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Short Run analysis of Regional Economic Structure using Economic Base Theory: Evidence from Six Districts of Bangladesh

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Abstract

The structure of the industrial sectors of a region is a driving factor to explain the growth of a region's economy. In Bangladesh, spatial variation in economic growth exists among different regions. A primary factor in this variation is the economic structure of the region, which can be characterized by basic and non-basic sectors. Economic base theory helps to understand how data can be used to study the economic development process and evaluate alternating development strategies. The aim of the study, thus, is to identify the basic and non-basic sectors using economic base theory and to explore the short-run regional economic structure in selected districts. Data of selected districts from economic census, 2003, and 2013 has been analyzed for thirteen sectors. The comparative analysis of the selected districts reveals that all of the districts except Bandarban are becoming economically weak during the timeframe. In contrast, Bhola district is in economic malaise relative to the other districts. The lagging behind the Transport, Storage, and Communication sector triggers to the disadvantaged economic condition for all the districts during the timeframe. The findings of this study would act as a reference for regional planners to allocate resources in different economic sectors of these districts.

Keyword: Economic structure; economic base theory; industry; basic and non-basic sector

1. Introduction

The regional economic structure is defined as the composition and patterns of various components of the regional economy, such as production, employment, consumption, trade, and gross regional product (Thakur et al., 2012). The regional economic structure is useful for explaining regional economic change, predicting the implications of economic decisions and planning (Glasson, 1974). Strength and weaknesses of different industries and its structure shape a region's economy (Islam et al., 2015). Usually, a region's economy develops when the sectors of the region develop with time. An increase or decrease in regional economic activities shape the regional workforce, regional business, and governments. Hence, different professional groups i.e., land-use planners, transport planners, economic development planners, have to consider different aspects of the economic activities at a different geographic level. For example, land-use planners have to think of the location of new industries, while economic development planners would

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study how a change in economic activities would impact employment, income, and industry output.

Regional economic theories explain the changes in the economy by evaluating the interrelationships of sectors within the regional economy (Rahman et al., 2018). Through regional economic theories, both short and long-run changes in the regional economy can be explained. There are a series of economic theories to explain short-run changes in the regional economy. The economic base theory is the simplest, and probably the most well-known (Glasson, 1974). Economic base theory helps to understand how the regional economy works and how economic development affects the regional economies (Wang et al., 2008). In 1659, Pieter De la Court, a Dutch Cloth merchant, first introduced the idea of the economic base through his study on the prosperity of his home city, where he mentions that the wealth of his home city is the result of the city's export-oriented industries. After that, Werner Sombart, a German political scientist, coined the two terms, one of which is "Town builders" and "Town Fillers" in 1933. Werner Sombart mentions, "town builders leverage a town's prosperity by means of trade whereas town fillers provide the goods and services that are locally demanded. The first inclusion of Economic base theory in book chapters was done by Homer Hoyt and Arthur Weimer in 1939, who presented the economic base theory as a methodological approach to determine basic and service employment ratio. Later, in 1962 Charles Tiebout shows the relationship between the economic base multiplier and Keynesian multiplier used by economists, which brings the credibility of economic base theory to the academics. However, critics find that the economic base model is static and demand-oriented as the model ignores the effect of the supply.

Regional economy comprises three economic agents, i.e., firms and businesses, households, the government. The circular flow of income and expenditure take place in the form of the commodity market, financial market, and factor market. The flow of income and expenditure would ultimately lead to quantifying the gross regional product (GRP). Another way of analyzing the level of regional economic activities is through valued-added GRP, which is nothing but a summation of total wages, interest, rent, and profit from the factors of production. The economic base theory identifies the level of economic growth through the amount of the region's export activities. The economic stimulus of a region will be greater if the region has a larger external demand for its goods and services. According to the economic base model, the regional economic activities can be subdivided into two sectors: basic sectors and non-basic sectors. Basic sectors or activities are those who sold regionally produced goods and services to people and businesses outside the economic boundary of the community. These sectors not only count the goods and services leaving the region but also includes the products which are consumed by the people out of the regions where the products are produced. For example, for a hotel in a particular region can be considered a basic one as the tourists would pay the money earned from other regions. Non-basic activities or sectors are those sold regionally produced goods and services to people and businesses inside the economic boundary of the community. For example, grocery stores can be considered a non-basic sector.

