Structural Changes, Employment and Productivity in Nepal

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Abstract

Nepal has been following the policy of economic liberalization since the mid-1980s, which accelerated at the start of 1990s. A key premise of economic liberalization is to create a situation, which will drive economic resources towards more productive uses leading to a sustained growth. In this context, this paper has examined the changes in structure, employment and productivity in the Nepalese economy for the period of 1991-2013 based on the World Bank's sectoral growth decomposition method. It has provided answers to the questions like how economic growth is reflected in employment generation and in changes in productivity; how is the situation of sectoral pattern of growth and employment generation; and the overall nature of structural changes in Nepal. Structural transformation that encourages the movement of labour and other resources from low productive sectors into high productive economic activities is considered to be successful for high economic growth. Sectoral productivity and employment pattern of growth have important implications for inclusive growth and poverty alleviation as well. Despite some structural changes through economic liberalization process, empirical evidence shows that the Nepalese economy has remained sluggish in employment generation and the structural changes have not been growth enhancing. Government should devise the policies of generating employment in high productive sectors in order to increase both employment and productivity in the economy to raise per capita income.

JEL Codes: E23, F6, O1

Keywords: Structural change, employment, productivity, economic liberalization, Nepal

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1. Introduction

Nepal has been following the policy of economic liberalization since the mid-1980s, which was accelerated in the beginning of 1990s (Khanal et.al., 2005). With the economic liberalization process, Nepal has dismantled many restrictions imposed earlier for the private sector to enter into economic activities. In addition, the country has adopted the policy of financial sector liberalization and trade liberalization. It opened up its current account in 1993 and has lowered imports' tariff substantially, and later became of a member of WTO in 2004. As a result of removal of administrative barriers, some economic sectors such as finance, communication, transport, health and education have expanded substantially. Although a decade long internal conflict faced by Nepal for the period of 1996-2006 posed constraints on the economic transformation process to some extent, the policy of economic liberalization has been kept unchanged even after the start of peace process in 2006. As a result, the Nepalese economy has been integrated with the world economy with the liberalization process to a greater extent.

Economic liberalization process may have changed the structure of the Nepalese economy. Structural transformation that encourages the movement of labour and other resources from agriculture into high productive economic activities is considered to be successful for higher economic growth. "An economy can be considered to be performing well if it has sustained productivity growth and a stable or rising employment/population ratio" (Ocampo et.al., 2009, p 41). The sustained growth in successful countries is found to be associated with the change in economic structure in several dimensions, making economic transformation to higher productivity and increasing return to scale.

Many studies such as Ferreira and Rossi (2003), Eslava et al. (2009), Fernandes (2007), and Paus, et. al. (2003) show the positive association of trade liberalization and productivity growth in manufacturing industries in Latin America. However, overall structural change in many Latin American as well as Sub-Saharan African countries has been growth retarding since 1990 - labour has moved from more productive to less productive activities as shown by McMillan and Rodrik (2012). In the context of Nepal, Sharma (2001) found some structural change in manufacturing output however there was no significant improvement in total factor productivity growth. No study has been conducted in aggregate level in

Nepal to examine the sectoral growth pattern from the perspective of employment generation and productivity.

In this context, it is imperative to look at the impact of economic liberalization process on productivity and employment which is vital for the sustainable growth of economy and raising living standard of common people. Hence, this paper attempts to analyze the structural change of Nepalese economy, focusing on the changes in productivity and employment along with the liberalization process. McMillan and Rodrik (2012) argue that only countries that can diversify away from agriculture and other traditional products and move into modern economic activities can achieve economic progress by increasing productivity and income. There should be growth-enhancing structural changes in the economy. On the other hand, “jobless growth" is considered as a major obstacle for the poor to benefit from the positive growth performance of the economy (Gutierrez, et. al, 2007). The question of how the economic growth is reflected in employment generation and in changes in productivity is an important question to be researched for right policy making. It is so because sectoral productivity and employment pattern of growth may have important implications for poverty alleviation as well (Gutierrez, et. al, 2007)

The reminder of the paper is structured as follows: After this brief background, section two presents the methodology and data used for analysis in this paper. Section three analyzes the overall and sectoral growth pattern of Nepalese economy, while overall and sectoral employment patterns are examined in section four. The fifth section interlinks the structural change, labour productivity and employment. Decomposition of per capita GDP growth is done into its components in section six while the final section concludes the discussion with some policy recommendations.

2. Methodology and Data

The paper has followed the growth decomposition methods recommended by the World Bank (ND) and partly used by McMilan and Rodrik (2012). The World Bank’s methodology is helpful to understand how growth is linked to changes in employment, output per worker and population structure at the aggregate level and by sectors, that is, a detail profile of growth. This method of growth disaggregation is based on the Shapley decompositions, which is a simple

additive method that links changes in a particular component to changes in total per capita GDP, by taking into account the relative size of the sector or component, as well as the magnitude of the change (World Bank, undated, p.5). The methodology decomposes GDP growth using several consecutive steps. First, growth in per capita GDP (proxied by per capita value added) is decomposed into employment rate changes, changes in output per worker (productivity) and demographic changes. Second, employment changes are further decomposed into changes in employment by sectors. Third, changes in output per worker are decomposed into changes linked to variations in output per worker within sectors and changes linked to sectoral relocation of workers between sectors. A fourth step goes further in understanding the role played by each sector on the aggregate effect of employment relocation across sectors.

To understand how growth is associated with increase in productivity and employment at the aggregate level and by sectors, it is important to perform a simple decomposition of per capita GDP growth in three components such as productivity changes, employment rate changes and demographic changes in line with Gutierrez et.al. (2007) and "Job Generation and Growth Decomposition Tool" of the World Bank. For this, per capita GDP, Y/N = y can be expressed as:

$$\frac{Y}{N} = \frac{Y}{E}\frac{E}{A}\frac{A}{N} \quad \text{.....(1)}$$

or,

$$y = \omega * e * a \quad \text{.....(2)}$$

where Y is value-added, E is employment, A is the population of working age and N is the total population. The ratio $\omega = Y/E$ corresponds to output per worker, $e = E/A$ corresponds to the share of the working age population employed and $a = A/N$ corresponds to the share of the population of working age. The decomposition can be extended to multiple sectors as

$$\frac{Y}{N} = \left(\sum_S \frac{Y_S}{E_S}\frac{E_S}{A}\right)\frac{A}{N} \quad \text{.....(3)}$$

or,

$$y = \left(\sum_s \omega_s * e_s\right) * a$$

where the sub-index stands for the sector of economic activity.

Following the Shapley decomposition, we have

$$\frac{\Delta y}{y} = \bar{\omega} + \bar{e} + \bar{a}$$

where $\bar{\omega}$, $\bar{e}$ and $\bar{a}$ are the marginal contribution of each component to the observed change in per capita value added. Similarly, equation (3) can be written as

$$\frac{\Delta y}{y} = \sum_s \bar{\omega}_s + \sum_s \bar{e}_s + \bar{a} \quad \text{.....(4)}$$

Here, $\bar{e}$ would be the amount of growth that can be linked to changes in the employment rate as measured by the ratio between total employment and the working age population. The component $\bar{a}$ reflects changes in the demographic structure of the population, while the term $\bar{e}_s$ denotes the amount of growth that can be linked to changes in the share of employment of sectors. The term $\bar{\omega}_s$ denotes the amount of growth that can be linked to productivity changes in sectors.

We have done the above mentioned decomposition for the period of 1991-2001 and 2001-2011, obtaining data from various issues of Economic Survey of Government of Nepal and Census Report of 1991, 2001 and 2011 published by Central Bureau of Statistics.

3. Overall and Sectoral Growth Performance of the Nepalese Economy

Table 1 presents the overall and sectoral growth performance of the Nepalese economy for the period of 1991-2013. Average growth of GDP decelerated to 2.7 percent in 2001-2010 from 4.4 percent observed in 1991-2000. Although Nepalese economy slightly improved in 2011 and 2012, it again decelerated to below 4 percent in 2013. This shows that the performance of Nepalese economy has been dismal, not enough to raise per capita income to a higher level. Agriculture GDP recorded a growth of 2.2 percent during 1991-2000 and 2.3 percent during 2001-2010. The agriculture sector is highly depending on rain-fed which is reflected in high volatility.

