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METHODOLOGICAL ANALYSIS OF REGIONAL ECONOMY AND EMPLOYMENT: EXTENDED SHIFT-SHARE FOR DHAKA DISTRICT

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Abstract

Regional growth of any particular employment sector is influenced by economic and industrial structure of nation and region. Shift Share analysis determines the degree of influence of national development and regional and local factors on overall regional employment growth. It is argued that in traditional shift share component analysis cannot separate the influence of regional structure from local advantages of regional growth. The purpose of this study conduct the shift share analysis without being free of this limitation by using extended shift share analysis method to identify the regional employment pattern for Dhaka district in broad national economic context. Being the capital Dhaka is the heart of economic activity and has colossal influence on the overall national employment. The study finds that, despite Dhaka district has locational advantages for agriculture, it is specializing towards manufacturing, business and service employment and overall regional employment of Dhaka is far ahead of national average.

Key words: *Regional employment, Industrial structure, shift-share, industrial specialization.*

Introduction

Regional growth and industry structure are interrelated. Various industrial sectors have different growth rate and contribute individually to the regional economic progress. Growth of sectors of a region depend industrial structure of both national and regional level. The variation between national and regional industrial structure and availability of the local resource bring influences the regional growth (Glasson, 1974). Due to interaction between industries mix of the region and local advantages a sector can become specialized on any sector in the region (Esteban-Marquillas, 1972).

A popular theory of regional economic structure analysis is "Shift share", it explains the scenario of economic growth of a region which is generated by a national growth in that sector, supportive industry mix and competitive local advantage of that particular region. But this traditional shift share analysis does not provide an insight about the specialization aspect of a region on particular sector. Here, the intervention of extended shift share analysis provides a much better depiction of regional economy considering the specialization in certain industry. Extended shift share is also dynamic in nature; it not only indicate the growth of certain economy but also ensure the dynamic inter-mechanisms of industries. With the application of expanded shift share analysis, it can be determined that whether region pattern of specialization of the region without being affected by the regional industrial structure (Kiser, 1992). It also depicts the influence of national growth on any section at regional level, its growth rate is whether faster or slower than national growth rate , degree of contribution of local facilities or specialization of sectors at regional level for analysis of boom or slack in regional economy. The study aims to analyze the industrial structure of the Dhaka district which is the capital of Bangladesh to indentify the industrial structure of Dhaka along with the underlying reasons for such composition and also to find the specialization sectors for Dhaka to provide a better view for formation of progressive economy for Dhaka.

Study area

Dhaka is the central district of Bangladesh. Dhaka district; is located between coordinates 23◦53' to 24◦06' north latitudes and 90◦01'to 90◦37' east longitudes (BBS, 2001). Its area is 1463.60 square kilometers. Dhaka district has 5 upazila: Dhamrai, Dohar, Savar, Nawabganj, Keraniganj. Total population of Dhaka district has been 9,151,424 and 6,163,045 in year 2001 and 1991 correspondingly. Major sectors for employment economic activity in Dhaka district are Agriculture, Manufacturing, Business, Service, Construction, Transportation and Communication

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etc. Total employment in the major sectors of Dhaka district has been 1,831,389 and 1,102,457 for year 2001 and 1991 (BBS, 2001).

Methods and Materials

Shift Share analysis is a regional tool of determining the effect of industrial structure of growth of GDP, employment etc of a region within certain time period (Glasson, 1974). Traditional Shift share analysis divides overall regional growth into three components: National Share, Industrial Mix effect and Competitive effect. But due to some constrains of Traditional Shift Share Analysis, Extended shift share Analysis can be used for regional industrial structure analysis. Extended Shift Share Analysis adds an additional component Allocation factor for shift share analysis (Esteban-Marquillas, 1972).

National Share represents the regional employment that would have grown if the employment growth rate were equal to national rate for the study period. It is calculated from equation (1). National Share of sector i of region j; $N_{ij} = (E_{ijo} \times E_t/E_o) - E_{ijo}$ …………………… (1)

Where;

E_{ijo}=Employment in sector i region j of initial year
E_t = Total national employment in terminal year
E_o= Total national employment in initial year

Here, industrial Mix effect indicates the employment growth that has occurred due to composition of industrial structure of the region. Positive value of industrial mix effect the sector is growing faster than national average and vice versa. It is calculated from the following equation (2).