There are both direct and indirect methods that can make the identification of basic and non-basic sectors. The indirect method includes- Assumption or Arbitrary method,

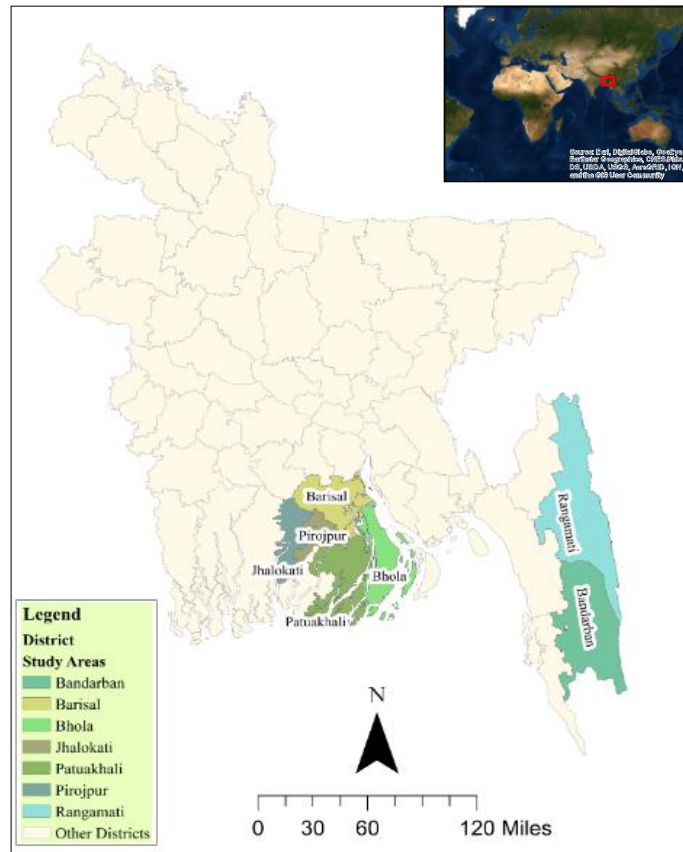
Location Quotient (LQ) method, and the Minimum Requirement Method (Glasson, 1974). The location quotient (LQ) method is a widely used method to identify basic and non-basic sectors. LQ method was first used by Haig (1926) and derived from his work on the economic base analysis (Glasson, 1974). LQ is a way of quantifying how concentrated a particular industry, cluster, occupation, or demographic group is in a region as compared to the nation (EMSI, 2015). Empirically LQ demonstrates how strongly an industry is represented in a region and has been used to quantify and identify numerous spatial phenomena, including the presence of industrial complexes, industrial specialization, and regional industrial clusters (Morrissey, 2014). Besides, LQ seeks to identify the “export orientation” of an industry and the most export-oriented industries in the region, emerging export industries beginning to bring money into the region, and endangered export industries that could erode the region’s economic base (EMSI, 2015).

The economy of Bangladesh has experienced both macroeconomic stability and robust economic growth following the transition to a democratic rule in the early 1990s (Rahman, 1992). However, spatial inequality is prevalent across different regions of Bangladesh in terms of economic growth and development (Rahman, 2005). Islam et al. (2015) found that the Fishing and Construction sector has been the most flourishing industries, whereas Real Estate, Renting, and Business activities have been lagging for all the six divisions in Bangladesh from 1995 to 2000. Comparing to other districts, Barisal district is in economic malaise. The regions are specialized in some selected industries based on their location, availability of raw materials, availability of utilities, and availability of skilled labor, marketplace, and so on. Economic development analysts are interested in the economic base of a region because the economic security of a region can largely depend on the success of the basic sectors.

