

ECONOMIC GROWTH ANALYSIS OF SIX DIVISIONS OF BANGLADESH USING LOCATION QUOTIENT AND SHIFT-SHARE METHOD

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Abstract

The structure and performance of industrial sectors of a region is an impelling factor in determining the growth of a region's economy. In Bangladesh, a great heterogeneity in economic growth exists among different regions along with the administrative divisions. This study investigates the short run and long run spatio-temporal variation of regional economies of the six divisions of Bangladesh. Location Quotient and Shift share method have been employed with gross divisional product and gross domestic product at constant price for the year 1995-96 to 1999-2000 as parameter. The comparative analysis of the six divisions reveals that Fishing and Construction sector have been the most flourishing industries and Real Estate, Renting and Business activities has been lagging for all the six divisions during the timeframe. Barisal district is in economic malaise relative to the other divisions and hence requires special attention to be in pace of consistent economic growth.

Key words: Location Quotient (LQ) Analysis, Regional Economic Growth, Shift Share Method.

Introduction

The economy of a region predominantly depends on the strength and weakness of different industries existing within it, the dynamics of industrial structure and its unique regional factors. Geographic and locational aspects are the paramount underlying factors contributing in the flourishing of different sectors in particular regions.

The six divisions of this study are enriched in different sectors due to geographical and administrative factors. Dhaka, being the capital and administrative hub of the country mainly specializes in secondary and tertiary activities whereas Rajshahi division's economic base is mainly dependent on agriculture (Hossain, 2013: 370; BBS, 2013a:7). Fishing is the most thriving sector in Khulna, Chittagong and Barisal because of the entwining rivers, canals and the Bay of Bengal at the southern coasts (BBS, 2013b:6; BBS, 2013c:6; BBS, 2013d:6). Sylhet relies on stone quarrying and mining for its economic base (Khoda, 2007: 1; Haq and Gomes, 2001: 154). This paper tries to identify if the distribution of GDP in different sectors of the divisions actually complies with these location attributes in the stated timeframe (1995-2000). It also attempts to explore the regional variation in distribution of GDP in six divisions with a view to identifying the thriving and lagging sectors and also quantifies how much of the growth of an industry of a region is attributable to national growth and how much is proliferated by location factors.

Methodology

Location Quotient and Shift Share method are two simple and widely popular techniques for regional development giving pertinent insights into economic changes (Hodgkinson, 2005: 299). Location Quotient is a method for short run regional analysis of economic structure of a region which helps to quantify how concentrated a particular industry, cluster or occupation is in a region compared to the nation (Mack and Jacobson, 1996: 6). On the other hand, shift share analysis proposed by Dunn (1960), is used to decompose variations in different economic indicators. With this method it can be ascertained how

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much of regional growth can be attributed to national trends and how much is due to unique regional factors (Esteban, 1999: 4).

LQ calculation

Location Quotient method helps to identify the basic and non-basic industries of a region where basic industries imply to industries which can export their product outside the regional territory after meeting their demand within the region and drive export income inside the region. The non-basic sectors are those which serve the need of the local community and are primarily local in their productive and marketing scope. Location Quotient with a value greater than 1 defines a sector as basic and a value less than 1 infers a sector as non-basic.

The location quotients (LQ) for different sectors of six divisions have been calculated for the five time intervals: 1995-96, 1996-97, 1997-98, 1998-99 and 1999-2000.

Location Quotient for each industry in a region has been derived from the following equation:

$$LQ = \frac{\text{Percentage of Regional GDP in industry } i}{\text{Percentage of National GDP in industry } i}$$

Where $i = 1, 2, 3 \dots n$

Economic base multiplier estimation

The economic base multiplier has been calculated afterwards using the equation below for different time intervals:

$$\text{Economic Base Multiplier} = \frac{\text{Total GDP in basic and non basic industry}}{\text{Total GDP in basic industry}}$$

Economic base multiplier is calculated by dividing the total GDP or employment in both basic and non-basic sector by GDP or employment in the basic sectors (Glasson, 1974:64).

Calculation of shift share components

In Shift Share method of long run regional analysis, economic growth is explained by the combined effect of two components: shift component and share component. National share component explains how much of the regional industry's growth is explained by the overall growth of the national economy. If the entire economy is uprising, there should be positive change in each industry in local regions also. Shift components are deviations in regional economic growth from the national share. The shift component can be subcategorized as Proportionality shift component and Differential shift component.