Industrial Mix effect of sector i of region j; $I_{jj} = [(E_{ijt}/E_{ijo}) - (E_t/E_o)] \times E_{ijo}$ ……………… (2)

Where; E_{ijt}= Employment in sector i region j of terminal year

Competitive effect shows the effect of internal location factors in the employment growth of the sector. A region with better locational advantage has positive competitive effect and vice versa. Esteban-Marquillas (1972), stated that in traditional shift share analysis, competitive effect shows employment growth of the region due to special dynamism of the sector in that region compared to the average growth of the that sector at national level. Rosenfield (1959) shows that in traditional shift share analysis, competitive effect includes not only sectoral dynamism but also specialization of regional employment in this sector. The study shows competitive effect is influenced and interwoven with the industrial mix effect. To solve this problem, Esteban-Marquillas (1972), formulate the concept of homothetic employment to use it instead of effective employment (Total employment in sector i of region j). Thus he separates the effect of industry mix from competitive effect.

Homothetic employment is the employment a sector would have if the structure of the employment in region was identical and equal to national structure (Esteban-Marquillas, 1972). It is calculated from the following equation (3).

Homothetic employment of sector i region j; $E_{hijt} = E_{io} \times E_t/E_o$ ………. (3)

E_{io}=Total national employment sector i in initial year

While calculating the competitive effect of a sector in a region based on the homothetic employment is done by equation (4).

Competitive effect of sector i region j; $C_{ij} = [(E_{ijt}/E_{ijo}) - (E_{it}/E_{io})] \times E_{hijt}$……(4)

Where;

E_{ijo}=Employment in sector i region j of initial year

E_{it}=Total national employment of sector i in terminal year

Esteban-Marquillas, (1972) defined the rest of the part regional growth as allocation factor. The study explained, it will show the degree of specialization of sector for the region. Chun-Yun Shi and Yang Yang (2008) defined allocation factor as an outcome of the interaction of the industrial mix effect and competitive effect.

If the allocation factor of a region is positive then, it is specialized in those sectors which is fast growing or is not specialized in the sector with lack of loactional advantages. If the allocation factor of a region is negative then, it is specialized in those sectors which is slow growing or is not specialized in the sector with loactional advantages. It is calculated from equation (5).

Allocation effect of sector i region j; $A_{ij} = [(E_{ijt}/E_{ijo}) - (E_{it}/E_{io})] \times (E_{ijt} - E_{hijt})$……(5)

Total regional growth is the sum of all four component discussed above. It can be determined by subtracting employment in initial year from terminal year, equation (6) is used for its estimation.

Regional growth of sector i region j; $R_{ij}= E_{ijt} - E_{ijt}$……. (6)

Net shift is the growth of the sector because of regional characteristics (Glasson, 1974). Esteban-Marquillas, (1972) and Glasson (1974) suggested that net shift can be determined by subtracting national share from regional growth. Esteban-Marquillas, (1972) mentioned that it is the sum of industry mix effect, competitive effect and allocation factor and it is determined by equation (7).

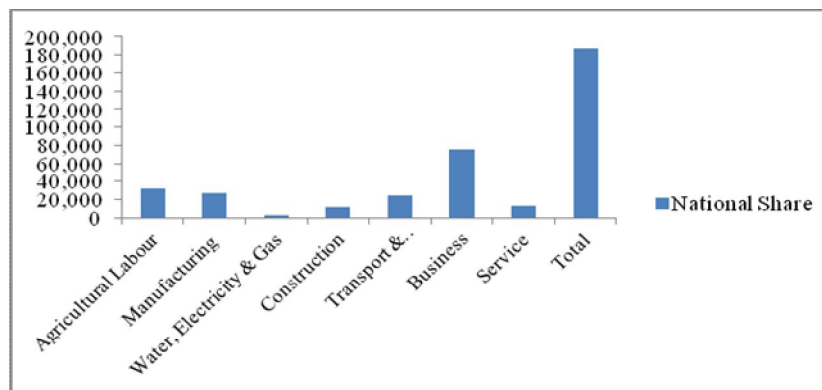$$NS_{ij}= R_{ij} - N_{ij}= I_{ij}+C_{ij}+A_{ij} \quad …………………… (7)$$

For studying the regional employment growth of Dhaka district, all data are obtained from Bangladesh Bureau of Statistics (BBS). Mainly the census data is used for the analysis. Other sources such as research papers, book and web-journals are also consulted for the study.