The identification of basic and non-basic sectors at the regional level is necessary. Previous research has analyses long-run economic structure analysis through a different method like shift-share analysis (Kiser, 1992; Xu et al., 2010; Rahman et al., 2018; Islam et al., 2015), but short-run economic structure analysis doesn’t get the proper attention. Moreover, the use of LQ for comparative performance analysis of industries hasn’t been done in a developing country context. Therefore, the study aims to identify the basic and non-basic sectors for the selected districts as well as an exploration of the short-run regional variation of economic structure in selected districts. In this study, we would study the regional economy on the second highest level administrative unit of Bangladesh, which is the District level, through economic base theory.

2. Materials and Methods

The study has been conducted on the District level. Seven districts, i.e., Barisal, Bandarban, Bhola, Jhalokathi, Patuakhali, Pirojpur, and Rangamati, has been selected as a study area (see Figure 1). Selected districts are located in two divisions which are Barisal and Chittagong. Barisal division is located in the southern part of Bangladesh, and the Chittagong division is in the southeast part of Bangladesh. The districts of Barisal division are included in the coastal region while Rangamati and Bandarban belong to the hill tract region.



Source: Author, 2020

Figure 1: Study area showing the location of districts in Bangladesh Map

2.1 Identification of indicator

The availability of data is one of the prime concerns while selecting appropriate indicators to study the economic structure of regions as found from the literature that regional economic profile can be studied through population statistics (i.e., growth, composition, and educational status; economic statistics (i.e., median household income, the population in the labor force, employed –unemployed population; industry characteristics (i.e., employment by industry, average earnings per job); natural resources (climate, amenities); built environment (transportation network, utility services), etc. Here, the study has utilized industry characteristics as an indicator to study regional economic profile. Here, the number of jobs or employed persons in a particular industry has been taken from the employment database of “Economic Census Report -2003 and 2013” prepared by the Bangladesh Bureau of Statistics (BBS).

2.2 Identification of Economic Sector

To study the economic structure, a total of thirteen economic sectors have been chosen in this study which are-

(1) Mining and Quarrying (2) Manufacturing (3) Electricity, Gas and Water Supply (4) Construction (5) Wholesale and Retail Trade (6) Transport, Storage and Communication (7) Hotel and Restaurants (8) Bank, Insurance and Financial Institutions (9) Real Estate and Renting (10) Public Administration and Defense (11) Education (12) Health and Social Work (13) Community, Social and Personal Services.

2.3 Measurement of Regional Economic Structure through LQ

The LQ value for each district in every industry for both 2003 and 2013 has been calculated using formula-

$$LQ = \frac{\text{Percent of regional employment in industry A}}{\text{Percent of national employment in industry A}} \quad (\text{eq.1})$$

If $LQ > 1$, then Basic employment = $\sum \left(\frac{LQ-1}{LQ}\right) * E_{ir}$

Where, E= Employment, r= region, i= sector (Glasson. 1974).

The formula for calculating the economic base multiplier is as follows:

$$K = \frac{\text{Total Employment in basic and non-basic activities}}{\text{Total Employment in basic activities}} \quad (\text{eq.2})$$

From a practical perspective, it is generally assumed that the higher the location quotient, the more likely it is that this industry has a competitive advantage. Following the economic base theory, LQ greater than 1 indicates that a region has proportionately more employment in a specific industry than the larger comparison area. Therefore, it can be said that $LQ > 1$ indicates the basic or exporting industry, and $LQ < 1$ indicates non-basic or local industry, and $LQ = 1$ indicates the non-basic sector that can entirely fulfill local demand (Glasson. 1974). Morrissey (2014) note that it is no commonly agreed or theoretical LQ cut-off values for defining what a high LQ value is or what LQ value defines a cluster. Whereas, Morrissey (2014) stated that a cut-off value of 1.25 or above as an indicator of industrial specialization and clustering. However, industries, which have both high LQ and relatively high total job numbers typically, form a region's economic base (EMSI, 2014).

