

# **Sinking in Premature Deindustrialisation or Revitalising Industrialisation? Nepal's Prospective**

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## **Abstract**

*Economies of the world in general evolve by transferring them from agriculture to manufacturing and then from manufacturing to services. Today's most developed economies have experienced their deindustrialisation at higher level of per capita income. But developing countries have begun to fall in premature deindustrialisation at low level of per capita income which is not taken as a good sign for their overall economic development. This paper analyses the potentiality of premature deindustrialisation in the context of Nepal covering the data of the period 1975-2016. The issue of premature deindustrialisation is analysed in terms of the share of manufacturing output in the gross domestic product of the country and employment. There is evidence of premature deindustrialisation in Nepal. The paper argues that reindustrialisation is essential and possible in Nepal.*

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**Key words:** *Structural transformation, Industrialisation, Deindustrialisation, Economic growth*

**JEL Code:** O14

## **1. BACKGROUND**

Different economies follow different development trajectories. The early proposition put forward by Clark (1940) and Fisher (1935) envisioned that the development of an economy shifts from agriculture to manufacturing to services. In line with the Clark-Fisher proposition a number of prominent economists offered the earlier theoretic support to a linear path of transformation of economies in which resources, for instance labour and capital, move from agriculture sector to the manufacturing (Chenery, 1960; Chenery & Syrquin, 1975; Chenery, Robinson & Syrquin, 1986; Kuznets, 1966). The two sector development model formulated by Lewis (1954) gives importance to the concept of transformation in terms of shifts in labour from agriculture to industry. Such transformation is argued to be advantageous, considering that the manufacturing sector implants larger benefits than traditional agriculture sector. In explaining the stages of development Rostow (1960) proposed that an economy passes from a pre-Newtonian era of primitive agriculture to the stage of high mass consumption. Thus the long held view on structural transformation in the broad sectors of an economy

is “the basic shift in the center of gravity of the economy from primary production to manufacturing and later to service” (Chenery, 1988, p.199).

Economic development is the prime goal of every nation. In the words of Södersten and Reed (1994,p.404) “Economic development is usually viewed as the transformation of a low income society using traditional technologies and producing mainly primary products into a high-income society using modern technologies to produce both primary products and a variety of industrial goods”. This definition gives importance to industrialization and indicates a distinct difference between ‘development’ and ‘growth’ because growth might possibly be achieved by putting more efficient technologies into practice in the prevailing product sectors.

Of late a number of studies evaluating the premature deindustrialization experience of many developing countries have stressed that it has been a more difficult path for current developing countries to make development happen through manufacturing growth (Eichengreen & Gupta,2013; Ghani & O’Connell,2014; Rodrik, 2016). This line of argument is primarily based on the downward shifts of both manufacturing value added(MVA) and employment share in GDP and total employment across all income levels as substantiated in recent studies(Dasgupta & Singh,2007;Ghani & O’Connell,2014; Haraguchi, Cheng & Smeets, 2017; Palma,2005;Rodrick,2016).

The emerging trend of earlier deindustrialisation in the developing countries has raised an important question: Whether the kind of premature deindustrialisation occurring in developing countries is necessarily injurious to a country’s long-term development visions. View point of Dasgupta and Singh (2007) is that it is absolutely possible to deindustrialise in terms of employment but not to do so in terms of output. They further argue that deindustrialisation in either meaning may not be a harmful situation if it is a normal response to changes in tastes and technology. However it is a distressing signal when so many developing countries at a low level of per capita income reveals signs of deindustrialisation in terms of falling or constant share of manufacturing output in GDP and manufacturing employment in total employment. This would imply that much of the excess labour in the reference countries is in agriculture which will remain in agriculture or will certainly fall in low-productivity informal manufacturing and informal services (Dasgupta & Singh,2007).

The onset of deindustrialisation is observed over time across almost all country groups with developing countries deindustrializing at lower income per capita and at lower shares of manufacturing (Palma, 2005). As Tregenna(2016b, p.97) describes:

Deindustrialisation in many developing countries began before they even reached the levels of industrialisation that had been typical in advanced economies before those countries began deindustrialisation around the 1970s. This is one of the key differences between the typical patterns of deindustrialisation in developing and advanced countries.