With the speeding up of liberalization process in the beginning of 1990s, however, the non-agriculture sector grew by 6.2 percent during 1991- 2000; but that pace did not continue in the later decade during which non-agricultural GDP

grew by just 3.0 percent, not much different from the growth of agricultural sector (Table 1). Such a dismal performance of non-agricultural sector was due to the adverse impact of a decade long internal conflict (1996-2006), continuation of political instability and transition resulting in sour industrial relations and unfavourable investment environment. A prolonged energy crisis and weak infrastructure also contributed to sluggish performance of the non-agricultural sector in recent years.

Table 1: Sectoral Growth Rate (1990 - 2013)

(in percent)

	1991-2000	2001-2010	2011	2012	2013
Agriculture, Fisheries & Forestry	2.2	2.3	4.5	5.0	1.3
Mining & Quarrying	5.1	2.9	2.0	5.0	5.5
Manufacturing	8.6	0.4	4.1	3.6	1.8
Electricity Gas & Water	7.1	4.3	4.4	8.4	0.2
Construction	5.6	2.7	4.8	0.2	1.6
Trade, Restaurant & Hotel	5.6	0.7	2.0	3.4	9.2
Transport, Communication & Storage	7.3	4.6	5.2	5.7	6.7
Finance & Real Estate	5.2	3.7	2.6	3.1	3.4
Community, Social and other Services	5.5	5.9	4.5	6.0	4.6
Non Agriculture GDP	6.2	3.0	3.6	4.2	5.0
Total GDP	4.4	2.7	3.9	4.4	3.7

Source: Economic Survey (Various Issues), Ministry of Finance, Government of Nepal

All sub-sectors within the non-agricultural sector grew by more than 5 percent during 1991-2000. Among them, the manufacturing sector grew by 8.6 percent, followed by the transport, communication and storage sector (7.34 percent) and the electricity, gas and water (7.09 percent). However, the contribution to growth of total GDP of these sectors was just 17 percent, 11.1 percent and 2.4 percent respectively (Table 2). Despite high growth of these sectors, overall GDP grew by just 4.4 percent due to relatively small contribution of these sectors.

In contrast during 2001-2010, all subsectors of non-agriculture sector witnessed a deceleration in growth. Among them, the performance of manufacturing and trade, restaurant & hotel remained very low – it grew by less

than one percent during 2001-2010. Only community, social service and others witnessed a growth of about 6 percent during that period.

During 2001-2010, the agriculture sector contributed to 30 percent of total GDP growth followed by community, social service and others (25.6 percent), finance and real estate (16.2 percent) and transport, communication and storage (14.3 percent). On the other hand, manufacturing; electricity, gas and water; trade, restaurant & hotel just accounted for 1.1 percent, 3.2 percent and 3.9 percent of total GDP growth respectively (Table 2). The contribution of the construction sector to total GDP also declined from 14.3 percent during 1991-2000 to 6.0 percent during 2001-2010. As a result, the performance of the non-agriculture sector remained sluggish during 2001-2010, leading to an increase in contribution of agriculture sector despite this sector being stagnant at a growth of around 2 percent.

Table 2: Sectoral Contribution to GDP growth

(in percent)

	1991-2000	2001-2010	2011	2012	2013
Agriculture, Fisheries & Forestry	20.1	30.2	40.1	39.5	11.8
Mining & Quarrying	0.6	0.5	0.2	0.5	0.7
Manufacturing	17.0	1.1	7.0	5.5	3.4
Electricity Gas & Water	2.4	3.2	2.5	4.3	0.1
Construction	14.3	6.0	7.3	0.3	2.4
Trade, Restaurant & Hotel	14.1	3.9	7.0	10.7	36.9
Transport, Communication & Storage	11.1	14.3	12.4	12.3	17.9
Finance & Real Estate	11.6	16.2	8.1	8.6	11.1
Community, Social and Other Services	11.0	25.6	15.7	18.9	17.8
Non Agriculture GDP	79.9	69.8	60.0	60.6	89.0
Total GDP	100	100	100	100	100

Source: *Author's calculation*

After overall stagnation during 2001-2010, some recovery seemed to occur in 2011. The manufacturing; construction; trade, restaurant & hotel; transport, communication & storage recovered marginally in 2011. Despite some improvement, agriculture growth supported by favourable weather contributed to 40.1 percent of growth in 2011. Growth pattern also remained the same in 2012, except for the mining & quarrying and electricity, gas and water which grew by 5.0 percent and 8.4 percent respectively in 2012 compared to a growth of 2.0 percent

and 4.4 percent respectively in 2011, but this sector just accounted for 0.5 percent and 4.3 percent respectively of growth observed in 2012. More importantly, the construction sector plummeted to a growth of 0.2 percent in 2012, due to collapse of real estate market. The agriculture sector, after growing close to 5 percent in 2011 and 2012, witnessed a fall in growth to just 1.3 percent in 2013. Only the trade, restaurant & hotel; and transport, communication & storage exhibited acceleration in growth in 2013 by growing at 9.2 percent and 6.7 percent respectively. The trade, restaurant & hotel sector remained the major contributor (36.9 percent) to the overall GDP growth in 2013. In this way, there is no any particular sector that can act as an engine of growth in Nepal. Still, Nepal is predominantly an agricultural dominance economy and the contribution of the manufacturing sector has remained negligible.

Along with erratic growth performance, Nepal has observed structural change at a slower pace. The share of agriculture in total GDP was 46.5 percent in 1991 which declined to 34.4 percent in 2013, implying 0.6 percent linear decline per year. In contrast to the structural change observed in advanced and newly emerging countries, the share of manufacturing sector declined from 7.0 percent in 1991 to 6.7 percent in 2013 in Nepal (Table 3). Likewise the construction sector also witnessed a fall in share between 1991 and 2013. However, mainly four sectors such as trade, restaurant & hotel; transport, communication and storage; finance and real estate; community, social and other services witnessed a rise in shares in total GDP. The share of mining & quarrying declined further to 0.4 percent and that of electricity, gas and water increased marginally to 2.2 percent in 2013.

Table 3: Sectoral Share in GDP

(*in percent*)

	1991	2001	2011	2013
Agriculture, Fisheries & Forestry	46.5	38.0	35.0	34.4
Mining & Quarrying	0.5	0.6	0.4	0.4
Manufacturing	7.0	9.9	6.8	6.7
Electricity Gas & Water	1.4	1.7	2.2	2.2
Construction	10.5	11.4	6.1	5.7
Trade, Restaurant & Hotel	10.7	11.2	14.1	14.7
Transport, Communication & Storage	5.7	7.4	9.4	9.8
Finance & Real Estate	9.5	9.8	12.2	12.1
Community & Social Services	8.3	10.0	13.7	14.1
Non Agriculture GDP	53.5	62.0	65.0	65.6
Total GDP	100.0	100.0	100.0	100.0

Source: *Author's calculation*

4 Overall and Sectoral Employment Generation

The employment performance of the Nepalese economy has been assessed based on the data of economically active population in different sectors obtained through various census surveys. Hence, the employment performance has been analyzed in three points of time: 1991, 2001 and 2011. Employment opportunities are very limited in Nepal. Out of total working age population (15-64 yrs), 73 percent people were employed in 1991, which increased to 77 percent in 2001. However, thereafter, it declined to 67 percent, which indicates that the generation of employment did not match with the growth of population. Moreover, the employment structure has not exhibited any discernible change as shown in Table 4. Despite declining share of agriculture in employment, it is still a dominant sector for providing employment to two-thirds of population. The employment share of the manufacturing sector after increasing to 8.8 percent in 2001, declined to 5.5 percent in 2011. After the agriculture sector, the community and social service sector, and the trade, restaurant and hotel sector emerged as a second and third major sector employing people with a share of 12.8 percent and 8.1 percent respectively.

Table 4 also presents the growth of employment in different sectors over the period of 1991-2001 and 2001-2011. Overall employment increased by 2.7 percent in 1991-2001 but only 0.6 percent in 2001-2011. This shows that not only

the economy grew at a lower rate, but also there was almost job-less economic growth during 2001-2011. Employment in the agriculture sector grew by 0.8 percent in 1991-2001 and 0.7 percent in 2001-2011. During 1991-2001, employment in almost all non-agriculture sectors had increased substantially – double digit annual growth. However, reverse trend was observed in almost all non-agriculture sectors during 2001-2011 period, except the mining and quarrying sector which contributes just 0.3 percent of total employment, and the transport, communication and storage sector; and community, social and other services (Table 4).