3. Results and Discussion

Table 1: District Wise Population and Employment in Secondary and Tertiary Sectors

District	Population	Person Engaged	Percentage of Person
Barisal	2318029	285153	12.30
Bhola	1791908	187354	10.46
Jhalokati	680379	60068	8.83
Pirojpur	1113695	130715	11.74
Patuakhali	1551325	135021	8.70
Bandarban	409420	53777	13.13
Rangamati	615280	87356	14.20

(Source: BBS 2015)

Table-1 shows that nearly 14% of people are engaged in secondary and tertiary activities, whereas nearly 9% of people are engaged in economic activities in Patuakhali. In Barisal division, 55 % of income comes from agriculture. Besides, for Rangamati and Bandarban, the dominant income source is agriculture (Banglapedia, 2017). So, it can be said that all of the districts are mainly specialized in primary activities.

Table 2: District Wise Statistical Measure of LQ

Districts	Year	Mean	Standard Deviation	Minimum	Maximum	Number of basic Industry	Number of Sector above mean
Barisal	2013	1.01	0.49	0.01	1.79	8	8
	2003	0.95	0.5	0.05	1.75	6	6
Bhola	2013	0.73	0.48	0.02	1.56	4	5
	2003	0.94	0.46	0.32	1.64	8	8
Jhalokhati	2013	0.99	0.76	0.08	2.77	6	6
	2003	0.9	0.6	0.06	2.13	5	8
Pirojpur	2013	1.03	0.55	0.14	1.73	8	8
	2003	1.11	0.48	0.22	1.97	8	8
Patuakhali	2013	1.02	0.74	0.06	2.34	6	6
	2003	0.86	0.56	0.39	1.85	6	7
Rangamati	2013	1.05	1.05	0.03	4.18	5	5
	2003	1.09	1.77	0.05	7.11	3	3
Bandarban	2013	0.99	0.75	0.05	2.46	5	5
	2003	1.29	1.64	0.05	6.53	5	5

*Bold word represents the highest or lowest value of mean (Source: Author, 2020; Data Source: BBS, 2015)

Table-2 shows the mean, standard deviation, minimum and maximum value of LQ value for seven districts in 2003 and 2013. It has been observed that the mean LQ value for all of the districts is nearly 1, representing similar economic characteristics. For Bhola, Pirojpur, and Bandarban, the average LQ value has decreased over time. From the standard deviation, the value of LQ can be seen that the industries of Rangamati and Bandarban have the highest intra-industrial variability comparing to other districts. For Bandarban and Rangamati, the extreme LQ value of the Public administration and Defense industry has increased the mean LQ of these areas.