Results

Shift share analysis enables to determine the regional economic change over a specific time period in relation to the national attribute. Here, in 1991 total national employment was 23,055,955 and this number is increased to 26,904,269 in 2001. Consequently, for Dhaka district the regional growth in employment from year 1991 to 2001 is 728,932. But according to the national growth rate of employment the increase of employment for Dhaka district would be 187,418 employments in the major sectors. Here, about 541,514 employments are extra created. This additional amount of employment could be resulted from the industrial structure, regional influences and specialization facts in Dhaka districts. Further analysis of national share, regional growth, net shift, industrial mix analysis, competitive effects and allocation tried to focus on the underlying reasons for the additional employment generation in Dhaka district. Besides these analysis also tried to develop the employment condition of different sectors in this time enclose.

National share for Dhaka district

All the sectors have positive national share (Fig. 1). So, all the sectors would have experienced enhancement in employment if their growth occurred at the same rate of national growth from year 1991 to 2001.
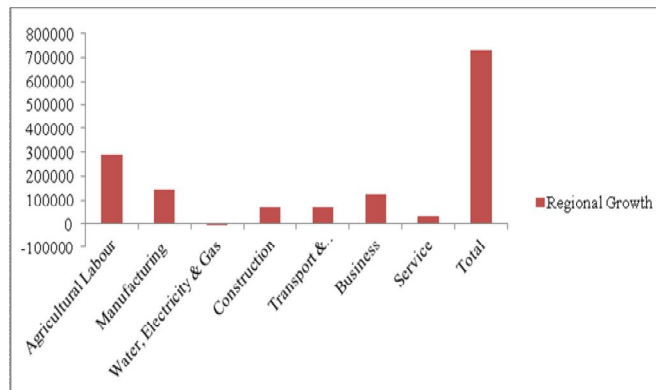

Data Source: BBS, 2001
Fig. 1: National Share Component of Dhaka district

Overall employment level would increase by the decade, in relation to the national growth. The national GDP and per-capita income also increased from 1991 to 2001. For Dhaka region, highest contribution of national share component has been identified for business sector. Business sector has always been a major source of household income for Dhaka. Business was main source income for 23.08% and 24.04% household in 1991 and 2001 respectively (BBS, 2001). This growth can be attributed by influence external factors of Dhaka city as it is the major investment hub of the country. All sectors except "Water, electricity and gas" have large contribution to regional employment, but this sector lagged behind compared to others as Government is the sole organization to supply utilities like gas, water, electricity in Bangladesh so only national intervention is the probable of this growth and no special regional enhancement would occur (National Web Portal of Bangladesh, 2013).

Regional Growth of Dhaka district

Overall regional growth of Dhaka district is positive. Within 1991 to 2001, regional growth of Dhaka is 66% which 3.88 times greater than national economic growth.
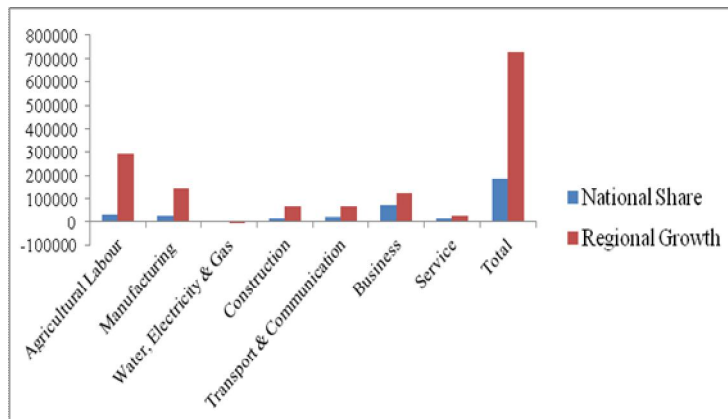
All the sectors have positive regional growth except "water, gas and electricity" sector (Fig. 2). Water-gas and electricity sector has negative regional growth might result in due to uncongenial industrial structure and unavailability of local resources or infrastructure effects its growth adversely.