Table 4: Growth and the Share of Employment in Different Sectors of the Nepalese Economy

(in percent)

	Employment share			Employment Growth (Annual average)	
	1991	**2001**	**2011**	**1991-2001**	**2001-2011**
Agriculture, Fisheries and Forestry	81.2	65.7	66.7	0.8	0.7
Mining and Quarrying	0.0	0.2	0.3	17.4	5.1
Manufacturing	2.0	8.8	5.5	16.0	-3.7
Electricity, gas and water supply	0.2	1.5	0.2	23.1	-16.0
Construction	0.5	2.9	3.2	18.9	1.6
Trade, Restaurant and Hotel	3.5	9.9	8.1	12.2	-1.3
Transport, Communication and Storage	0.7	1.6	2.4	10.5	4.3
Financial and Real Estate	0.3	0.8	0.7	11.8	0.2
Community, Social and Other Services	11.6	8.6	12.8	0.0	4.2
Total	100	100	100	2.7	0.6

Source: Census Surveys 1991, 2001 and 2011, Central Bureau of Statistics

The employment elasticity of overall economy and its different sectors are presented in Table 5. During 1991-2001, the employment elasticity of whole economy was 0.64, which declined to 0.18 during 2001-2011. It also proves the job-less marginal growth observed during 2001-2011. Similar trend is observed in the agriculture sector, the employment elasticity of which was 0.32 for 1991-2001, but declined to 0.25 for 2001-2011. The employment elasticity of almost all non-agriculture sectors was quite satisfactory during 1991-2001, except community,

social and other services. However, the employment elasticity of manufacturing; electricity, gas & water; trade, restaurant and hotel turned into negative during 2001-2011. These three sectors not only grew at a lower rate, but also laid off workers in the recent decade.

Table 5: Employment Elasticity of Different Sectors of the Nepalese Economy

	1991-2001	2001-2011
Agriculture, Fisheries and Forestry	0.32	0.25
Mining and Quarrying	3.70	1.50
Manufacturing	2.15	-4.85
Electricity, gas and water supply	3.93	-1.83
Construction	3.76	0.47
Trade, Restaurant and Hotel	2.58	-1.43
Transport, Communication and Storage	1.55	0.74
Financial and Real Estate	2.60	0.05
Community, Social and Other Services	0.00	0.63
Total	0.64	0.18

Source: *Authors' calculation*

5. Structural Change, Labour Productivity and Employment

We have seen above that the Nepalese economy has undergone some structural changes. But, question that arises is whether the structural changes have been growth and productivity enhancing as well as employment inducing. There should be a high-productivity employment opportunities in the economy for a higher growth and decent work. The movement of labour from low-productivity to high productivity activities raises economy-wide labour productivity (McMillan and Rodrik, 2011).

The labour productivity gaps between different sectors are typically very large in the Nepalese economy, although overall labour productivity witnessed some improvements between 1991 and 2011. The agricultural sector has the lowest labour productivity, though there has been some improvement over 1991-2011 period, and it is the agriculture sector which provides employment to more than two-thirds of labour force. The labour productivity in the financial and real estate sector has remained the highest among others, but only few people are being

employed in this sector (Table 4 and Table 6). The labour productivity of the finance and real sector was 28 times larger than that of in the agriculture sector in 2011. Among non-agriculture sectors, the labour productivity in the community, social and other services sector remained the lowest, although it is the major non-agricultural sector for providing employment to people (Table 4).

Table 6: Sectorwise Labour Productivity (at 1991 Price)

in '000

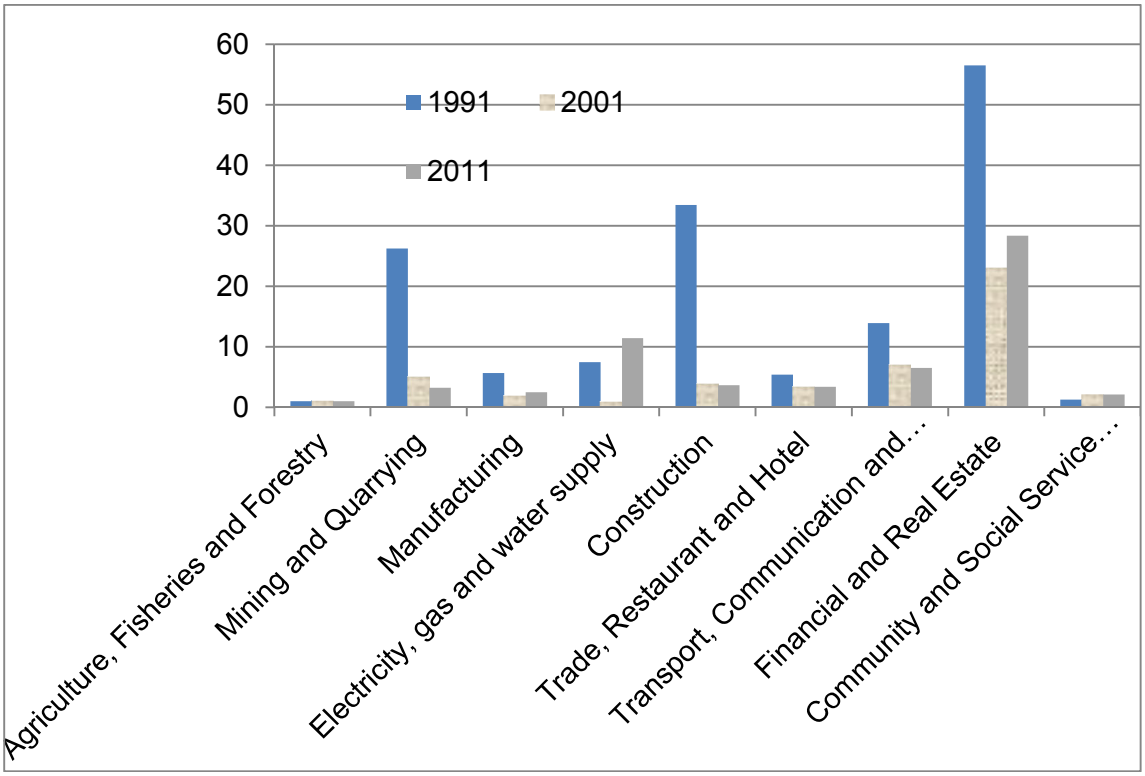
	1991	**2001**	**2011**
Agriculture, Fisheries and Forestry	9.3	11.5	14.6
Mining and Quarrying	243.5	56.8	47.2
Manufacturing	52.6	22.2	36.3
Electricity, gas and water supply	69.5	10.9	166.7
Construction	310.7	43.5	53.0
Trade, Restaurant and Hotel	50.4	38.8	49.2
Transport, Communication and Storage	129.1	80.6	95.3
Financial and Real Estate	525.0	264.5	413.7
Community and Social Service and others	11.7	23.3	30.6
Total	15.8	20.2	27.3

Source: Author's calculation

Figure 1 presents the ratio of labour productivity of different sectors relative to the agriculture in three different points of time. Except the community, social and service, the labour productivity of all other sectors declined in 2001 and revived in 2011. In 2011, such a labour productivity ratio remained the highest for the financial and real estate sector (28 times)[1], followed by the electricity, gas and water supply (11 times), and the transport, communication and storage (7 times). Despite declining over time, the labour productivity of the manufacturing sector remained twice the productivity in the agriculture sector and the productivity in construction was four times larger than that of the agricultural sector in 2011. In this way, the persistence of inter-sectoral productivity gaps, despite some improvement between 1991 and 2011, is clearly a feature of underdevelopment in Nepal. In this situation, any changes in employment pattern towards higher productive sectors will increase economy wide labour productivity.

[1] This may be supported by remittance inflows in recent years.

