

Changing Population Geography in South Asia

Economic Division in British India

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March, 2015

Institute of Developing Economies
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Changing Population Geography in South Asia^{*+}

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Abstract

This paper is an interim report for the study of *Economic Division in Colonial India*. The study is to delve further understandings of historical changes in population geography and economic geography in Indian subcontinent during 20th century. Based on the uncompleted database, it focuses on the feasibility of the study in Bengal region in particular with particular interests on the partition in Indian Subcontinent. On the course of constructing the database, this interim report shows some possible studies within the scope of this project.

* This work is a part of the project on “*Economic Division in Colonial India*”. As the title of this report shows, the project is still in progress and this paper includes very preliminary results and analysis. Its contents may be modified based on the updated available data.

+ We would like to acknowledge Arif Khan and his team for his excellent research assistance for data entry.

1. Introduction

International borders split spaces into different countries and add obstacles for international transactions. The emergence of international borders in South Asia, where it was British India until 1947, made substantial changes and has formed different countries. This region is unique because it has been extensively censused since 1873.

The impact of economic division is not negligible and can be observed at present. For example, Dhaka, capital city of Bangladesh, has several manufacturing industries but these industries appeared after the partition from India and succeeding independence from Pakistan. Until the partition, Calcutta was the largest international port. Since the regions of Bangladesh are relatively near to Calcutta, they had served as its hinterland and it means the growth of manufacturing industries was economically prevented. After the partition, the centripetal force, in the other words agglomeration force, of Calcutta was weakened and East Bengal was released from this force. Then, Dhaka could start absorbing the abundant economic benefit and increased its potential. The history of Dhaka and those of each manufacturing industry in Dhaka tell us how economic division was important for their growth¹. However, it does not tell the growth in the rest of Bangladesh nor the corresponding side of India such as West Bengal, Assam and Northeast India. It is also inferred that there would be similar phenomena emerged in India/Pakistan border. For any regions of British India, historical growth is directly or indirectly affected by the partition and independence. The quantitative impacts of economic division are crucial for its understandings of relations among competing regions within and between countries.

This paper is an interim report for the research projects on *Economic Division in British India*, whose purpose is to quantify above mentioned impacts of the

¹ During colonial period, jute was produced in East Bengal and manufactured in West Bengal. After the partition, the reactions by each region showed clear difference. East Bengal started their investment for manufacturing and West Bengal increased their cultivation. See Bharadwaj and Fenske (2012) and Tsubota (2014). For another example, leather manufacturing is found to grow in the same path in East Bengal. See Murayama and Tsubota (2014) in detail.

emergence of international borders in Indian Subcontinent.² The project covers not only colonial period but post-partition period, throughout 20th century, and not only British territory but native states. Based on the available database which has not been completed³, this paper focuses on the feasibility of the study in Bengal region in particular with particular interests on the partition in Indian Subcontinent. On the course of constructing the database, this interim report shows some possible studies within the scope of this project.

1901	1911	1921	1931
India	4	2	2
Ajmer-Merwara	2		1
Andaman & Nicobar Islands	1	1	2
Assam	2	2	2
Baluchistan	3	2	2
Bengal	4	4	3
Calcutta	4	3	2
Bezar	5	Bezar and Orissa	2
Bombay	6	3	4
		Cities of Bombay Presidency	2
		Western India States Agency	2
Burma	4	2	5
Central Provinces	3	2	2
Coorg	1	1	1
Madras	3	4	3
North-Western Provinces and Oudh	3	2	2
Punjab and North Western Frontier Province	2	2	2
		Punjab and Delhi	3
		Delhi	2
		United Provinces of Agra and Oudh	3
Baroda	3	2	5
Central India	3	1	3
Cochin	2	2	2
Gwalior	2	2	2
Hyderabad	1	2	1
Kashmir	2	2	3
Mysore	4	2	2
Rajputana	3	2	2
Tranvacore	3	2	3
		Rajputana and Ajmer-Merwara	2
		Tranvacore	3
		Jaipur State	2
		Mavrubhanj State	2
Total	49	49	73

Table 1. Number of Census volumes from 1901 to 1931⁴

While there are many attempts to study the population related studies within India and across Indian Subcontinent, for example Kingsley (1968) and others, most of the studies employ state level data. The difficulties accessing the

² This research project also considers the evolution of cities and economic geography by using remote sensing technique. Another paper by Keola and Tsubota (2015) is another preliminary attempt to construct colonial geographical information (GIS) and complement this study.