Data Source: BBS, 2001

Fig. 2: Regional Employment Growth of Dhaka district

Among the sectors, agriculture has the highest regional growth in employment. Predominant agriculture based economy is governing the major share for employment generation in Dhaka district like all over Bangladesh. Except Dhaka city, other areas of Dhaka district are focused on agricultural based economy. Positive increase in employment in these sectors indicating the overall employment generation for Dhaka district. In compared to national growth, except "water, gas and electricity" all the sectors have much more regional employment generation than the national rate (Fig. 3).
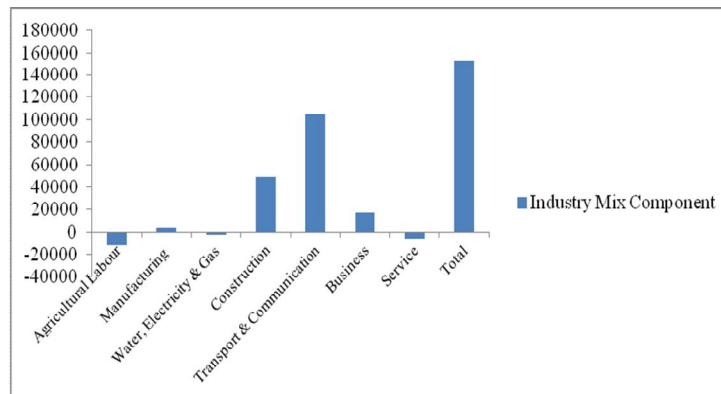

Data Source: BBS, 2001

Fig. 3: Difference between national share and regional Employment Growth of Dhaka district

These differences between national share and regional growth are attributed to the shift components. Here industrial mix, competitive effects and allocation factors adjust the difference between national and regional growth rate and the net shift component might be equal to these differences.

Identification of Slow and Fast Growing Sectors of Dhaka: Industry Mix Effect

Sum of industrial mix component is positive; it implies that industrial structure of Dhaka district is identical to that of national industrial structure i.e. the region is progressing in national fast growing industry (Fig.4).

Data Source: BBS, 2001

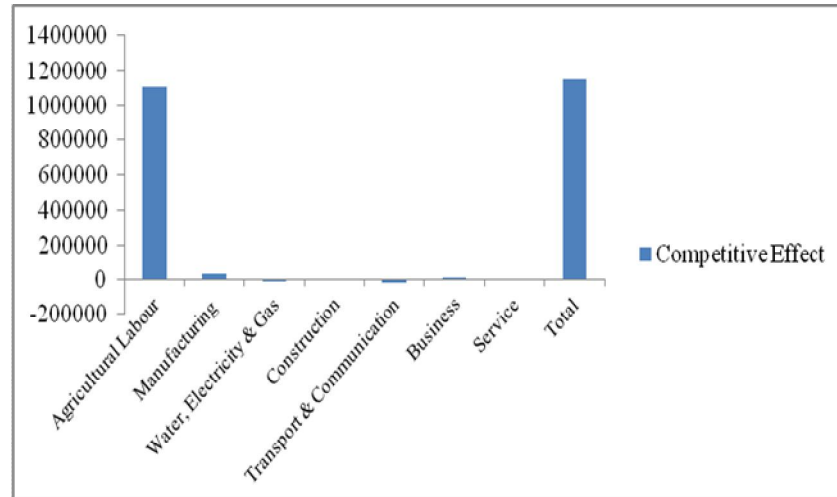**Fig. 4:** Industrial mix component of Dhaka district

Agriculture sector has a negative industrial mix component. Agriculture sector has the lowest industry mix effect component which indicates that other regional industries are not very favorable for its growth or other industries are not complementary for its growth. So, it is growing slowly in respect of national growth rate; independent of the national influence. This industrial mix deducts the number of agricultural employment in Dhaka from the national share. Agricultural activity predominates in the rural areas (World Bank, 2013). Dhaka being highly urbanized part of Bangladesh, industrial structure is more suitable for growths of sectors other than agriculture (BBS, 2001).

"Water-gas-electricity" and "Service" sector are other two slow growing industries. Less employment has been generated in these two sectors compared to the national rate for Dhaka. . This may be because predominantly job opportunities were created by the government sector such in local government offices; banks etc besides many informal jobs are created in Dhaka which is not recorded in the mainstream census survey of BBS, Year. . In case of service sector, it did not flourish before formulation of Privatization Board in 2000 to create mass scale employment in this sector such as in bank, health care etc (Privatization Commission Bangladesh, 2013; Syeduzzaman, 2012).

Manufacturing, Construction, Transportation, Business are the sectors which are growing faster than the national growth rate of these sectors as they have positive industrial mix effect. Development of Manufacturing industry and transportation are indicators of urbanization (Muhammad, Z.M. n.d). Due to industrialization and improved transportation system, there will be development of construction and business sector. Because of rapid urbanization Dhaka district relative to other regions of the country, these sectors are growing faster in Dhaka and creating employment at higher rate than national level (Muhammad, 2013).