Figure 1: Labour Productivity Ratio (relative to the agriculture sector)



Source: Table 6

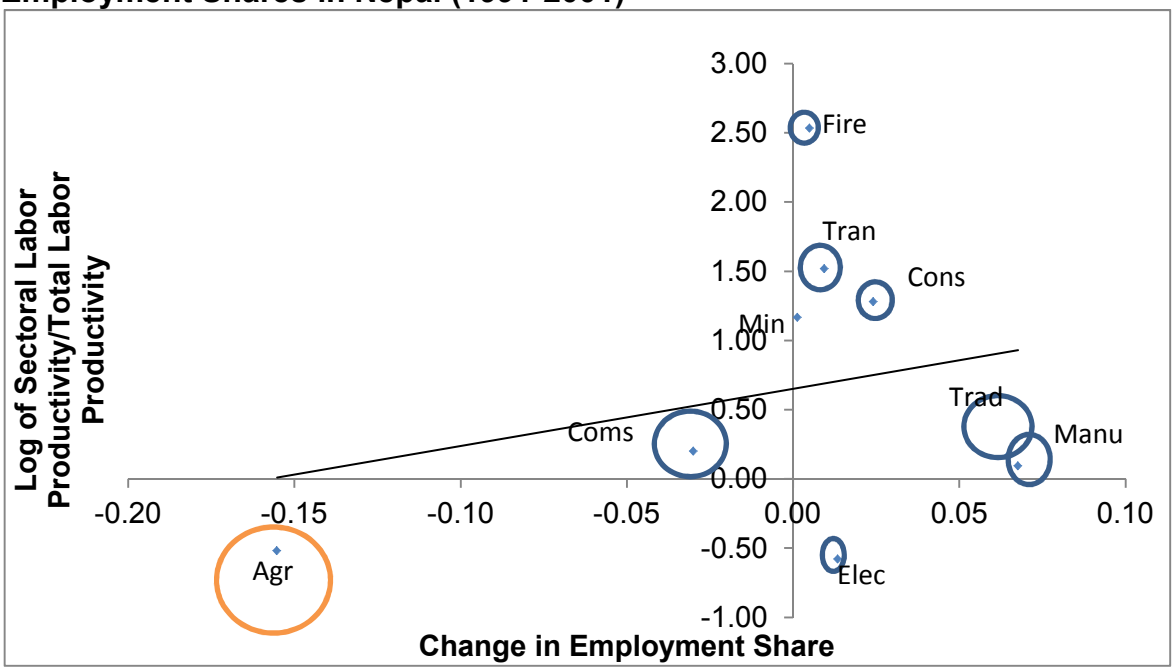
Overall labour productivity can increase either through rise in labour productivity within economic sectors through capital accumulation, technological change, reduction of misallocation across plants, or through moving labour across sectors from low-productivity sectors to high-productivity sectors (McMillan and Rodrik, 2011). The second part is the effect of structural change (labour reallocation across different sectors) on labour productivity. When employment changes are positively correlated with productivity level, there will be positive impact from structural change on overall productivity. Hence, a partial analysis of productivity performance within individual sectors can be misleading when there are large differences in labour productivities and employment shares across economic activities. A high rate of labour productivity growth within an industry can have quite ambiguous implications for overall economic performance if the industry's share of employment shrinks rather than expand over time (McMillan and Rodrik, 2011). If the displaced labour ends up in activities with lower productivity, economy wide growth will suffer. Such a situation can happen when there is a large inter-sectoral productivity gaps.

The relationship between change in productivity and employment share has important implications for the economy. Figure 2 and 3 present the relative productivity of sectors (at the end of period) against the change in their employment share during 1991-2001 and 2001-2011[2]. A negative correlation between the direction of labour flows and labour productivity in individual sectors indicates growth reducing structural change and vice-versa (McMillan and Rodrik, 2011). However, Figure 2 shows the positive correlation between labour productivity and change in employment share during 1991-2001. This indicates growth-enhancing structural change during that period – workers were moving from agriculture to high productive non-agriculture sector, immediately after the adoption of economic liberalization policy in the 1990s. There was an expansion of communication, transportation, financial sector and manufacturing during that period.

In contrast, several factors like intensification of internal conflict, political instability and growing shortage of infrastructure, particularly energy shortage started crippling the economy. As a result, reverse trend started working in the economy as seen from Figure 3, which depicts the negative correlation between labour productivity and change in employment share during 2001-2011. During 2001-2011, manufacturing; trade, restaurant & hotel; and electricity observed a relative loss in employment. The sector experiencing the largest employment gain is only the community, social and other service sector (Coms in Figure), which has a high level of informality and is among the least productive sectors. The employment share of agricultural also increased marginally during 2001-2011. In this way, Nepalese economy has been witnessing growth reducing structural change in the recent decade; people are going back to the agriculture sector or going to foreign employment. Amidst energy shortage, unstable industrial relation, and rising competition from imports, many industries have been forced to contract and release labour to informal work and foreign employment. Because of reverse structural change and lack of employment for the growing population, it is estimated that about 4 to 5 million people are abroad for foreign employment in recent years.

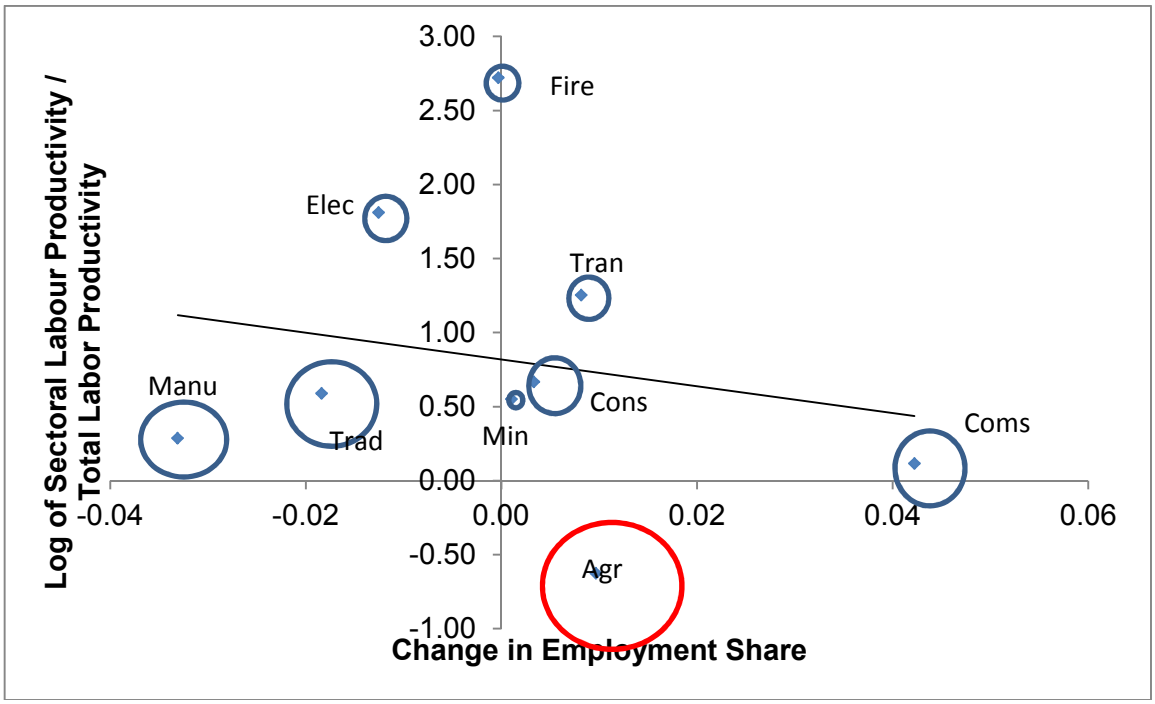
[2] Size of circle tends to show the relative share of the sectors in the economy.

Figure 2: Correlation between Sectoral Productivity and Change in Employment Shares in Nepal (1991-2001)



Source: Author's computation

Figure 3: Correlation between Sectoral Productivity and Change in Employment Shares in Nepal (2001-2011)



Source: Author's computation

Notes: Agr = Agriculture, Fisheries and Forestry, Min = Mining and Quarrying, Manu= Manufacturing, Elec = Electricity, gas and water supply, Cons = construction, Trad = Trade, Restaurant and Hotel, Fire = Financial and Real Estate, Coms = Community, Social and Other Services

6. Decomposition of Per Capita GDP growth

This section analyses the per capita growth by decomposing it into three different components as shown above in section 2. Table 7 presents the main data used for the aggregate decomposition. Data on value added are at 1991 price. New GDP series is used for 2001-2011 period and old series is used for 1991-2001 period.