Proportionality shift component (also known as Structural or Industrial Mix Component) identifies fast growing or slow growing industrial sectors in a local area based on the national growth rates for individual industrial sectors. The component is positive in areas specializing in nationally fast growing sectors and negative in areas specializing in nationally slow growing sectors.

Differential shift component (also known as Regional shift component or Competitive effect) is the most important factor. It compares a local area's growth rate in an industry sector with the growth rate for that same sector at national level. The leading and lagging industries of the region can be sorted out which have positive and negative differential shift components respectively. A region with location advantage for a specific industry would yield positive differential component and vice versa (Glasson, 1974:92).

The shift share component for each industry in the three regions have been determined using the following formulas:

$$\text{National Share, } N_j = \sum [E_{ij_o} (E_t/E_o) - E_{ij_o}]$$

$$\text{Proportionality Shift Component, } P_j = \sum [(E_{jt}/E_{io}) - (E_t/E_o)] E_{ij_o}$$

$$\text{Differential Shift Component, } D_j = \sum [(E_{jt}/E_{ij_o}) - (E_{jt}/E_{io})] E_{ij_o}$$

$$\text{Total Regional Growth, } G_j = E_{jt} - E_{j_o} = N_j + P_j + D_j$$

Total Net Shift Component, $(P+D)_j = E_{jt} - (E_t/E_o)E_{jo} = G_j - N_j$

Where, E_j = total employment in region j;

E = total national employment

o, t = initial and terminal period;

i = industry subscript

Identification of fast growing and slow growing sectors

In the above equations, if the proportionality shift component is found to be positive, the region is specialized in nationally fast growing sectors and if this component is negative, the region is specialized in nationally slow growing sectors.

Identification of leading and lagging sectors

The leading and lagging sectors of a region are identified from the differential shift component. The leading sectors for a region have been identified by the positive differential shift component and the lagging sectors have been identified by the negative differential shift component. Positive differential shift component for an industry implies the region has advantage (e.g. natural resources, favorable location and an efficient labor market) for flourishing of the industry. Differential shift component with negative value means there exists location disadvantage for the industry to grow in the region.

Analysis of Economic Growth Pattern of the Divisions

Scenario of Basic Sectors in Different Divisions

From the analysis of Location Quotient, basic and non-basic sectors for each of the divisions are sorted out. Then the Economic Base Multiplier is calculated for each divisions. The analysis mainly focuses on the basic sectors of different divisions because these sectors have export orientations which contribute to increasing GDP for that particular division.

Table 1: Gross Divisional Product by Industry at Constant Market Prices, 1999-2000

Divisions Economic Sectors	GDP in Million TK					
	Barisal	Chittagong	Dhaka	Khulna	Rajshahi	Sylhet
Agriculture and Forestry	28136	61664	96549	57823	115156	25342
Fishing	16408	33461	27090	18118	18664	6278
Mining and Quarrying	1130	8537	1499	1318	1273	6518
Manufacturing	4559	60548	178019	23332	29818	7403
Electricity, Gas and Water Supply	1211	4666	12980	2430	5128	1841
Construction	10051	27090	49938	18868	40235	8408
Wholesale and Retail trade	13772	52270	110044	29551	46391	11255
Hotel Restaurants	556	2643	5344	1397	2114	420
Transport, Storage and Communication	8577	37937	78514	20130	28901	7364
Financial Inter mediations	1206	5672	15070	2668	5010	1354
Real Estate, Renting and Business activities	9687	31526	65842	19698	40662	7576
Public Administration and Defense	2183	8451	25723	4678	7464	1762
Education	3614	7680	12170	5277	12428	2254
Health and Social Works	2741	8602	14481	5075	9980	2467
Community, Social and Personal Services	4064	31455	48824	19050	39560	10284

Source: BBS, 2006

Table 2: Sector wise LQ value and Basic and Non Basic sectors in 1999-2000

Industrial Sectors	Barisal	Chittagong	Dhaka	Khulna	Rajshahi	Sylhet
Agriculture and Forestry	1.32	0.81	0.66	1.27	1.44	1.27
Fishing	2.46	1.42	0.59	1.28	0.75	1.01
Mining and Quarrying	1.01	2.14	0.19	0.55	0.31	6.23
Manufacturing	0.27	1.01	1.53	0.65	0.47	0.47
Electricity, Gas and Water Supply	0.77	0.84	1.20	0.73	0.87	1.25
Construction	1.27	0.97	0.92	1.12	1.36	1.14
Wholesale and Retail trade	1.01	1.08	1.17	1.02	0.91	0.89
Hotel Restaurants	0.87	1.15	1.20	1.02	0.87	0.70
Transport, Storage and Communication	0.85	1.06	1.13	0.94	0.77	0.78
Financial Inter mediations	0.70	0.93	1.27	0.73	0.78	0.84
Real Estate, Renting and Business activities	1.00	0.91	0.98	0.95	1.12	0.84
Public Administration and Defense	0.78	0.85	1.34	0.79	0.71	0.68
Education	1.50	0.90	0.73	1.03	1.38	1.00
Health and Social Works	1.14	1.01	0.87	0.99	1.11	1.10
Community, Social and Personal Services	0.46	1.00	0.80	1.00	1.19	1.24