³ Due to the huge volumes of the census covering this region, the project faced difficulties in its construction of the database. It may be one of the reasons why our research question has not been extensively explored.

⁴ Some volumes are bounded in a book but counted as separate if numbered separately.

finer geographical data are in the availability of the database. In the colonial period, the figures at state level are available from the Census of India numbered as volume one which summarize the characteristics of each native states, and British territories. However, all of the district data and further detailed data in provincial tables are kept in different volumes for each administrative area. Simple number of the volumes covering the Census of India shows the efforts needed to collect the scattered tables (Table 1).

Additional difficulties are the separation of regions into different countries due to the partition and the subsequent independence as Bangladesh. As different sovereign countries, the censuses were conducted different manner. Until 1961, the population census for India and Pakistan took similar format as was in the colonial period. However, the following census after 1970s developed themselves in a simpler format, different aggregations, and different timing (Table 2). This change causes the loss of comparability in some articles.

	1951	1961	1971	1972	1974	1981	1991	1998	2001	2011
India	o	o	o			o	o		o	o
Pakistan	o	o		o		o		o		
Bangladesh	(As East Pakistan)				o	o	o		o	o

Table 2. Census held after 1947

Kingsley (1968) is one of the exceptions which cover India and Pakistan as a whole. However, as is pointed out by Schendel (2004), studies in the subcontinent are also partitioned by the international borders and the comparative studies of the regions in the subcontinent are rather scarce. Our project is to fill out this gap and try to provide the evidence of economic division. It would contribute to the impacts of partition and independence of parts of regions from integrated ones. It may offer some insights to the current discussions related with referendums in Scotland, Catalonia, Quebec and others. Also, if we have economic and regional integration in South Asia goes deeper, the comparative studies of population and economic geography of the past where regions were more integrated would show some predictions how future geography is similar or different from the one in the past.

The rest of the paper is organized as follows. Brief summary of the literature appears in Section 2. Section 3 examines the changing population geography by Theil index. Section 4 is discussions and some future studies covered in this

research project.

2. Literature review

On the economic division, there are two notable studies, Redding and Sturm (2008) and Nakajima (2008). Redding and Sturm (2008) is the first study to examine the impacts of division. Following division, Western German cities close to the new border with Eastern Germany went from being at the center of an integrated Germany to being on the periphery of West Germany. They find that the border regions suffer negative impacts from division of Germany and show lower population growth. Nakajima (2008) conduct the same methodology to Japan-Korean division after the World War II. He also finds similar results that western Japan, which is near to Korea, became to be periphery of Japan from the center of Empire of Japan.

In both studies, they only focus on one side of the divided regions. It is not natural to assume the impact be symmetric. It would be possible to have different impacts in both sides but such studies are not examined. Furthermore, while international border is a line to split space into two regions, the effect of the border might be different at place to place. Such analysis has not been done yet. Moreover, the relations among the cities got affected but detailed relations among neighbouring regions are also not analyzed, which means the impact on urban hierarchy. Our research project explicitly introduces interdependency of regions and observes the change of the dependency, as well.

There are related studies in India in particular. First set of studies share similar focus with ours, impacts of partition on population. Hill et al (2008) particularly examine the impacts in Punjab on demographic distribution. Bharadwaj, et al (2008) is the first to employ district data and examine the change in population between 1931 and 1951. They focus on the change in the composition of the attributing variables such as gender, education, and occupations. These are the studies on the immediate direct impacts of the migrations caused by the partition. However, there are some shortcomings the studies lacks, for example exclusion of the trends before and after partition, and the geographical position of the districts. More detailed analysis of occupation data similarly to the population would bring the explanations of rise in developments occurring post-partition.