3.1 Overall Scenario of Basic and Non-basic Sectors in selected districts

Sector \ District	Rangamati		Patuakhali		Pirojpur		Jhalokhati		Bandarban		Bhola		Barisal	
	2003	2013	2003	2013	2003	2013	2003	2013	2003	2013	2003	2013	2003	2013
Mining and Quarrying	0.00	0.00	0.00	0.07	1.60	0.17	0.00	0.60	0.00	0.00	0.00	0.02	0.05	0.01
Manufacturing	0.61	0.47	0.40	0.35	0.45	0.48	0.42	0.55	0.80	0.48	0.38	0.35	0.59	0.44
Electricity, Gas and Water Supply	0.19	0.74	0.25	0.65	0.95	1.73	0.39	0.30	0.05	0.45	1.22	0.68	1.23	1.52
Construction	0.05	0.40	0.38	0.14	0.22	0.32	0.06	0.00	2.66	0.14	0.71	0.06	0.21	0.80
Wholesale and Retail Trade	0.82	0.85	1.14	0.97	1.00	1.12	0.93	0.82	0.66	0.88	1.15	1.56	1.01	1.21
Transport, Storage and Communication	1.12	0.58	1.25	1.13	1.16	0.99	1.55	0.69	1.40	0.83	1.55	0.66	1.75	0.75
Hotel and Restaurants	0.37	1.16	0.39	2.34	0.55	1.62	0.42	2.77	0.45	2.06	0.32	1.33	0.57	1.79
Bank, Insurance and Financial Institutions	0.88	1.11	1.03	1.91	1.15	1.37	1.30	1.52	0.67	0.91	0.87	0.76	0.91	1.37
Real Estate and Renting	0.32	0.03	1.83	0.06	1.67	0.14	1.08	0.08	0.63	0.30	1.05	0.19	0.82	0.37
Public Administration and Defense	7.11	4.18	0.86	1.10	1.22	1.07	0.96	1.12	6.53	2.46	1.16	0.66	0.92	1.05
Education	0.89	2.19	1.85	1.89	1.97	1.62	2.13	2.07	1.00	2.05	1.64	1.38	1.32	1.35
Health and Social Work	1.00	1.07	0.61	0.86	1.26	1.44	0.93	1.01	1.16	1.04	1.00	0.67	1.75	1.13
Community, Social and Personal Services	0.84	0.89	1.20	1.77	1.26	1.32	1.48	1.33	0.82	1.27	1.11	1.13	1.23	1.38

Gray cell indicates the basic industries, and white indicates the non-basic industries

(Source: Author, 2020)

Figure 2: Sector-wise LQ value of Basic and Non-basic Sectors in 2003 and 2013 for the study area

3.2 District wise findings

From Figure-2, it is also observed that for Real Estate and Renting sector and Transport, Storage and Communication sector, LQ value showed a decreasing trend in all of the districts. The transport, Storage, and Communication sector were converted to the non-basic industry for all of the districts except for Patuakhali during the timeframe. Education is basic for all of the districts in 2013. Mining and Quarrying, Manufacturing, and Construction are lagging industry for all of the districts over time. While the Hotel and Restaurants sector is flourishing in all of the districts as this sector was converted to basic industry for all of the districts. Education is also one of the leading sectors in all of the districts, but Bhola, Jhalokhati, and Pirojpur have experienced a decreasing trend of LQ value during the timeframe

Barisal

For Barisal Hotel & Restaurants got the highest LQ in 2013 whereas Health and Social Work was highest in 2003. Mining and Quarrying got the lowest LQ both in 2003 and 2013. Three emerging export industries (Hotel & Restaurants, Bank, Insurance and

Financial Institutions, Public Administration, and defense) can be seen as they were converted from non-basic to the basic industry in 2013. In contrast, the Transport, Storage, and Communication industry is an endangered industry as it converted to the non-basic industry in 2013 in Barisal.

Bhola

Bhola Wholesale & Retail Trade is the most export-oriented industry or unique industry in 2013; thus, it is forming the economic base for Bhola as its LQ is highest among all other industries, whereas in 2003, Education got the highest LQ. This district has the highest number of conversion of industries from basic to non-basic. The only industry, which is converted to basic industry, is Hotel & Restaurants.

Pirojpur

Among 13 sectors, Electricity, Gas, and Water Supply sector converted to the basic sector and got the highest LQ for Pirojpur in 2013; thus, it is forming the economic base for Pirojpur while the Education sector was a unique industry for 2003. Comparing to other districts, it has a greater number of basic industries.

Patuakhali

Hotel & Restaurant sector is the most export-oriented industry for Patuakhali in 2013 while it was a non-basic industry in 2003.

Jhalokathi

In Jhalokathi Transport, Storage, and Communication industry and Real State and Renting industry have been converted to non-basic industry. Like Bhola, the number of converted industries is higher for Jhalokathi. The number of basic industries is greater for both 2003 and 2013 compared to other districts.