*Red indicates the Basic sectors and Black indicates the Non-Basic sectors.

Source: Authors, 2015

It can be observed from Table 1 that divisions have different combinations of basic and non-basic sectors based upon their location advantage, growth of national sector and growth of the overall economy. For example, Sylhet is specialized in Mining and Quarrying sector due to location advantage of this region (LQ value 6.23). Fossiliferous limestone, Laterite and Carbonaceous Shale are the rock and minerals excavated only in Sylhet district (Khoda 2007:2). Again Barisal is a coastal division that depends on its Fishing sector showing an LQ value of 2.46 (Table 2). About 42544 households are engaged in fish culture and 4230 households are in fish capture in Barisal (LGED, 2009: 18). So the economy of Barisal is mainly based on fishing sector.

Table 3: Economic Base Multiplier for the Division in Different Time Periods

Location	Economic Base Multiplier				
	1995-96	1996-97	1997-98	1998-99	1999-2000
Barisal	5.15	5.24	5.22	5.29	5.31
Chittagong	18.69	18.32	17.83	18.39	17.60
Dhaka	7.46	7.48	7.46	7.42	7.42
Khulna	14.02	12.45	12.41	12.30	11.97
Rajshahi	6.60	6.59	6.42	6.48	6.59
Sylhet	6.90	6.90	6.72	6.90	6.89

Source: Authors, 2015

From the value of economic base multiplier for the six divisions it can be easily identified that the multiplier is highest for Chittagong division and lowest for Barisal division. It indicates that there is a greater demand for the export oriented goods of Chittagong which in turn increases the local GDP. But for Barisal division, the demand for basic products is not as high as other divisions. It has a very low contribution of GDP in Transportation, Storage and Communication that makes it difficult to improve its export orientation (Table 1).

Overall Scenario of Shift Share Components of Six Divisions

The national share of each sector is driven by the cumulative effect of overall national GDP which increased during the study year 1995-96 to 1999-2000 (BBS, 2006: 480-485). The figure below shows the result of national share component that substantiates the GDP increase with positive values in each industrial sector.