Another set of studies considers the change of accessibility and its outcomes in space. Bharadwaj and Fenske (2012) examined the impacts in labour market of the migrants on wage, employment and production. They find the absorption of immigrants into jute cultivation smoothly contributed to the increase in its production and didn't harm the existing workers' working conditions. Donaldson (2014) examined the relation between price equalization and the advancement of railways in British India. The extension of railways reduces transport costs and accelerates the flow of information and goods. Thus it resulted in the equalization of price of goods.

3. Dynamics of population distribution in India

This section examines the population distribution at district level in India.⁵ During the early 20th century, the population growths in India were lower than those after partition. This is a trend commonly observed in the world (Figure 1).

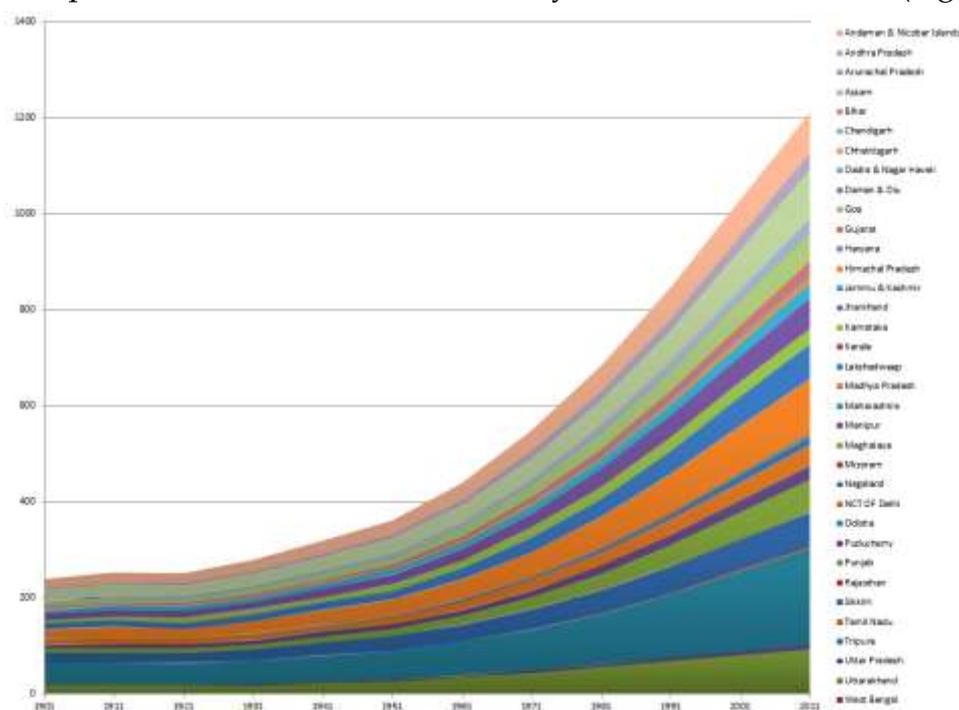


Figure 1. Population by Indian states in 1901-2001

For the trend of the composition, we calculate Theil index. This is an index

⁵ Our database is still not completed and our analysis is limited to the variables and regions where available.

to show the dispersion from the uniform distribution and has the property of decomposability. Since the administrative areas are in the space and are decomposable for any sub-administrative areas, this decomposability is a useful feature.

year	Overall	Between	Between/Overall (%)
1901	0.2789	0.1659	59.47%
1911	0.2607	0.1550	59.45%
1921	0.2532	0.1481	58.49%
1931	0.2461	0.1429	58.05%
1941	0.2514	0.1466	58.33%
1951	0.2630	0.1549	58.89%
1961	0.2613	0.1584	60.63%
1971	0.2581	0.1548	59.96%
1981	0.2599	0.1518	58.42%
1991	0.2633	0.1516	57.57%
2001	0.2709	0.1520	56.11%
2011	0.2781	0.1503	54.03%