Table 7: Employment, Output, Productivity and Population (1991-2011)

	1991	2001	2001(new)	2011 (new)	1991-2001 (Annual % Change)	2001-2011 (Annual % Change)
GDP (value added) Rs. million @1991 price	116127	185961.3	200780.8	291173.8	4.7	3.7
Total Population in '000	18491.1	22736.9	22736.9	26494.5	2.1	1.5
Total population of working wage in '000 *	10108.8	12831.9	12831.9	15854.3	2.4	2.1
Total number of employed in '000#	7339.6	9900.2	9900.2	10570.7	3.0	0.7
					Change	
GDP (value added) per capita	6280.2	8178.8	8830.6	10990	1898.7 (2.6% per year)	2159.4 (2.2% year)
Output per worker (w)	15822.0	18783.6	20280.5	27545.3	2961.6 (1.7% per year)	7264.9 (3.1% per year)
Employment Rate (e)	0.73	0.77	0.77	0.67	0.05	-0.10
Share of population of working age (a)	0.55	0.56	0.56	0.60	0.02	0.03

Source: Various Issues of Economic Survey and Census Survey

The Nepalese economy registered a growth rate of 2.6 percent per year in per capita value added for 1991-2001 and 2.2 percent for 2001-2011. The growth for two periods was accompanied by increase in output per worker by 1.7 percent and 3.1 percent annually respectively. There was also an increase in employment rate by 5 percentage points in 1991-2001, but such a rate declined by 10 percentage point in 2001-2011 – contraction in employment in a recent decade.

The share of working age population increased by 2 percentage points during 1991-2001 and by 3 percentage points during 2001-2011. In this way, the growth of per capita GDP was mainly caused by increase in productivity during 2001-2011. There was a fall in employment ratio during this period, while there was a rise in share of working age population.

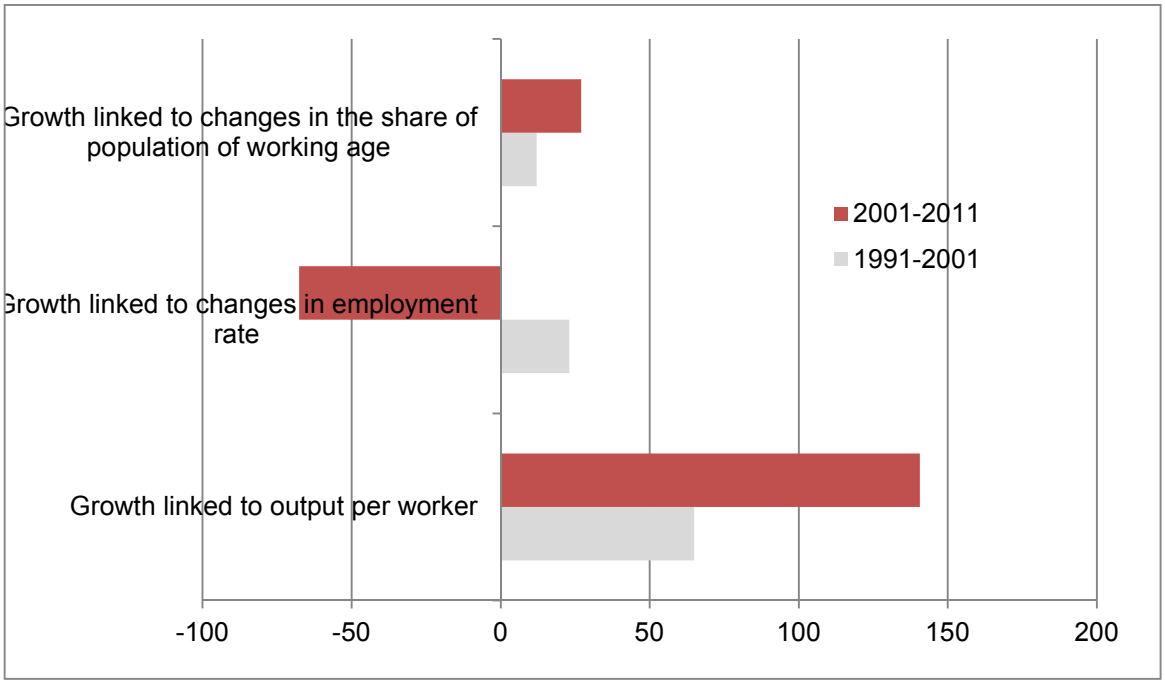
The Shapley decomposition shows the importance of these three components further. Table 8 and Figure 4 below present the results of the decomposition of aggregate per capita growth into its main components. Table 8 shows the contribution in absolute observed growth in per capita GDP at 1991 price as well as the percent contribution. The results show that during 1991-2001 almost 65 percent of the change in per capita value added can be linked to change in productivity. Change in employment was also important, accounting for 23 percent of observed growth. Thus, growth during 1991-2001 was not "job-less". The remaining 12.1 percent of growth was linked to the change in the structure of the population i.e. increase in proportion of working age population.

Table 8: Decomposition of Growth in per Capita Value Added (1991-2011)

	1991-2001		2001-2011	
	Change in per Capita Value Added (@1991 price) in Rs.	**% of total change in per capita value added growth**	**Change in per Capita Value Added (@1991 price)**	**% of total change in per capita value added growth**
Total growth in per capita GDP	1898.7	100	2159.4	100
Growth linked to output per worker	1232.1	64.9	3035.2	140.6
Growth linked to changes in employment rate	437.3	23.0	-1459.0	-67.6
Growth linked to changes in the share of population of working age	229.3	12.1	583.2	27.0

Source: Author's calculation

Figure 4: Aggregate Employment, Productivity and Demographic Profile of Growth (1991-2011)



Source: Table 8

Contrary to 1991-2001, changes in employment rate moved in opposite direction during 2001-2011. A large portion of people were out of work in the economy. A decline in per capita value added due to fall in employment rate was compensated by increase in productivity. A rise in working age population increased the contribution to per capita value added to 27.0 percent in 2001-2011 period from 12.1 percent in the previous decade. In this way, contraction of employment has been observed in recent years.

6.1 Role of Sectors to Employment Generation and Per Capita GDP growth

To compute which sectors contributed to employment generation and to per capita GDP growth, we decompose the change in employment rate (Δe) by sectors as

$$\Delta e = \sum_{i=1}^{s} \Delta e_i \quad \text{.....(5)}$$

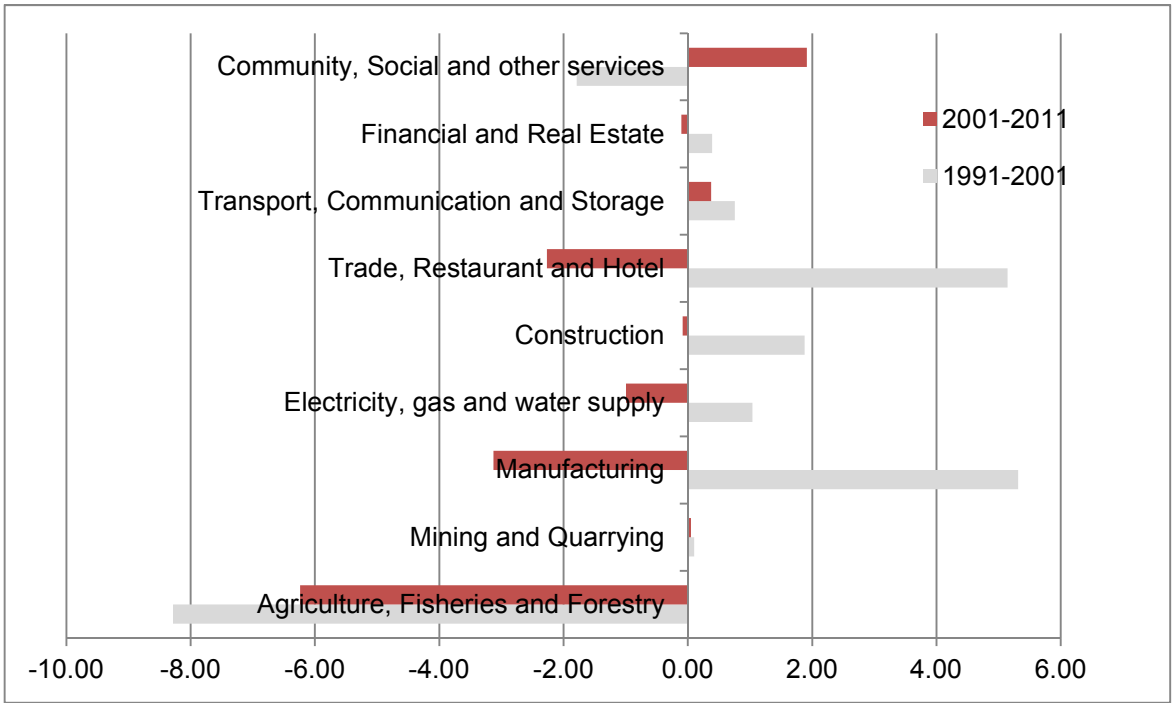
where $\Delta e_i = \Delta E_i / A$ is just the change in employment in sector 'i' as a share of total working population. This analysis gives us a simple measure of which sector contributed more to changes in the employment rate.