When compared to the turning point of today's advanced economies (e.g., United Kingdom, United States of America, France, Canada, and Japan among others) most developing countries have started to deindustrialise or tertiarise earlier (Gürbüz, 2011). A number of studies have documented strong evidence of a hump-shaped relationship between manufacturing employment and per capita income. The employment share of manufacturing rises in the earlier stages of development and falls behind at high levels of per capita income. The premature deindustrialisation is considered as a trouble to sustained growth affecting a large number of developing countries.

The performance of the manufacturing sector of Nepal is not encouraging; the share of manufacturing sector in the gross value added of the country is low as revealed in section 5 of this paper. As such the objective of this paper is to analyse the trend of share of the manufacturing in the GDP of Nepal and employment, and investigate the possibility of the inverted U-curve relation between manufacturing share in GDP and per capita real GDP of Nepal. The paper contributes the literature on deindustrialisation by bringing the case of Nepal in the stage as Nepal is a least developed country struggling to stride in the group of developing countries.

The rest of the paper is structured as follows: Section 3 reviews literature on the relationship between manufacturing share and GDP and/or employment. A theoretical discussion on the role of manufacturing as a mechanism of growth, and concept of deindustrialisation as well as premature deindustrialisation is presented in section 2. Data sources and methodology are given in section 4. Section 5 presents analysis of data and discussion. Section 6 offers policy implications and conclusion.

## **2. REVIEW OF EMPIRICAL LITERATURE**

The literature on deindustrialisation primarily hypothesises an inverted-U relationship between per capita income and the share of manufacturing employment and similar relationship is also postulated between the share of manufacturing output and GDP. There is a large body of empirical literature on deindustrialisation of nations and greater number of studies are made in the context of advanced countries and less in the context of developing countries. The literature reviewed here is just a cursory survey, not a comprehensive one.

Several studies have used the augmented version of Chenery's (1960) equation by adding the squared term of per capita income and/or population to investigate empirically the relationship between manufacturing share in GDP and/or employment and per capita income. Rowthorn and Coutts (2004) analyse the impact of GDP per capita, trade balance between manufactured exports and manufactured imports, openness of manufactured trade, manufactured imports from developing countries, manufactured imports from China, and gross domestic capital formation on the percentage share of manufacturing in civil employment covering 23 countries over the period 1963-2002. The group of countries are most developed OECD countries and South Korea and Taiwan. The results confirm the inverted-U relationship between manufacturing share of employment and per capita income. In this study the estimated turning point is around \$ 9,500 (at 1995 PPP) per capita which most OECD countries had achieved by 1970 and some well before. The study documents that in the case of Britain's improvement in the non-manufacturing sphere of trade helped balance a worsening performance in the manufacturing trade in the balance of payment.

Kollmeyer (2009) analyses the causes of deindustrialisation in economically most advanced countries focusing on rising consumer affluence, faster productivity growth in manufacturing sector, and expanding trade linkages between the North and the South of the global economy. The study tests the relative importance of these three factors with two-way fixed-effects regression models and panel data on 18 OECD countries from 1970 to 2003. The results indicate that each factor makes significant contributions to deindustrialisation but the single greatest impact comes from the steadily rising affluence (wealth) of consumers in these countries. Thus Kollmeyer's (2009) study confirms the presence of an inverted-U relationship between share of manufacturing and per capita income.

Rodrik (2016) used the manufacturing share of GDP as one of the explained variables in his empirical analysis of premature deindustrialisation across the world. He also used income level, population size, country and time dummies as the main explanatory variables in his model. Rodrik's study documented an inverted-U relationship between share of manufacturing in GDP and per capita income. Mijiyawa (2017) analysed the driving factors of manufacturing development in Africa using the system-GMM technique with average panel data of the period 1995-2014 covering 53 African countries. Among other things the study documented a U-shaped relationship between the manufacturing share of GDP and per capita GDP.