Table 3. Theil Index of population in India

We use the data published as Decadal Variation in Population Since 1901 by Office of the Registrar General and Census Commissioner, India. There are mainly three types of cravats on the use of this data but all of the three are on the missing data.⁶ Firstly, there are no sub-state data but are total of state during the colonial period. Such examples are Delhi, Sikkim, Manipur, and Mizoram, even we have some disaggregates after partition and we use aggregated figures throughout the period of our analysis. Second, there is no census in Arunachal Pradesh State before 1961. Due to the impossibility of comparison before and after, we drop observations of districts and state in Arunachal Pradesh. Thirdly, there are some states, where some districts were governed by princely states or from other reasons there is no data during colonial period. We drop such districts and restrict our analysis for the comparable observations. Such states are Punjab, Haryana, Nagaland, and

⁶ The 1981 Census could not be held in Assam. The population figures for 1981 for Assam have been worked out by Interpolation by Census Registrar.

Assam.⁷

Table 3 shows the time series trend of the index. *Overall* indicates the overall Theil index and *Between* is disparities among states and territories. Between index shows decreased until 1931, increased to 1961 and turned to decrease afterwards. It suggests that there may be higher inter-state migration and/or changes in fertility behavior.

4. Dynamics of population in Bengal

4.1. Population disparity

In this section, particularly focusing on Bengal region, we compare the distributional change of population. East Bengal was former East Pakistan and is Bangladesh. The data of East Bengal is obtained from Statistical Yearbook of Bangladesh. West Bengal is the corresponding districts of the data used in the previous section. The analysis restricts data for West Bengal, India and Bangladesh as East Bengal.⁸ When there are districts which split from larger districts, we merged such districts with the one split from. For example, Jamalpur and Tangail are merged to Mymensingh and Patuakhali to Barisal. Data for Western districts are the same source as in the previous section.

Over a century, Figure 2 shows the populations of East Bengal and West Bengal have grown in the same trend.

⁷ In the revision of our paper, it would be needed to compare how Theil Index changes for the period we have data as a part of robustness check. If we have significant correlations between pre and post partition period, the Theil Index of the colonial period can be calculated.

⁸ However, our future revision doesn't exclude the inclusion of Assam and other neighbouring regions.