Appendix 1 presents the data on employment by sectors. All sectors registered an absolute growth in the number of employed during 1991-2001.

Likewise, except agriculture and community, social and other service, all sectors gained in the share of total employment during that period. In contrast, manufacturing; electricity, gas and water; and trade, restaurant and hotel registered a decline in employment during 2001-2011. Only community, social and other service sector gained in the share of total employment during 2001-2011. Total employment grew by 2.7 percent and the employment rate increased by 4.5 percentage points during 1991-2001. However, despite an absolute increase in employment by a meager 0.6 percent, the employment rate declined by 10.5 percentage point during 2001-2011. This shows getting employment is not easy in recent years in Nepalese economy, compelling people to go for foreign employment.

Further, during 1991- 2001, employment rate declined in agriculture; community, social and other service (Appendix 1 and Figure 5). However, such a drop in employment rate was observed in almost all sectors except transport, communication and storage sector; community, social and other services sector; and mining and quarrying sector during 2001-2011.

Figure 5: Contribution of each Sector to Changes in Employment Rate (1991-2011)



Source: Appendix 1

Moreover, Table 9 shows the contribution of sectoral employment changes to growth in total per capita output. Of the contribution linked to change in employment rate to per capita GDP growth i.e. Rs. 437.3 (or 23.03 percent) during 1991-2001, the manufacturing sector contributed with Rs. 510.9 and the trade, restaurant and hotel sector with Rs. 494.4. However, there was a negative contribution of agriculture and community, social and other service as a result of contraction of employment in these sectors during 1991-2001. On the other hand, except community, social and other service; transport, communication and storage; and mining and quarrying, the contribution of all other sectors through employment changes to overall change in per capita GDP was negative during 2001-2011. This depicts the severe contraction of employment in almost all sectors during 2001-2011.

Table 9: Contribution of Employment Changes to Overall Change in Per Capita GDP (1991-2011)

	Contribution to changes in per capita GDP		**Percent of total changes in per capita GDP**	
	1991-2001	2001-2011	1991-2001	2001-2011
Agriculture, Fisheries and Forestry	-796.7	-868.9	-41.96	-40.24
Mining and Quarrying	9.8	7.2	0.52	0.33
Manufacturing	510.9	-435.8	26.91	-20.18
Electricity, gas and water supply	99.9	-138.5	5.26	-6.41
Construction	180.7	-11.4	9.52	-0.53
Trade, Restaurant and Hotel	494.4	-315.9	26.04	-14.63
Transport, Communication and Storage	72.8	51.9	3.83	2.4
Financial and Real Estate	37.6	-14.3	1.98	-0.66
Community, Social and other services	-172.2	266.7	-9.07	12.35
Total	437.3	-1459	23.03	-67.57

Source: Authors' Computation

6.2 Sectoral Productivity Changes and their Contribution to Per Capita GDP

This section performs the decomposition of productivity in terms of sectoral employment shifts and change in productivity within sectors by

$$\frac{Y}{E} = \sum_{S} \frac{Y_i}{E_i} \frac{E_i}{E} \quad \text{.........(6)}$$

where Y_i is value added of sector 'i', E_i is employment in sector 'i' and E is total employment. The equation just states that total output per worker is the weighted sum of output per worker in all sectors, where the weights are simply the employment share of each sector.

As given in the World Bank's Job Generation and Growth Decomposition tool, changes in aggregate output per worker can be decomposed into changes in output per worker within sectors and movement of labour between sectors (intersectoral shift) by using the Shapley approach. Increase in productivity within a sector increases average productivity, but its size depends on the size of each sector i.e. its share in total employment. Similarly, intersectoral shift of labour from low productivity sector to high productivity sector also increases the average productivity.

Table 10 presents the data for decomposing total productivity into sectoral productivity. The table shows the fall in productivity of almost all sectors except agriculture, and community, social and other service during 1991-2001. The reverse was the situation during 2001-2011 when all sectors except the mining and quarrying registered an increase in productivity.

Table 10: Changes in Productivity by Sectors (1991-2011)

	Output per worker (@1991 price in '000)				**% Change**	
	1991	**2001**	**2001 (new)**	**2011**	**1991-2001**	**2001-2011**
Agriculture, Fisheries and Forestry	9.3	11.2	11.5	14.7	20.4	28.2
Mining and Quarrying	243.5	60.4	56.9	47.8	-75.2	-16.0
Manufacturing	52.6	20.6	22.3	36.6	-60.8	64.1
Electricity, gas and water supply	69.5	10.6	11.0	168.9	-84.8	1437.7
Construction	310.7	67.6	43.6	53.6	-78.2	23.0
Trade, Restaurant and Hotel	50.4	22.2	38.9	49.7	-56.0	27.7
Transport, Communication and Storage	129.1	85.8	80.8	96.3	-33.5	19.1
Financial and Real Estate	525.0	236.7	265.2	418.3	-54.9	57.8
Community, Social and other Services	11.7	23.0	23.3	30.9	95.4	32.5
Total	15.8	18.8	20.3	27.5	18.7	35.8

Source: Author's calculation

Table 11 shows the contribution of each sector as well as of inter-sectoral employment shifts to the observed growth in the total output per worker. The growth of total productivity by Rs. 2961.6 for the period of 1991-2001 is accounted for by an increase of Rs. 2520.8 from agriculture, and community, social and other services sector and a decrease of Rs. 10433.6 from all other sectors, and a significant positive effect of inter-sectoral labour relocation of Rs. 10874.5. Such a positive effect of inter-sectoral effect indicates on average labour moved from lower than average productivity sectors to above average productivity sectors during 1991-2001. As we saw, during 1991-2001, labour moved to manufacturing; trade, restaurant and hotel; construction; electricity, gas and water. These sectors had labour productivity higher than average.

Table 11: Decomposition of Output/Worker into Within Sector Change in Output/Worker & Inter-sectoral Shifts

	Contribution to change in total output per worker	
	1991-2001	**2001-2011**
Agriculture, Fisheries and Forestry	1390.9	2142.7
Mining and Quarrying	-177.9	-19.5
Manufacturing	-1735.8	1022.8
Electricity, gas and water supply	-487.8	1371.9
Construction	-4106.9	307
Trade, Restaurant and Hotel	-1896.4	974.4
Transport, Communication and Storage	-503.2	315.3
Financial and Real Estate	-1525.7	1161.7
Community and Social Service	1129.9	809.3
Inter-sectoral shift	10874.5	-820.9
Total change in output per worker	2961.6	7264.9

Source: Author's calculation

However, there was a negative effect of inter-sectoral shift to labour productivity during 2001-2011. It means labour moved out from high-productive non-agricultural sectors to the agriculture sector or remained unemployed and opted for foreign employment. As a result of job-less growth, an increase in labour productivity in all sectors except mining and quarrying contributed to an increase in total output per worker during 2001-2011. Use of more capital-intensive technique in industries and service sectors such as computer and information

technology seemed to have increased the productivity in these sectors in recent years by shredding employment. As of present, one-third of change in total output per worker is still generated from agriculture. Among non-agriculture sector, electricity, gas and water sector had greater contribution, followed by manufacturing, and finance and real estate to change in total productivity during 2001-2011.