Utilising panel data set from a large number of countries for two separate periods 1970-1990 and 1991-2013 Haraguchi, Cheng and Smeets (2017) tested whether an inverse U-shaped relationship holds between manufacturing share in GDP, and

manufacturing employment share in total employment. Their study also documented the existence of the inverse U-shaped relationship between the dependent variables and independent variables (GDP per capita and its square).

### **3. CONCEPTUAL FRAMEWORK**

#### *Theoretical Reasons for Manufacturing as Driver of Growth*

Industrialisation is essential because history indicates that economic development and convergence to high standards of living has almost always involved a significant amount of industrialisation (Allen, 2011). Many scholars from the discipline of economics have put forward a number of arguments in support of the significance of manufacturing sector as a driver of economic growth of nations. Economist Nicholas Kaldor is one of the strong supporters of the vital role of manufacturing in the economic growth of nations. Kaldor (1967) empirically tested the dominant effect of the manufacturing sector on the rate of economic growth. He offered various propositions on the distinct role of manufacturing for growth, including the sector's high productivity, linkage effects and demand effects (Haraguchi, Cheng, & Smeets, 2017; Szirmai & Verspagen, 2015). Greater possibility of the manufacturing sector for bigger productivity growth occurs from the sector's ability to attain greater levels of capital accumulation, economies of scale and technological progress compared with agriculture and some services (Szirmai, 2013). In his two sectors development model Lewis (1954) emphasises that the capitalist (manufacturing) sector can expand continuously by investing part of its profits until all the surplus labour of the subsistence agriculture sector has been absorbed. The expanding industrial development in the Lewis model represents a pathway for capital accumulation and economic growth.

Manufacturing sector tends to be technologically a dynamic sector. The productivity in the manufacturing sector of a poorer country will increase in a faster rate revealing a distinctive trend of unconditional convergence with the technological frontier (Rodrick, 2013). As a consequence the manufacturing sector in comparison to other sectors has a higher chance for technological progress, keeping in view that its development does not rely on country-specific situations. Growth in manufacturing tends to speed up the rate of technological development of the whole economy partially because of the absorption of surplus labour (Kaldor, 1967), and creation and diffusion of invention in certain industries through linkage effects (Marconi, Reis & Araújo, 2016).

The desire to industrialise is common to the less-developed countries (LDCs) (Södersten, & Reed, 1994). These authors suggest a number of reasons for this. First, most of the present developed market economies (DMEs) themselves achieved that status through industrialization so that it may seem reasonable to assume that

following the same route will lead to the same results. Second, primary products may be viewed as an inadequate basis for development, especially if world demand for them is thought to be inelastic. Third, a wider economic base (diversification) may lead to greater stability in national income, foreign exchange earnings, and so on. Fourth, industrialization may reduce the country's dependence on the rest of the world. Fifth, the speed of technological advances may be higher in industrial processes than in primary products. Sixth, it may be the case that an LDC has (or believes it has) a potential comparative advantage in some industrial activities. Finally, having an industrial sector may be seen as a symbol of independence. Some of these reasons are 'economic' but others, particularly the last, are distinctly non-economic (Södersten & Reed, 1994, pp.404-405).

### *Deindustrialisation*

Although deindustrialisation always signifies some sort of problems or contraction in the manufacturing sector, the term is defined in different ways. For example, Bluestone and Harrison (1982) who studied deindustrialisation in the USA defined deindustrialisation as, "a widespread, systematic disinvestment in the nation's basic productive capacity" (p.6). Cairncross (1982) offered four different definitions. Firstly, deindustrialisation may be taken to indicate a direct drop in employment in manufacturing or in output. This, as Cairncross mentions, can be misinforming in the sense of mistaking the short-run or cyclical recessions as long-run deindustrialisation. Secondly, definitions of deindustrialisation may focus on the shift from manufacturing to the service sectors, so that manufacturing has a smaller share of total employment or output. This definition has the weakness that such a shift may take place even if manufacturing is increasing in absolute terms (Dicken, 1986, p.393). Thirdly, deindustrialisation may be defined in terms of a declining share of world trade in manufacturing goods (Singh, 1977) so that there is a growing failure to earn an adequate surplus of exports over imports to keep the economy in external balance. The fourth definition expands the third to the extent where continued balance-of-trade deficits accumulate to the level that a country or region is unable to pay for necessary imports to continue further production of goods, thus creating a further falling spiral of economic collapse (Chisholm, 1985).