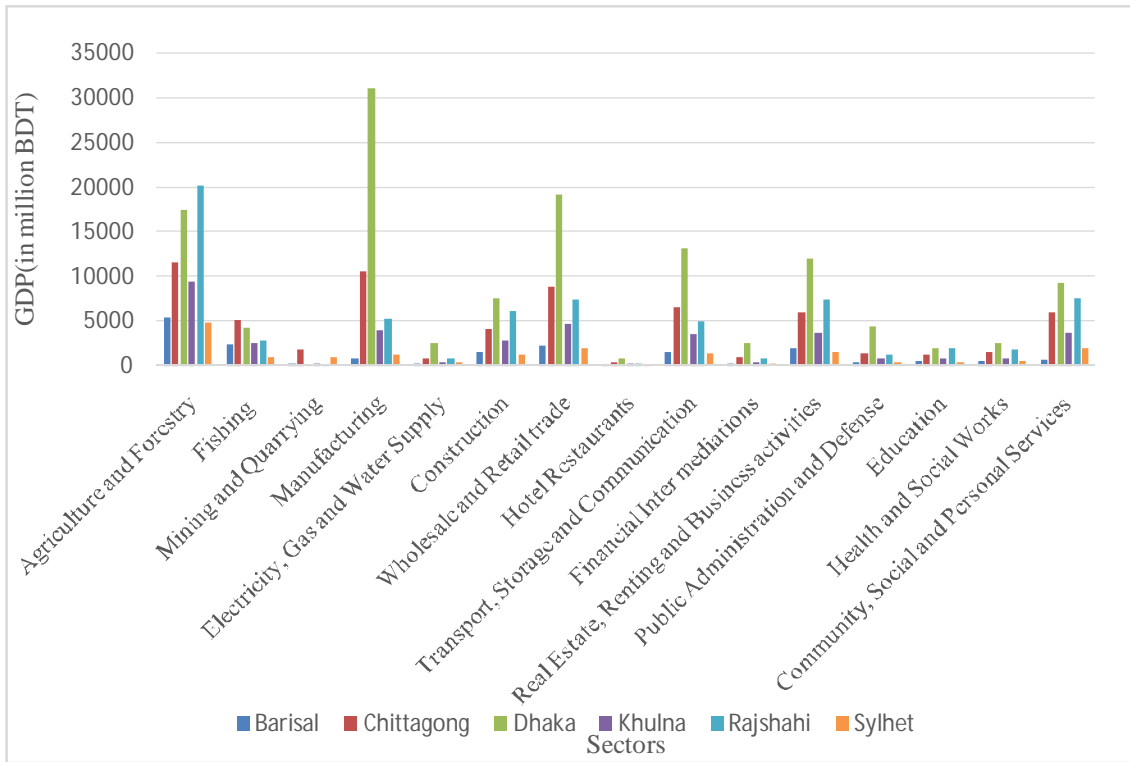


Figure 1: National Share of Different Sectors in Six Divisions from 95-96 to 99-2000
 Source: Authors, 2015

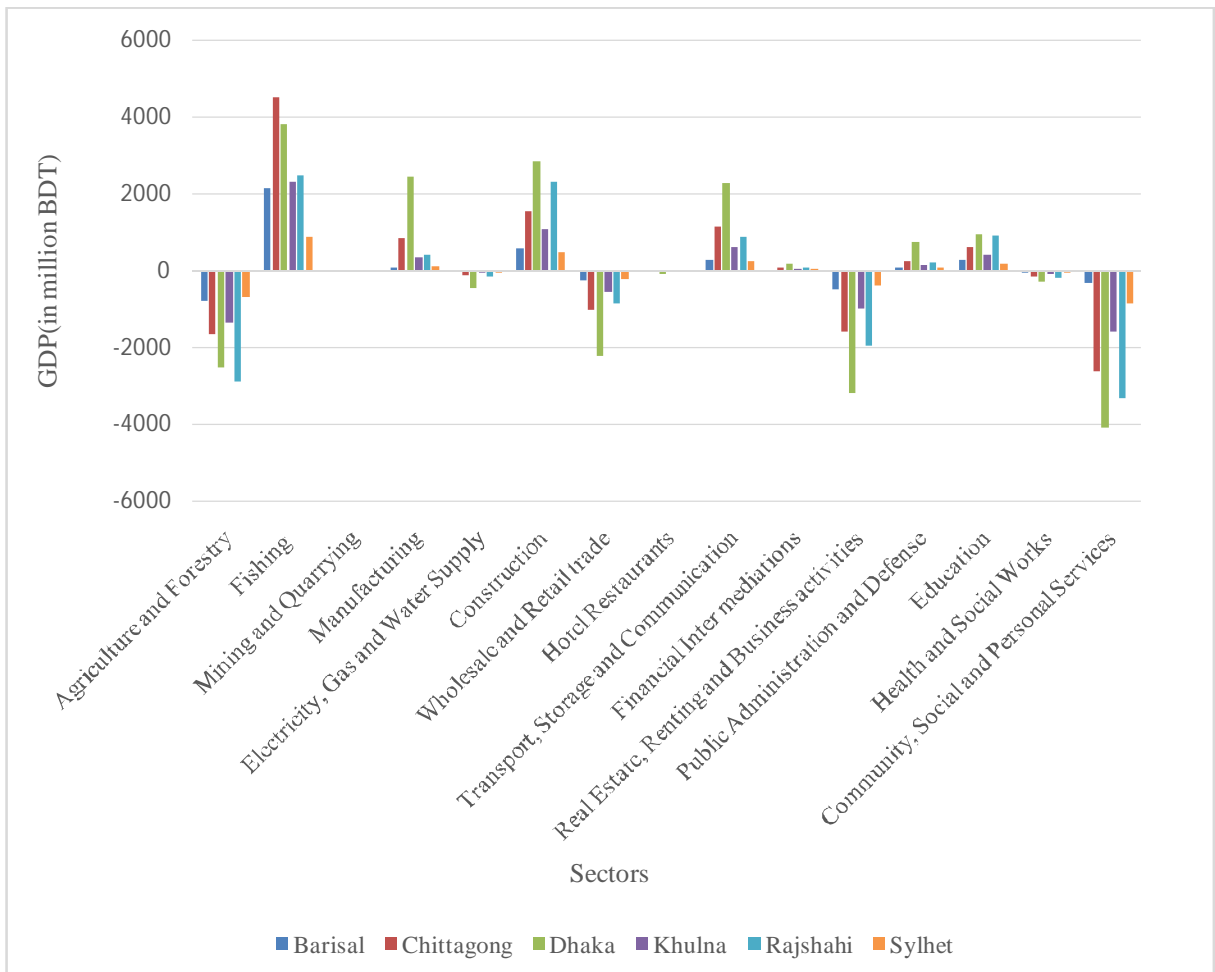


Figure 2: Proportionality Shift of Different Sectors in Six Divisions from 95-96 to 99-2000
 Source: Authors, 2015