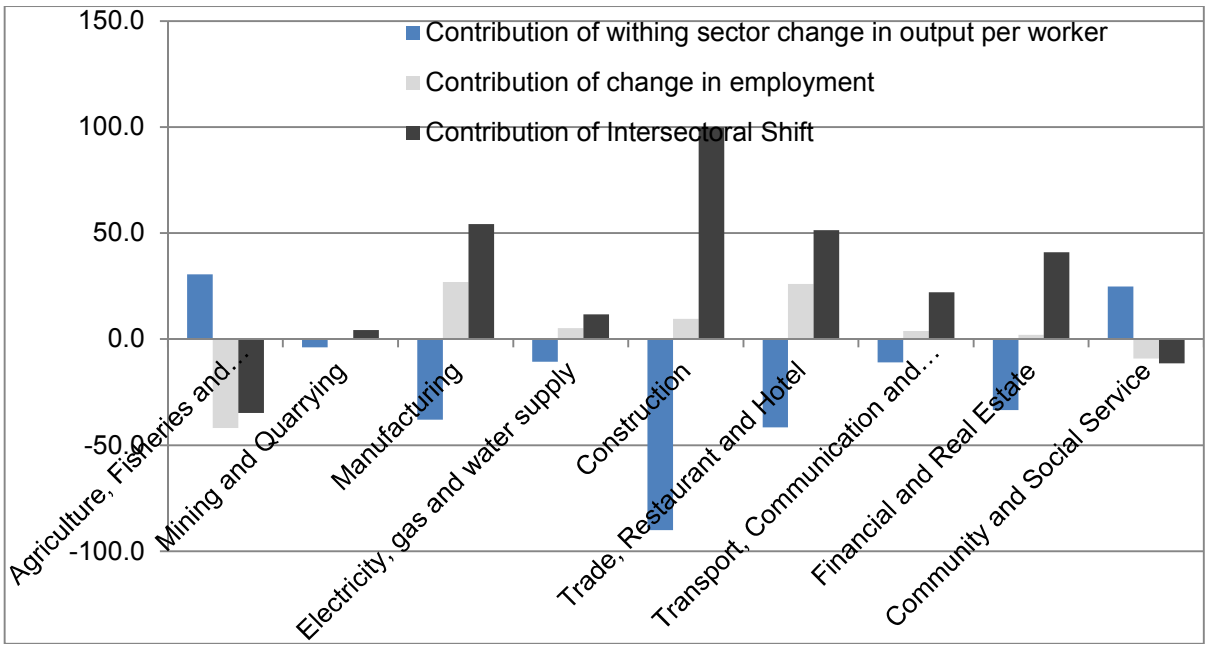
6.3 Combining Together Change in Employment Rate and Productivity

Appendix 2 and Appendix 3 combine the exercise done above together to see the intricacies of change in per capita GDP, which is the result of change in productivity, employment share, inter-sectoral shift and demographic change for two periods: 1991-2001 and 2001-2011. While Appendix 2 shows the change in per capita GDP and its components in absolute values, Appendix 3 presents the same in percent. Sectoral contributions are decomposed into (i) contribution of changes in output per worker (first column), (ii) contribution of changes in employment (second contribution), and (iii) contribution of the sector to the inter-sectoral employment shifts. Contributions of these components in different economic sectors are shown in Figure 6a and 6b.

Except the agriculture sector, all other sectors contributed positively to increase in per capita GDP during 1991-2001 (Figure 7). There was increase in employment in almost all non-agricultural sectors resulting in positive effect from inter-sectoral shift of labour from low-productive sectors to high productive sectors during that period (Figure 6a). However, the period 2001-2011 remained quite different. There was a fall in employment in almost all sectors which resulted in negative contribution to change in per capita during 2001-2011 (Appendix 2 & 3 and Figure 6b). The contribution of inter-sectoral shift became negative in this period in several non-agricultural sectors. Hence, manufacturing; electricity, gas and water; and trade, restaurant and hotel sector accounted for a fall in per capita GDP. A positive contribution from community, social and other services; transport, communication and storage; and finance and real estate along with agriculture helped to gain rise in per capita GDP during 2001-2011. A rise in working age population also contributed to growth in per capita GDP during that period (Appendix 2 & 3). However, except community, social and other service, and mining and quarrying, all other sectors had negative contribution from change in

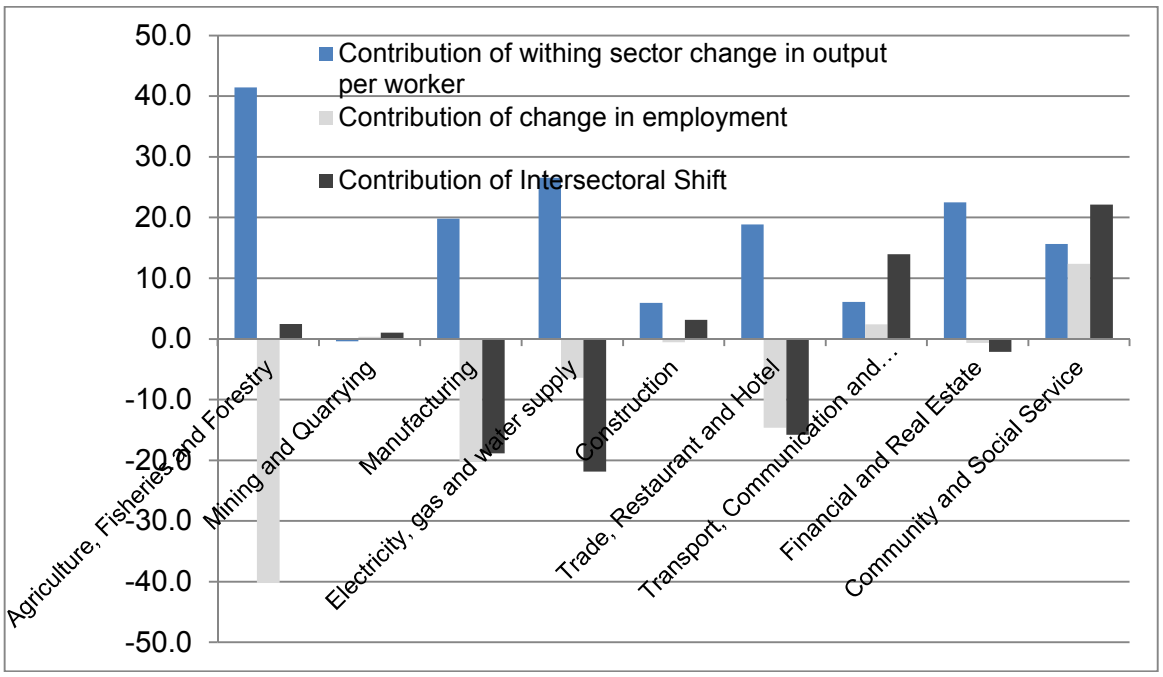
employment to growth in per capita GDP. This shows a situation of shrinking employment amidst rising population, especially working age population.

Figure 6a: Growth Decomposition, Percent Contribution to Total Growth in GDP (Value Added) per capita, during 1991-2001



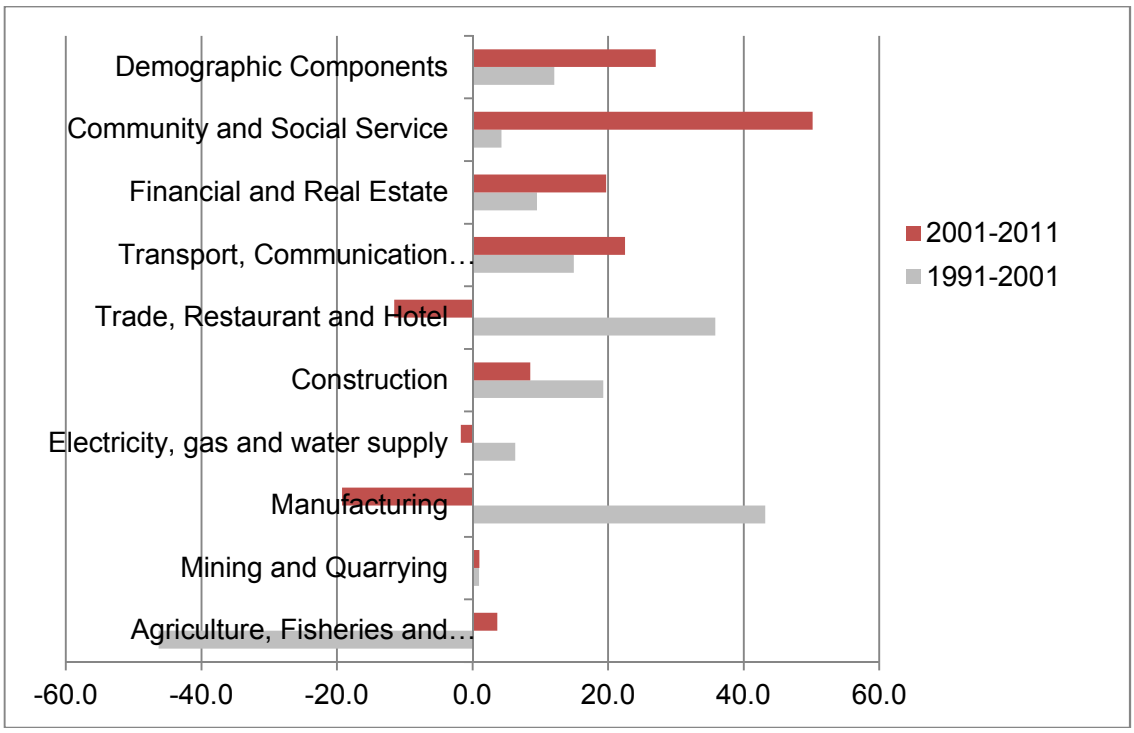
Source: Appendix 3

Figure 6b: Growth Decomposition, Percent Contribution to Total Growth in GDP (Value Added) per capita, during 2001-2011