Rowthorn and Wells (1987) introduced the concept of 'positive' and 'negative' deindustrialisation. In terms of causes, positive deindustrialisation is conceptualised as a normal outcome of growth and development in developed economies, coming from fast productivity growth in the manufacturing sector. For the reason that this fast productivity growth is together with even faster growth and large job creation in the services sector, there is no consequential rise in employment. The harmful event of negative deindustrialisation stems from economic failure, more accurately from serious problems in industry. This type of deindustrialisation causes unemployment to rise

because labour thrown away from the manufacturing sector is not engaged into the service sector. Rowthorn and Wells also point out another form of deindustrialisation in which the structure of net exports change from manufacturing towards other goods and services, resulting in a reallocation of labour and other resources from manufacturing to other sectors.

Inspired by the empirical analysis of deindustrialisation in developing countries, Pieper (2000) suggests three kinds of deindustrialisation: productivity deindustrialisation which is a negative contribution of the industrial sector to aggregate productivity growth in an economy, and employment and output deindustrialisations which are shrinkages in the contribution of the industrial sector to aggregate output and employment respectively.

Though there are different conceptualisations of the term 'deindustrialisation' Tregenna (2009, 2013) proposes that deindustrialisation should be defined in terms of a sustained fall in both the share of manufacturing in total employment and the share of manufacturing in GDP. The logic for this proposal is that manufacturing may act as an engine of growth through both output and employment channels (Tregenna, 2016b). Rodrik (2016) also uses deindustrialisation in the sense of sustained decline in the share of manufacturing in total employment as well as in gross domestic output.

### *Causes of Deindustrialisation*

There are different causes or sources of deindustrialisation discussed in the literature. Rowthorn and Coutts (2004) diagnose five basic explanations of deindustrialisation. First, reclassification of jobs from manufacturing to services because of 'specialisation' through the outsourcing of activities to domestic service providers. Second, fall in the share of manufacturing in total consumer spending because of a decrease in the relative prices of manufacturers. Third, slower employment growth in manufacturing than in services due to higher productivity growth in manufacturing than in services. Fourth, the negative effects of international trade (specifically imports from lower-cost producers) on manufacturing employment in developed countries. Fifth, negative effects of lower rates of investment on the share of manufacturing (in both GDP and employment), in view of the fact that investment outlay goes disproportionately into manufacturing (Tregenna, 2016b).

Palma (2005) adds the 'Dutch disease' concept in the causes of deindustrialisation. As explained by Palma Dutch-disease type of deindustrialisation results from the fact that commodity-rich countries have a different (i.e., lower) path of deindustrialisation than commodity-poor ones. As some of the latter countries have become commodity-rich, these countries have experienced an 'additional' degree of deindustrialisation. This

is due to moving from one (higher) path of deindustrialisation to the other (lower) one. In this context, Dutch Disease should only be recognised as the 'additional' level of deindustrialisation related to the latter movement (Tregenna, 2016b). According to Palma (2005) this 'additional' degree of deindustrialisation is not only found in cases where a country discovered significant natural resources but also when countries have developed significant export finance or tourism. Additionally, this can also take place as a result of policy shifts (markedly trade or financial liberalisation) in middle income countries-as has happened in Latin America since economic reform (Tregenna,2016b).

### ***Premature Deindustrialisation***

In the words of Tregenna (2016a, p.720), "When a country de-industrialises at a lower level of income per capita than would be typical by international standards, this can be considered premature de-industrialisation". As observed by Rodrik (2016) the tendency of turning of developing countries into services economies without having gone through a proper experience of industrialization is called "premature deindustrialization". There are two premises in Rodrik's definition of 'prematureness' in the manufacturing sector of the low and middle income countries. One is that these economies are going through deindustrialization much earlier than the historical averages. Other theme is that earlier deindustrialization may have unfavorable effects on economic growth of developing countries.