The Proportionality Shift component for sectors like Agriculture and Forestry, Wholesale and Retail Trade, Real Estate Renting and Business Activities, Community, Social and Personal Services are showing a declining trend as these sectors are not growing as fast as the national average. On the other hand, sectors like Fishing, Construction, Transportation, Storage and Communication and Education are growing faster than the national average.

Fishing, Construction, Manufacturing, Wholesale and Retail Trade and Education are the sectors that are performing well in all the six divisions for the unique advantage that each division possesses. According to a report by Hoek-Smit (1998:5) the housing sector has contributed to 7% of the constant GDP growth while the service sector contributed to 50% of total GDP with a growth rate of 6.5% during 1996. The housing sector was going through a recession period because of lack of long term investment and inadequacy of Annual Development Program (ADP). Service sector has undergone a slow growth from 3.71% in 1981-90 to 5.67% during 2001-05 for Bangladesh (CUTS International, 2008: 1). The growth rate has slowly increased due to major policy changes related to industrial policy, trade policy, monetary and fiscal policy, exchange rate policy and promotion of foreign direct investment.

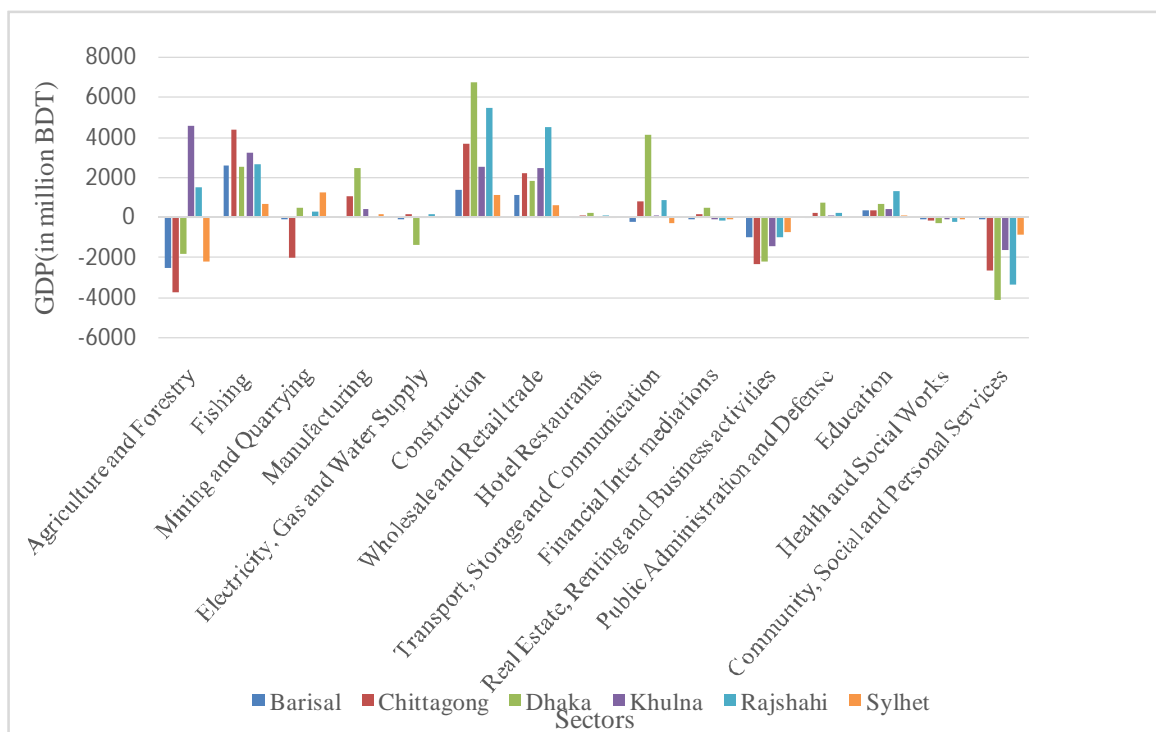


Figure 3: Differential Shift of Different Sectors in Six Divisions from 95-96 to 99-2000

Source: Authors, 2015

Comparative Scenario of Short Run and Long Run Economic Trend

LQ bubble graph has been used to see the variations in short run and long run economic trend of the six divisions (Figure 4). LQ bubble is a graphical technique developed by Purdue University to see LQ percent change of different industrial sectors over time (EMSI, 2015: 2). The area of bubble is defined by the value of constant GDP during 1999-2000. The bigger the bubble, the higher the GDP contribution of the sector.