Bandarban

For Bandarban, Hotel & Restaurants industry is a newly emerging export-oriented industry besides Community, Social, and Personal service. The hotel & Restaurant sector sets the economic base for these districts as it has the highest LQ in both the time.

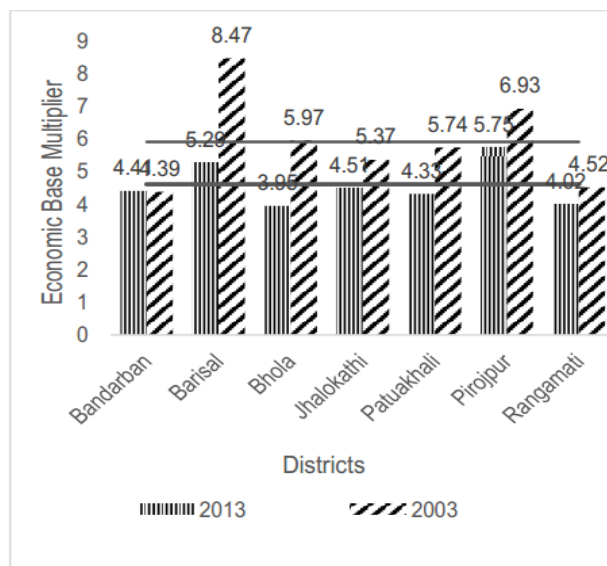
Rangamati

In Rangamati, Public administration and Defense industry have higher LQ comparing both inter-industry and temporal perspective. The number of non-basic industry were high both of the time, which reflect that majority of industries were contributing to the local needs only instead of exporting to other areas.

3.3 Short-run regional variation of economic structure

Figure-3 shows that the economic base multiplier of the districts except Bandarban has reduced over time with a drastic decrease for Barisal and Bhola. The decreasing trend in economic base multiplier value represents that these districts are becoming economically weak due to deteriorated secondary and tertiary activities. Barisal division is mainly specialized in primary activities due to its geographical location (42 % of GDP comes

from the agriculture and forestry, and fishing sector) (Islam et al., 2015). Besides, the economy of Rangamati and Bandarban is based on the agriculture and forestry sector (Banglapedia, 2017). Rangamati, Bandarban, and districts of Barisal division have meager contribution of GDP in Transportation, Storage, and the communication sector makes it difficult to improve its export orientation over time (Islam et al., 2015; BBS, 2011). From the analysis of LQ value (see Figure-1), it has also found that all of the districts have a decrease in LQ value in Transportation, storage and Communication.



Source: Author, 2020

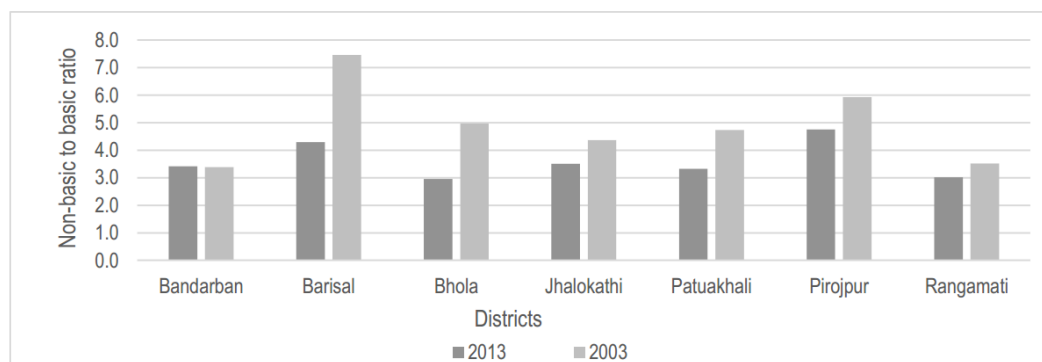
Figure 3: District wise change in economic base multiplier over time