Premature de-industrialisation is widespread among middle-income and low-income countries. Dasgupta and Singh (2007) explain two ideal types of deindustrialisation taking place in the developing world. The first is the Indian type where manufacturing employment is not growing in the formal sector but is increasing at a reasonably fast rate in the large informal sector. The share of manufacturing in Indian employment, including both the formal and informal sectors, did not show any declining sign. Manufacturing output showed a large expansion.

The other type of deindustrialisation illustrated by Dasgupta and Singh (2007) which they label as "pathological deindustrialisation" is the one that occurred in several Latin American and African countries in the 1980s and 1990s. During these two decades of the 20<sup>th</sup> century as a result of the Washington Consensus policies (Williamson, 1990, 2000) of Washington-based International Financial Institutions (IFIs), the Federal Reserve Board, and US Executive Branch, Latin American and many African countries were forced to follow the prescribed policies in response to the debt crises. Consequently there were considerable structural changes in these economies. Alternatively Ocampo (2004, 2005) and Shafaeddin (2005) have convincingly asserted that this change was of the wrong type. In the view of Ocampo and Shafaeddin the fault in the policy is that these countries initiated to specialize in line with their immediate (short-run)

comparative advantage instead of their long-term dynamic comparative advantage. As a result these economies have become more vulnerable to external economic shocks (Dasgupta & Singh, 2007). The Latin American countries have faced balance of payments constrained at a much lower growth rate than before. Main Latin American countries are still not returning to their long-term trend rate of growth under import-substitution industrialisation (ISI) which they acquired over 1950-1980. In short, Latin American deindustrialisation displays all the symptoms of industrial failure, and the ability to develop modern services.

### *Causes of Premature Deindustrialization*

So question arises as to why premature deindustrialisation is occurring in developing countries? There are different answers to this question. Some analysts see the causes of deindustrialisation in developing countries in 'internal' and external factors; others find them originating in the supply side while others find them in the demand side. Much of the contemporary thinking comes from supply side. Baldwin (2014) argues that amazing changes in technology have resulted in an unbundling of the manufacturing process. Today it is not necessary for a country to build its own domestic supply chain for industrialisation as before 1985; industrialisers in the present day join supply chains and grow rapidly because offshored production has brought things that would take decades for countries to develop domestically. As a consequence a less developed country can become home to only a particular part of the supply chain and thus manufacturing as a share of GDP may rise by less than the extent that happened in previous processes of industrialisation.

Subramanian and Kessler (2013) add technological innovation in communication and information in the supply side to explain the lower share of manufacturing in GDP as the development process advances. They argue that since the 1990s the world entered into a period of 'hyper-globalisation'. This resulted in a dramatic rise in the share of trade and services in the world trade. Such a fast rise in trade share is to some extent surprising amid no significant decline in transportation costs and substantial drop in the cost of information and communications. Though this expansion in global trade in part may be an outcome of breaking up of manufacturing across borders (the splitting of value chain), Subramanian and Kessler believe that this phase may be characterised by the increase in services trade, trade moving from "stuff" to "fluff" (i.e., tangibles to intangibles). The ultimate impact of this has been the decrease in the importance of manufacturing not only in developed countries but also in developing countries.

Rodrick (2016) links premature deindustrialisation of developing countries to globalization. His logic is that as the developing countries opened up their foreign trade, their manufacturing sector was adversely affected in two ways. One of the

route is that those countries that entered in trading without a strong comparative advantage in manufacturing became net importers of manufacturing products which inverted their long process of import-substitution. Furthermore, developing countries brought in 'deindustrialisation' from the advanced countries in the sense that they were exposed to the relative price trends built in advanced economies. The fall in the relative price of manufacturing in the advanced countries produced a restraint on manufacturing everywhere including those countries that had not achieved much technological progress. This explanation is consistent with the sharp decline in both employment and output shares in developing countries (Rodrick, 2016).

Grabowski (2017) argues for one more type of supply side phenomena. He reasons that technological innovation has, with the passage of time, become increasingly capital intensive in nature. In consequence jobs which in the past required the use of significant amounts of labour are now being automated and mechanised. Thus development of manufacturing with greater mechanisation will result in slow growth in employment opportunities.