According to the LQ analysis of Barisal division, Fishing, Education, Construction and Wholesale and Retail Trade have positive LQ change over the years from 1995 to 2000. Fishing Sector is a leading industry for Barisal with an LQ value of 2.46 in 1999-2000.

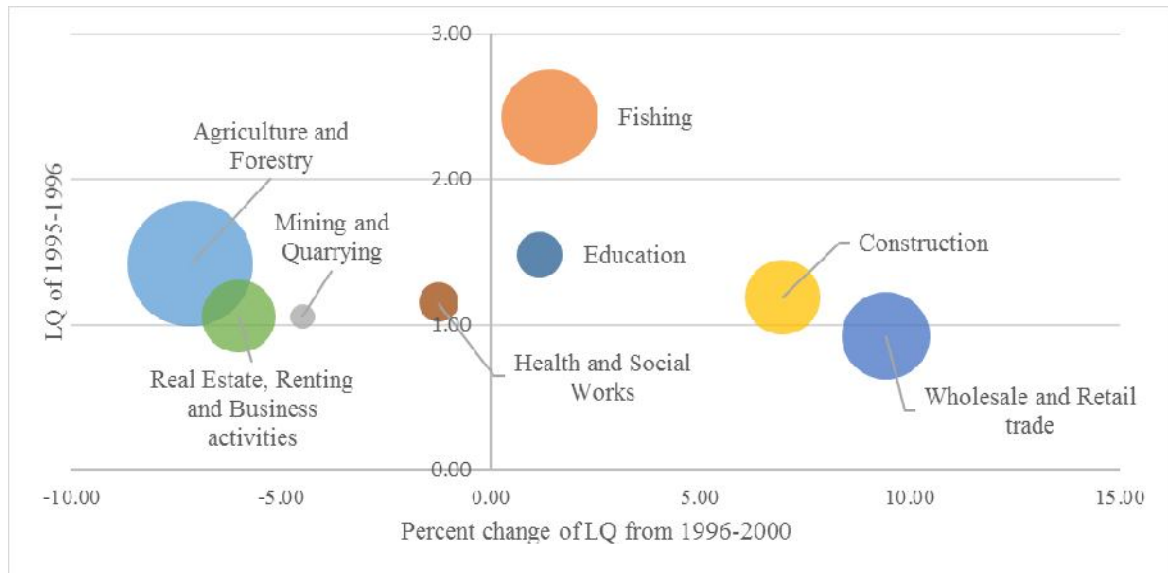


Figure 4: Percentage Change of LQ among Different Basic Sectors of Barisal Division

Source: Authors, 2015

But the region is falling behind as Agriculture and Forestry is aggravating rapidly (Figure 4). Differential Shift is found to be positive for Fishing sector as it outperforms the national trend and negative for Agriculture and Forestry (Table 4).

Table 4: Shift Share Components of GDP (Million TK) of Basic sectors of Barisal division

Industrial origin sector	Regional growth	National Share	Proportionality Shift	Differential Shift
Agriculture and Forestry	2930	5438.34	-786.24	-2508.34
Fishing	5029	2455.09	2138.97	2573.91
Mining and Quarrying	157	209.93	-0.88	-52.93
Construction	2899	1543.09	570.79	1355.91
Wholesale and Retail trade	3359	2246.67	-260.79	1112.33
Real Estate, Renting and Business activities	922	1891.10	-500.99	-969.10
Education	439	496.67	-56.49	-57.67
Health and Social Works	685	729.04	-317.98	-44.04

Source: Authors, 2015

For Chittagong, Mining and Quarrying sector has the highest LQ value and thus it remains as a highly-demanded sector for its export orientation (Table 2). But when the economy is observed in the long run, the sector showed locational disadvantages in Chittagong (Differential Shift of -2008.47 Million TK). Agricultural and Forestry has the highest GDP value in Chittagong Division (Table 1). But it is a non-basic sector in Chittagong. The differential shift (-3693.82 Million TK) construes that the sector is not performing well in the long run.