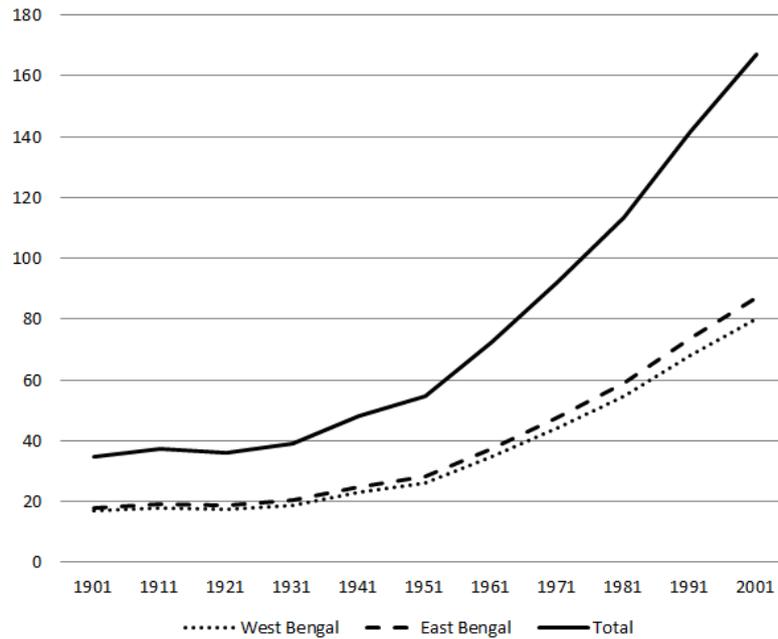


Figure 2. Population of Bengal in 1901-2001

With closer look of the population growth at district level and with comparison before and after the partition, districts can be classified into two types. Some changed their trends and the others followed the same trends. The effects and non-effect of the partition is the interests of this paper. A timer-series comparison of the population distribution is shown by Theil Index as in Table 4. The comparison between East and West shows that relatively higher disparity of population is observed in East Bengal over time. Disparity between East and West increased from 1901 to 1931 but suddenly decreased until 1961. After the jump to 1971, disparities between East and West are steadily decreasing. The lower figure in 1961 is doubtful and should be checked again.

year	West Bengal	East Bengal	Between	Overall
1901	0.04730	0.05641	0.05322	0.16177
1911	0.04269	0.06198	0.05488	0.16785
1921	0.04319	0.06408	0.06649	0.18353
1931	0.04424	0.06728	0.06684	0.18902
1941	0.05579	0.06631	0.05077	0.17837
1951	0.06043	0.06751	0.04077	0.17276
1961	0.05550	0.06462	0.02918	0.15312
1971	0.05264	0.06089	0.04237	0.16014
1981	0.05138	0.06013	0.04091	0.15670
1991	0.05237	0.06227	0.03798	0.15711
2001	0.05214	0.05733	0.03353	0.14592

Table 4. Theil Index of population in Bengal

4.2. Partition of Bengal

Before going to the further analysis, we put short explanation of the emergence of international border in Bengal. In the 1930s, the movements for the independence increased and in the 1940s, political parties of Hindus and Muslims started to argue how to demarcate the regions. Bengal Boundary Commission was assigned and considered demarcation proposal based on the majority of the regional groups, Hindus or Muslims. The principle of the demarcation was majority. It should be noted that the scale of the regions was influential. With employing the smaller administrative units, the majority regions may be tangled each other. Even at Thana (sub-district) level, it was evident that the simple principle of majority brought the boundary much more complicated than current one because there were some Hindu majorities regions in East Bengal and Muslim majority regions in West Bengal.

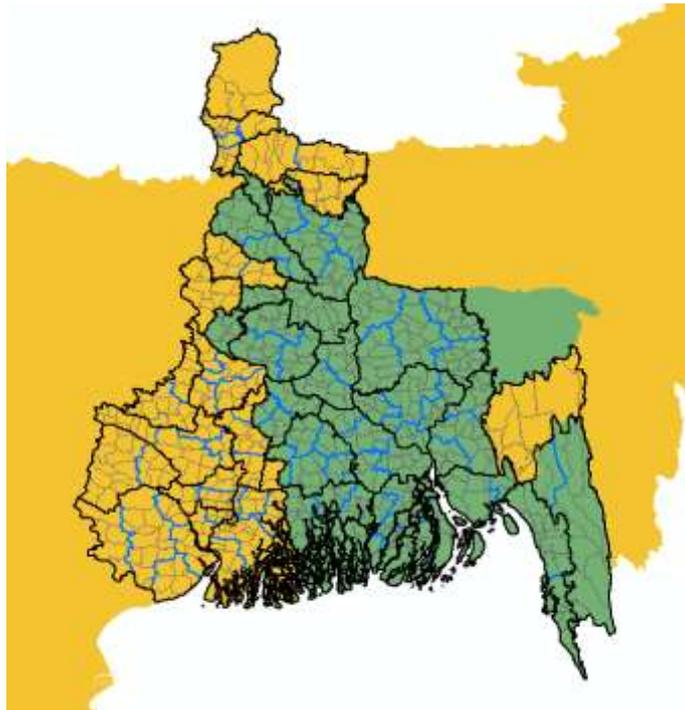


Figure 3. Sub-district of Bengal with current international borders⁹

Figure 3 shows the boundary of administrative units at 1931 and the current national boundary. While each Bengal is plainly colored, each region experienced different growth. It may also be related with the different effectiveness and tensions of international borders. Schendel (2004) pointed out that Indo-Bangladesh border is not uniformly effective, which suggests that the impacts of the partition would also be different among regions. The border is drawn in one long line surrounding Bangladesh. However, the meaning and the influence of the border doesn't have to be uniform. These points may be examined in the analysis by changing the definition of effective border.