It is not that supply factors are the only causes of premature deindustrialisation in developing countries. Demand side factors may also cause deindustrialisation. Grabowski (2017) illuminates how the demand side factor arising from the increased inequality following economic growth may reduce the relative share of manufacturing. His argument is that the distribution of income worsens with economic growth which has worked in shifting demand from manufacturing goods to services and other types of goods. The increased inequality in income distribution resulting from economic growth tends to reduce the relative demand for manufactured goods within developing nations and between developed and developing nations through trade. This has led to a decline in manufacturing production as a share of GDP and manufacturing employment as a share of total employment.

Shifts in public policy also causes or sparks premature deindustrialisation (Tregenna, 2016a). Particularly the neoliberal economic policies of trade liberalisation, product markets liberalisation, financial sector liberalisation, and austere monetary policies have been the causes of premature deindustrialisation in the developing countries. As an illustration Tregenna brings the case of Chile after the 1974 coup. Chile rapidly liberalised foreign trade; there was large reduction in tariff, and rapid privatisation of state owned enterprises (SOEs). This policy move negatively affected Chile's manufacturing employment and output. Fascinatingly, after the removal of the 'Chicago Boys' (the civilian economists of General Pinochet educated in Chicago University of USA) in 1984 and the reinforcing of protection for domestic industry, manufacturing in Chile began improving to some extent. This regaining was particularly obvious in

import-substituting sectors (ISS) that were hardest hit in the previous decade (Gwynne, 1986). In spite of this, Chilean manufacturing has in reality never recovered the gone ground (Tregenna, 2016a).

Another illustration of policy-induced premature deindustrialisation and disastrous consequences thereof is the deindustrialisation of Mongolia after 1990 (Reinert, 2004). Mongolia's earlier industrialisation was itself policy-induced in a planned Soviet scheme of industrialisation. From 1991 onward Mongolia implemented sweeping economic liberalisation, including full financial liberalisation and capital account convertibility, and from 1997 all tariffs were eliminated (except on alcohol). After these reforms, Mongolia's manufacturing sector fast failed giving rise to other several economic problems.

### *Consequences of Premature Deindustrialisation*

Premature deindustrialisation has serious results, both economic and socio-political. On the economic side, it reduces the economic growth potential and chances for convergence with income levels of the advanced economies. Formal manufacturing tends to be technologically the most dynamic sector, exhibiting unconditional convergence (Rodrik, 2013), which makes it distinct and an engine of growth. Deindustrialisation disconnects the main channel through which developed countries achieved rapid growth in the past; it blocks off the shift of workers from the rural area to urban factories where their productivity tends to be much higher (Rodrick, 2015). From the econometric analysis based on cross-country data Dasgupta and Singh (2005) conclude that the manufacturing sector plays a critical role in growth of nations. Although they found a similar econometric result for services, Dasgupta and Singh claim that in terms of causal analysis of the model, services do not in essence play a similar role as manufacturing as an engine of growth. Pieper (2000) from a study of deindustrialisation in developing countries finds a close correlation of industrial performance with overall economic performance. She documents strong influence of industry on aggregate productivity and employment

Loss of manufacturing job due to premature deindustrialisation may have welfare effects. Tregenna (2016b) argues that in totality welfare effects of job loss depend partially on whether there is simply a change in the sectoral composition of employment, or a net loss in manufacturing jobs without these being replaced by new jobs in other sectors. Tregenna adds that the welfare effect of job-losers in the manufacturing sector is determined by factors like: (i) the possibility of finding alternative employment, (ii) the difference in wages and non-wages benefits between the lost manufacturing job and an alternative, (iii) other differences or changes between a lost manufacturing job and alternative job, such as spatial rearrangement that may be required, (iv) in

the case of people displaced from the manufacturing sector but unable to find other employment, the change in their income and other circumstances.

Manufacturing is a key source of employment for both skilled and semi-skilled workers. As claimed by Armah (1992) this implies that manufacturing to a large extent supports to an equal income distribution than do other industries. Therefore deindustrialisation is likely to lead to higher poverty and earnings inequality. Brady and Wallace (2001) from a case study of the steel industry in Lake County, Indiana found that deindustrialisation contributed to the county's impoverishment as indicated by the percentage increase of the population receiving Aid to Families with Dependent Children (AFDC).