This study found similar results from the percentage of basic employment in different economic sectors. Transportation, storage, and Communication was a basic sector in 2003 (see Table 3) for Barisal and Bhola districts, which held the greater percentage of basic employment while in 2013, it was a non-basic sector for both of the districts, implying that the rapid reduction of multiplier value of these districts over time is mainly for the diminishing Transportation, Storage, and Communication sector. Bhola is also falling behind, as Education is aggravating over time. Tabel-3 also shows that Hotel and Restaurants was a non-basic sector and Education had a little contribution to basic employment for Bandarban in 2003. In contrast, these sectors had a greater percentage of basic employment in 2013. Hotel and Restaurants, and Education sectors play a significant role in the slight increment of economic base multiplier during the timeframe.

Table 3: Distribution of percentage of basic employment of sectors of Barisal, Bhola, and Bandarban

District Sectors	Percentage of Basic Employment					
	Barisal		Bhola		Bandarban	
	2013	2003	2013	2003	2013	2003
Electricity, Gas and Water Supply	1.00	0.58	0.00	0.40	0.00	0.00
Construction	0.00	0.00	0.00	0.00	0.00	2.54
Wholesale and Retail Trade	38.48	3.57	77.18	36.16	0.00	0.00
Transport, Storage and Communication	0.00	40.61	0.00	20.98	0.00	11.07
Hotel & Restaurants	22.02	0.00	6.96	0.00	24.81	0.00
Bank, Insurance and Financial Institutions	4.90	0.00	0.00	0.00	0.00	0.00
Public Administration and Defense	1.12	0.00	0.00	3.30	29.22	84.78
Education	14.52	11.73	11.73	32.86	35.96	0.06
Health and Social Work	1.43	14.34	0.00	0.05	0.36	1.55
Community, Social and Personal Services	16.52	4.13	4.13	5.87	9.66	0.00

Source: Author, 2020



Source: Author, 2020

Figure 4: Change in non-basic to basic employment ratio for districts over time

In 2013, the multiplier was highest for Pirojpur (most developed district) and lowest for Bhola (most depressed district) (see Figure 4). It indicates that Pirojpur district has greater demand for the export-oriented goods of Pirojpur. However, for Bhola, the demand for basic products is not as high as other districts. In 2003, one basic activity may generate around seven non-basic activities in Barisal, whereas in 2013, one basic activity can generate around four non-basic activities (see Figure 4). The change of non-basic to basic ratio is also drastically decreased in Bhola. From Figures 3 and 4, it is observed

that the change in multiplier value is proportional to the ratio of non-basic to basic activity ratio of a certain district.

4. Conclusion

A nation's economy depends on its regions' economic sectors, their structures, and their efficient performance. From the discussion of the economic structure of all the selected districts, it can be stated that the overall economy is on a downswing with particular sectors lagging (i.e., Transport, Storage and Communication sector) and the other sectors promoting behind in a region. If proper attention is given to the fact and required measures are taken, these districts can play a significant role in the national and regional economy. As Hotel and Restaurant sector seemed to be consistently flourishing for the districts during the timeframe, this needs more investment and government incentive to bring about more money in the economy. Education is also one of the leading sectors in all of the districts, but Bhola, Jhalokathi, and Pirojpur have experienced a decreasing trend of LQ value during the timeframe. So, policymakers should take a robust and holistic measure to revive this sector for these districts. However, the unavailability of sector-specific total payroll data for the districts during the timeframe is a major limitation of the study. By using employment as the unit of measurement in economic base studies, it does not consider the fact that equal change in employment in two basic industries paying widely different wage levels may have a significantly different multiplier effect. Again, it does not consider the changes in productivity whereby a firm may increase the output dramatically, leading to higher wages and more spending without increasing its labor force. However, the findings of this study would be helpful for efficient decision making by providing an integrated and visionary insight.

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