Sectoral Dynamism without employment specialization: Competitive Effect

Except "Transportation & communication" and "Water-gas-electricity" all other sector has positive competitive effect (Fig. 5). This implies that local factors are suitable for the employment growth of these sectors for Dhaka. Negative competitive effect of transportation sector can be explained by traffic congestion in Dhaka city (Ahsan. and Hoque., 2002). The prime cause of lagging in electricity sector is organization inefficiency, corruption, inappropriate policy etc (Ahmed, 2011). Water supply sector is facing hindrance like illegal connection, corruption, non-revenue water (Rahman, *et al.*; 2011). Growth of gas supply sector is being retarded by dependency on other regions for gas, generation losses, management problem, corruption etc (CPD; 2000).

Fig. 5: Competitive Effect of Dhaka district

Among the sectors with positive competitive effect agricultural sector has the highest competitive effect which implies that agricultural sector is making better utilization of local resources than other sectors. Due to relatively small positive national share component and negative industrial mix effect, growth of agricultural sector completely depends on proper utilization of local factors like existence of growth centre, irrigation facility using DND embankment, modern technology etc (Banglapedia, 2012).
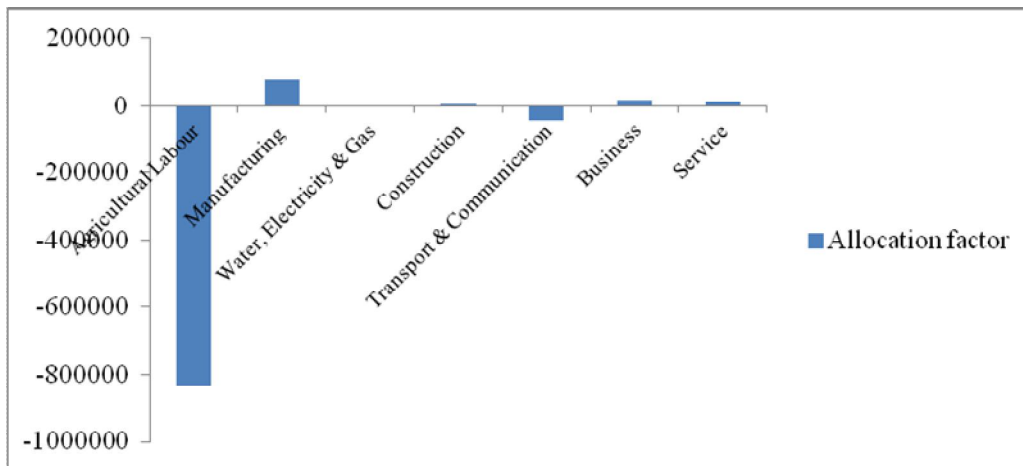
Construction sector is having locational benefits for its growth because increased demand of housing for increasing number of population of Dhaka city (Nasrin,2011). Positive value of competitive effect of manufacturing, business, and service sector can be attributed by relatively better infrastructure facilities, cheap labour availability, and resource allocation for Dhaka.

Specialization of Employment: Allocation Effect

The allocation factor reveals employment growth because of the concentration of employment in faster growing industries and in faster growing region (Cunningham, 1969). The economic interpretation of the allocation effect is elusive and often omitted. Esteban-Marquillas (1972) and Cunningham (1969) interpret a positive allocation effect as the contribution of regional specialization in sectors in which the regional growth rates are relatively the highest, and a negative allocation effect as a lack of regional specialization in the fastest growing sectors. In addition, Cunningham (1969) hints that the allocation effect can be indicative of a convergence (negative allocation effect) or a divergence (positive allocation effect) of the regional and the national economic structures.

In Agricultural sector, allocation factor is lowest of this region (Fig. 6). Although agricultural sector has better locational advantages its specialization is hindered by industrial structure and influence of the fastest growing industries. Transport and communication sectors and Water, electricity, gas sectors are also faced slower regional growth or these sectors are not specialized to get competitive advantage in respect of national growth of these sectors respectively. These two sectors have convergence of the regional and national economic structures. The highest allocation effects are found in industries and manufacturing sector.