⁹ Sub-district maps appeared in Census of India (1931), Vol. V, Part I, by each division with the name list. Unfortunately, such detailed maps and list only appeared for Bengal and not for other states. Even for Bengal, maps in the other years are not as precise as those in 1931.

Country	Variables	Obs	Mean	Std. Dev.	Min	Max
India	Population in1901	19	891583.6	375863	265780	1528283
	Population in1911		947303.6	374616.4	279899	1537618
	Population in1921		919702.5	363528.3	294237	1453390
	Population in1931		994580.8	397930	332061	1575694
	Population in1941		1222608	558905.6	383042	2352399
	Population in1951		1384209	674316.4	448275	2956475
	Population in1961		1838225	848893.3	563598	3351250
	Population in1971		2332211	1053139	772618	4207420
	Population in1981		2872666	1290682	989294	5529497
	Population in1991		3583051	1641352	1230608	7281881
	Population in2001		4219800	1950997	1503178	8934286
	Distance to Kolkata		118.5618	93.47873	0.0002339	311.8558
	Distance to Dhaka		183.4152	39.0399	124.1617	265.6049
	Distance to vertical border		68.24082	39.1105	11.48794	152.6644
Distance to Northern border	56.89216	38.26451	11.48794	152.6644		
Bangladesh	Population in1901	17	1730828	841810.8	124000	3914000
	Population in1911		1858815	975380.3	154000	4526000
	Population in1921		1938411	1040860	173000	4838000
	Population in1931		2084072	1164375	213000	5130000
	Population in1941		2335561	1302380	247000	6024000
	Population in1951		2466597	1345948	287000	5785000
	Population in1961		2990545	1607010	385000	7018000
	Population in1971		4204588	2191839	508000	9645000
	Population in1981		5124529	2676812	751000	11500000
	Population in1991		6254294	3370272	975000	14000000
	Population in2001		7115824	3701095	1333000	17200000
	Distance to Kolkata		167.3557	58.43444	70.64081	276.7015
	Distance to Dhaka		93.93658	43.94551	0.000181	172.2462
	Distance to vertical border		92.8023	58.57023	22.94541	211.8623
Distance to Northern border	92.8023	58.57023	22.94541	211.8623		

Table 5. Summary statistics

4.3. Methodology

For the estimation, we compare the change of the trends in population growth by employing difference in difference method. Following the specification of Redding and Sturm (2008) and Nakajima (2008), our regression equation is written as,

$$\Delta \ln pop_{rt} = \sum_{i=1}^N \delta_i \eta_i + \sum_{i=1}^N \theta_i Border_i + \epsilon_{ri},$$

While there is only one international border emerged, in 1940s there were

wider discussion in the choice of this international border including the above mentioned majority principle. By changing the affected regions, we may consider the impact of partition as a sensitivity analysis. Since some of the variables related with border is not prepared, we cannot examine further analysis at this stage. However, in the following fiscal year, with the complete dataset, we should be able to analyze such impacts. Not only difference in difference method, but also regression discontinuity design may be useful when we have larger samples.

5. Discussion and future directions

Population geography in Indian Subcontinent is not well explored because of the less data on fertility and huge collection of census covering entire regions with split by the international borders. The international border split not only the regions in continuous space but also the academic studies. The comprehensive set of the data at both sides allows us to see the evolution after the partition.

The emergence of international border in Bengal is a unique event. The region is equipped with well-established population census and the political discussions on partition are extensively analyzed by Indian Historians until today. However, still the quantitative analysis of the impact of partition is left aside. Our research project comes into this knowledge gap to fill out.

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