Sylhet division can be portrayed with the same scenario. Mining and Quarrying sector dominates the region's export orientation with LQ value of 6.23 (Table 2). But the Agriculture and Forestry sector is exacerbating for the inadequacy of regional factors (Differential Shift of -2182.71 Million TK).

Dhaka division is flourishing mainly for its Manufacturing sector (Table 1, 2 and 5). Two non-basic sectors (Construction and Real Estate, Renting and Business Activities) have potential of becoming basic sectors with LQ values close to 1 (Table 2).

Table 5: Shift Share Components of GDP (Million TK) of Basic Sectors of Dhaka Division

Industrial origin sector	Regional growth	National Share	Proportionality Shift	Differential Shift
Manufacturing	33616	31155.79	2448.031	2460.21
Electricity , Gas and Water Supply	1187	2544.41	-457.339	-1357.4
Construction	14406	7666.24	2835.753	6739.76
Wholesale and Retail Trade	21045	19202.05	-2228.95	1842.95
Hotel and Restaurants	1153	904.23	-97.9087	248.767
Transport, Storage and Communication	17304	13206.42	2258.058	4097.58
Financial Inter medication	3079	2587.13	180.1721	491.872
Real Estate, Renting and Business Activities	9869	12076.50	-3199.3	-2207.5
Public Administration and Defense	5167	4435.08	732.4551	731.923

Source: Authors, 2015

The Greater Dhaka Urban Region (GDUR) has the largest concentration of manufacturing industries in the country and in spatial context, location, finance, infrastructure, transportation and management services create advantages in urban centers for industrialization (Islam and Hossain, 2013: 1). The differential shift component also suggests that Construction sector is increasing profoundly for its thriving local advantages (Table 5). But Real Estate, Renting and Business Activities is not getting the native advantages that it needs to become a basic sector.

In Rajshahi division, Agriculture and Forestry has the highest contribution of GDP compared to other divisions (Table 1). It also has locational advantages like relevant geographic condition, transport facilities, provision for agricultural processing industries etc. which make it a leading industrial sector. Construction sector is also burgeoning with the momentum from the local factors (Table 6).

Table 6: Shift Share Components of GDP (Million TK) of Basic Sectors of Rajshahi Division

Industrial origin sector	Regional growth	National Share	Proportionality Shift	Differential Shift
Agriculture and Forestry	21663	20171.66	-2916.29	1491.34
Construction	11607	6176.66	2284.76	5430.34
Wholesale and Retail Trade	11937	7433.65	-862.89	4503.35
Real Estate, Renting and Business Activities	6416	7388.77	-1957.43	-972.77
Education	3274	1975.03	901.21	1298.97
Health and Social Works	1581	1812.13	-206.10	-231.13
Community, Social and Personal Services	4291	7609.49	-3319.02	-3318.49

Source: Authors, 2015

For Khulna division, according to the differential shift components, Agriculture and Forestry, Fishing, Construction and Wholesale and Retail are the flourishing sectors whereas Transportation, Storage and Communication and Real Estate, Renting and Business Activities are the main lagging sectors (Figure 5).

Fishing sector has a prominent role in the economy of Khulna division. Shrimp is a major export product of Bangladesh which is preponderant in Jessore, Khulna and Satkhira district (BBS, 2013b:6).