Manufacturing sector is fastest regional specializing sector. Constructions, Business, Service and Other sectors have positive allocation effects. This indicates that, these sectors are specialized in this region and also enjoy competitive advantage.
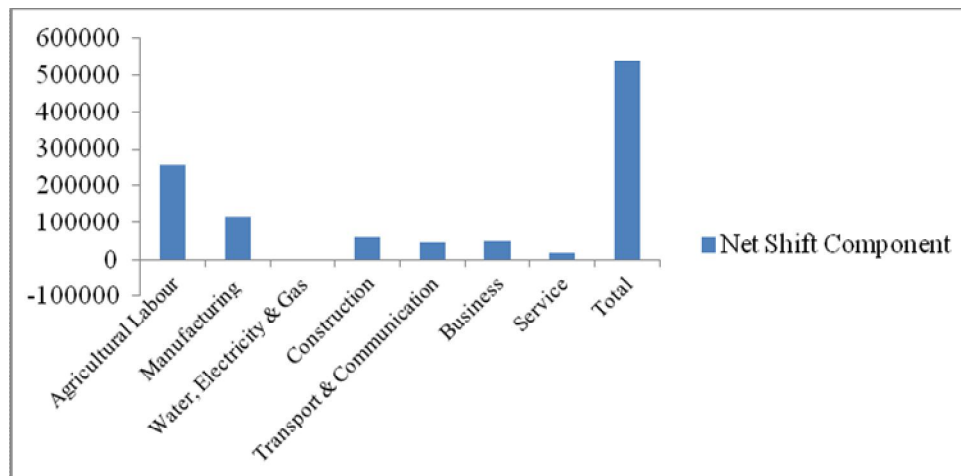
Fig. 6: Allocation factor of Dhaka district

Employment distribution among the different sectors, according to their respective advantages are not better for Dhaka region because the total allocation effect is negative and some sectors distribution of employments are better according to allocation effects such as industries and manufacturing, construction, service and business.

Net shift

Net shift is the summation of industrial mix, competitive effects and allocation factors (Fig. 7). Here, total net shift component of different employment generating sector of Dhaka is positive. That implies Dhaka is a relatively prosperous growth areas of Bangladesh. All the sectors excluding water-gas-electricity have positive net shift component.

Fig. 7: Net shift for employment in Dhaka district

Dhaka being the capital of Bangladesh might have received greater priorities in allocation of funds for regional development which might be the probable cause of growth of these sectors. Only "Water, Electricity and gas" sector has negative net shift, this in turn reduces the regional employment in this sector. Now, considering the net shift, it is clear that, the deviation between National share and regional growth is the result of net shift. This is responsible for the overall differences in employment and thus the shift components are attributed to the regional employment generation. Here, the industrial composition, regional resources and specialization in certain industries are generating and shifting employment number to and from different industries of Dhaka district.

Discussion

Shift Share analysis for Dhaka city shows economy of Dhaka is growing very higher in comparison to national economy. So, economy of Dhaka is highly worthy for further investment. Agricultural sector has experienced the highest employment growth from 1991 to 2001. But negative industrial mix effect indicates that it is a slow growing industry which is hindering its specialization for Dhaka. So, appropriate policy options and application of modern technology

and infrastructure facilities is necessary for drawing investment in agricultural sector. The water-gas-electricity is the only sector experiencing losing regional employment. This sector may not be better option for regional development investment. In order to improvement of this sector strict legislative measures and policy are required to control corruption and administrative management.

Manufacturing, construction and business sectors have become fast growing industry by dint of utilization of local resources. As a result, they gave gained positive allocation and have become specialized sector Dhaka. More investment can create more employment in this sector.

In spite of being a fast growing sector, transportation and communication sector has a negative competitive effect which implies this sector's dependency and loss of share to other regions (Herath,et al, 2011). This is hindering its specialization. Although, service sector is growing slowly, it has become specialized as it utilizes local resources properly. Through investment and policy development targeting service sector and privatization employment should be created for accelerating its growth.

Conclusion

Through extended shift share analysis the scenario of regional economy and employment can be determined based on the past to present context and also forecasted for the future. This analysis is helpful for policy makers to determine the potential areas for economic interventions. But data variability and sample size could provide result that is subjected to controversy on accuracy of result. But for Dhaka district this analysis showed the consistency of result. As it is evident that after year 2001, Dhaka region became specialized in manufacturing, business and service sectors and agriculture is losing attention. In a brief, the mega city effect is spreading on other areas of Dhaka. This study also showed that, Dhaka is an outlier in comparison to national average having more and more employment generation due to the concentration of activities in the capital and this is working as an engine for economic development of Bangladesh.

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