Source: Appendix 3

Figure 7: Growth Decomposition, Total Percent Contribution to Total Growth in GDP (Value Added) per capita by Sectors



Source: Author's calculation

7. Conclusions and Policy Recommendations

This paper has examined the structural change of the Nepalese economy from the perspective of change in productivity and employment with the implementation of economic liberalization process. Although the Nepalese economy started to change in a right direction in the first decade of the liberalization, such a trend did not continue in the next decade. Hence, there is no significant structural change in employment and productivity front, although the share or agriculture in the total GDP has decelerated marginally per year. Still, the agricultural sector is the mainstay for two-thirds of populations, but productivity of this sector is very low. There has not been any particular sector, which has emerged as an engine of growth in the Nepalese economy. Sluggish and job-less growth in non-agricultural sector in the recent decade has been compelling the people to go for foreign employment. The Nepalese economy observed just a marginal growth in employment and contraction of employment elasticity in recent years.

During 2001-2011, the Nepalese economy witnessed a negative correlation between relative productivity of sectors and the change in their employment share. This indicates decline in employment in high productive sectors. As a result, structural changes have not remained growth enhancing and employment generating. It is suggested that energy shortage, industrial conflict, and political instability have contributed to cause manufacturing industries and even service sectors to contract and release labour to less productive activities like agriculture, community, social and other services, and to foreign employment. While the working age population has been increasing, employment rate is found to be contracting.

In contrast to positive effect from structural changes – inter-sectoral labour relocation during 1991-2001, there was a negative effect from such a shift during 2001-2011. This also indicates that structural changes in Nepal in recent decade is not growth inducing and employment generating, resulting in slowdown in the growth of per capita GDP. Obviously, this type of growth cannot be inclusive despite increase in productivity in non-agriculture sectors in recent years because of using capital intensive techniques.

A number of policy implications can be drawn from the analysis in this paper to increase both productivity and employment for raising per capita income in the economy. First, productivity in the agricultural sector should be increased through mechanization and commercialization. Second, special attention should be given for promoting the manufacturing and service sector, which can generate employment and exhibit the high productivity. Third, government should focus on developing human capital necessary for the economy. With increasing skills, employment will increase and growth will be more inclusive. Specially, there should be policy and programs for developing entrepreneurial skill. Fourth, construction of physical infrastructure and adequate supply of energy should be ensured for promoting economic activities in the economy.

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Appendix 1: Employment by Sectors of Economic Activity, 1991-2011

Economic Sectors	Employment			Employment Growth (Annual %)		Employment/Pop. of working age (e)			Change in 'e' in each sector	
	1991	2001	2011	1991-2001	2001-2011	1991	2001	2011	1991-2001	2001-2011
Agriculture, Fisheries and Forestry	5961788	6504689	7047343	0.8	0.7	58.98	50.69	44.45	-8.28	-6.24
Mining and Quarrying	2361	16048	28003	17.4	5.1	0.02	0.13	0.18	0.10	0.05
Manufacturing	150057	872253	581478	16.0	-3.7	1.48	6.80	3.67	5.31	-3.13
Electricity, gas and water supply	11734	148218	25438	23.1	-16.0	0.12	1.16	0.16	1.04	-0.99
Construction	35658	286418	340898	18.9	1.6	0.35	2.23	2.15	1.88	-0.08
Trade, Restaurant and Hotel	256012	984662	856891	12.2	-1.3	2.53	7.67	5.40	5.14	-2.27
Transport, Communication and Storage	50808	161638	258786	10.5	4.3	0.50	1.26	1.63	0.76	0.37
Financial and Real Estate	20847	76687	78475	11.8	0.2	0.21	0.60	0.49	0.39	-0.10
Community, Social and Other Services	850321	849584	1353396	0.0	4.2	8.41	6.62	8.54	-1.79	1.92
Total	7339586	9900197	10570708	2.7	0.6	72.61	77.15	66.67	4.55	-10.48

Source: Census Survey and Authors' calculation

Appendix 2: Growth Decomposition, Contribution to Total Growth in GDP (Value Added) per capita

	1991-2001				2001-2011			
	Contribution of within sector change in output per worker	**Contribution of change in employment**	**Contribution of Inter-sectoral Shift**	**Total**	**Contribution of within sector change in output per worker**	**Contribution of change in employment**	**Contribution of Inter-sectoral Shift**	**Total**
Agriculture, Fisheries and Forestry	578.7	-796.7	-661.0	-879.1	895.2	-868.9	52.9	79.2
Mining and Quarrying	-74.0	9.8	82.1	17.9	-8.1	7.2	22.5	21.5
Manufacturing	-722.2	510.9	1030.7	819.5	427.3	-435.8	-406.9	-415.4
Electricity, gas and water supply	-203.0	99.9	222.6	119.6	573.2	-138.5	-472.1	-37.4
Construction	-1708.6	180.7	1894.1	366.2	128.3	-11.4	67.4	184.3
Trade, Restaurant and Hotel	-789.0	494.4	974.7	680.2	407.1	-315.9	-340.6	-249.3
Transport, Communication and Storage	-209.3	72.8	420.5	284.0	131.7	51.9	301.7	485.4
Financial and Real Estate	-634.7	37.6	777.3	180.2	485.4	-14.3	-46.0	425.1
Community, Social and Other Services	470.1	-172.2	-216.9	81.0	338.1	266.7	478.0	1082.8
Subtotal	-3292.1	437.3	4524.2	1669.4	3378.2	-1459.0	-342.9	1576.2
Demographic Components				229.3				583.2
Total change in value added per capita				1898.7				2159.4

Source: Authors' calculation

Appendix 3: Growth Decomposition, Percent Contribution to Total Growth in GDP (Value Added) per capita

	1991-2001				2001-2011			
	Contribution of within sector change in output per worker	**Contribution of change in employment**	**Contribution of Intersectoral Shift**	**Total**	**Contribution of within sector change in output per worker**	**Contribution of change in employment**	**Contribution of Intersectoral Shift**	**Total**
Agriculture, Fisheries and Forestry	30.5	-42.0	-34.8	-46.3	41.5	-40.2	2.5	3.7
Mining and Quarrying	-3.9	0.5	4.3	0.9	-0.4	0.3	1.0	1.0
Manufacturing	-38.0	26.9	54.3	43.2	19.8	-20.2	-18.8	-19.2
Electricity, gas and water supply	-10.7	5.3	11.7	6.3	26.5	-6.4	-21.9	-1.7
Construction	-90.0	9.5	99.8	19.3	5.9	-0.5	3.1	8.5
Trade, Restaurant and Hotel	-41.6	26.0	51.3	35.8	18.9	-14.6	-15.8	-11.5
Transport, Communication and Storage	-11.0	3.8	22.1	15.0	6.1	2.4	14.0	22.5
Financial and Real Estate	-33.4	2.0	40.9	9.5	22.5	-0.7	-2.1	19.7
Community, Social and Other Services	24.8	-9.1	-11.4	4.3	15.7	12.4	22.1	50.1
Subtotal	-173.4	23.0	238.3	87.9	156.4	-67.6	-15.9	73.0
Demographic Components				12.1				27.0
Total change in value added per capita				100.0				100.0

Source: Authors' calculation