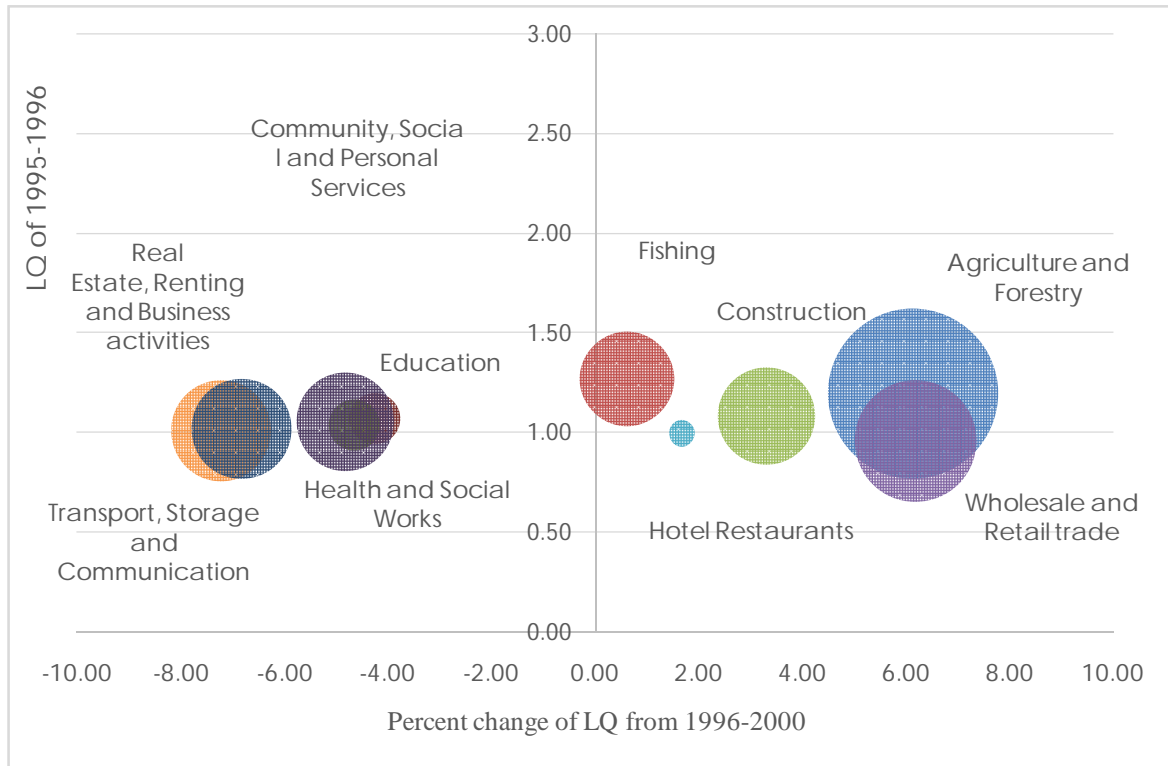


Figure 5: Percentage Change of LQ among Different Basic Sectors of Khulna Division
Source: Authors, 2015

Table 7: Shift Share Components of GDP (Million TK) of Basic sectors of Khulna division

Industrial origin sector	Regional growth	National Share	Proportionality Shift	Differential Shift
Agriculture and Forestry	14003	9454.42	-1366.86	4548.58
Fishing	5869	2642.79	2302.51	3226.21
Construction	5443	2896.52	1071.43	2546.48
Wholesale and Retail Trade	7282	4804.67	-557.72	2477.33
Hotel and Restaurants	301	236.47	-25.60	64.53
Transport, Storage and Communication	3640	3557.81	608.32	82.19
Real Estate, Renting and Business Activities	2312	3751.13	-993.75	-1439.13
Education	1288	860.65	392.72	427.35
Health and Social Works	812	919.77	-104.61	-107.77
Community, Social and Personal Services	2066	3664.40	-1598.30	-1598.40

Source: Authors, 2015

Major Findings and Recommendations

From the analysis and interpretation of data a concluding remark can be deduced that Fishing and Construction sectors are dominating in all the division which need necessary policy actions to develop further. Real Estate, Renting and Business Activities is lagging for the fact that it is not getting enough reconciliation from the local authorities to improve which in turn is losing potential GDP.

Agriculture and Forestry sector needs to be further propagated as it has the highest GDP contribution in almost all the divisions of Bangladesh. The sector is in a vulnerable state for Barisal, Chittagong, Dhaka and Sylhet for the stated timeframe. A robust and holistic measure is needed to revive this sector for these regions. As Fishing and Construction sector seemed to be consistently flourishing for the six divisions during the timeframe, this needs more investment and government incentive to bring about more money in the economy. The export oriented industries in Dhaka, Chittagong, Khulna, Rajshahi, Barisal

and Sylhet are Manufacturing, Fishing, Agriculture and Forestry, Construction, Fishing and Mining and Quarrying industries respectively. The location specific thriving industries should be focused with meticulous consideration to uphold the regional economy. Chittagong is in a declining state with respect to Mining and Quarrying industry. If proper attention is given to the fact and required measures are taken, this industry can play significant role in the national and regional economy.

Concluding remarks

A nation's economy stands on its regions' economic sectors, their structures and efficient performance. From the critical analysis and discussion of the economic trend of all the six divisions, it can be stated that the overall economy is on an upswing with particular sectors promoting and the other sectors lagging behind in a region. The short and long run analysis of region specific sectors yield a comprehensive study of economic trend for the divisions of Bangladesh. However the unavailability of sector specific data for the regions after 2000 is a major limitation of the study. The findings of this study would be helpful for efficient decision making by providing an integrated and visionary insight.

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