Different political consequences are related to deindustrialisation. As explained by Rodrick (2015) historically, industrialisation played a rock-bottom role in Europe and North America in creating modern states and democratic politics. Therefore relative absence of industrialisation in today's developing societies could easily be the source of political instability, fragile states, and illiberal politics. However there is debate in the political science literature on the effects of deindustrialisation on the welfare state. Based on cross-country empirical study one line of opinion cultivated by Iversen (2001) is that deindustrialisation has actually been a key driver of the expansion of the welfare state since the 1960s. For this the suggested channel is the need to support the displaced blue-collar working class, specifically in the case of limited matching of skills between the manufacturing and services sectors. An opposite view is that deindustrialisation smashes the political support for the welfare state, with the channel being the decrease of the organised blue-collar working class (Piven, 1991).

#### **4. DATA AND METHODOLOGY**

The data used in this study are taken from different publications of government of Nepal: The *Economic Survey* of several fiscal years published by Ministry of Finance, Government of Nepal, and National Account data published by Central Bureau of Statistics (CBS) of the Government of Nepal. GDP deflator with the base year of 2000/01 is used to express the current price data of all economic variables in constant price. The data on school level enrollment (from grade One to grade Ten) are compiled from *Economic Surveys* of several fiscal years published by Ministry of Finance, Government of Nepal. The time series data on Nepal's total population are not available; so they are interpolated and extrapolated on the basis of the inter-census growth rates of the censuses 1971, 1981, 1991, 2001, and 2011. Both qualitative tools (figures/diagrams) and simple econometric approach are used in analysing the data. The sample period of the study is 1975-2016.

For the purpose of investigating the possibility of an inverse U-curve, an indication of premature deindustrialisation in the context of Nepal, multiple regression equation as specified in equation (1) is estimated by applying the ordinary least squares (OLS) method. Regression analysis is a statistical technique of determining the relative importance of various factors contributing to a given result, and hence this procedure is used in this study to identify more specifically the contribution various factors have made to deindustrialisation.

$$\text{SHAREMANUF} = \alpha + \beta_1 \ln \text{PCGDP} + \beta_2 (\ln \text{PCGDP})^2 + \beta_3 \ln \text{PCGFCF} + \beta_4 \ln \text{PCM} \\ + \beta_5 \ln \text{PCX} + \beta_6 \ln \text{PCG} + \beta_7 \ln \text{PCELCT} + \text{error} \quad (1)$$

where, SHAREMANUF is percentage share of manufacturing sector's output in the GDP; PCGDP is per capita real GDP (a proxy for per capita income); PCGFCF is per capita gross fixed capital formation (a proxy for capital stock); PCM is per capita real imports; PCX is per capita real exports; PCG is per capita government capital expenditure; PCELCT is per capita electricity supply; 'ln' is short hand of natural logarithm.

The main variable of interest is the quadratic/squared PCGDP term; for the existence of the inverse U-curve relation between 'SHAREMANUF' and 'PCGDP', the coefficient of the squared PCGDP term needs to come with negative sign and it should be statistically significant. In searching the inverse U-curve relationship of manufacturing's employment share with income level in developed countries, Alderson (1999), Rowthorn and Coutts (2004) and Kollmeyer (2009) used the squared income term in their regression model. The claim based on Engel's law is that the demand for manufactured goods should normally increase substituting for food demand with the rise in per capita income. However, beyond a certain level it is possible that an increase in per capita income would be accompanied by a decrease in the manufacturing share of GDP because of attention toward the service sector. Thus, an inverted U-shaped relationship can be expected between the manufacturing share of GDP and per capita income.

Capital is a conventional input in production and hence the GFCF variable is included in the model. The export (X) and import (M) variables are included as the explanatory variables to account for the influence of foreign trade in a country's manufacturing production. In an early analysis of the issue Singh (1977) remarked that for examining problems of industrialisation and deindustrialisation in an open economy it is not sufficient to study the characteristics of domestic economy alone. It is also necessary to study the interactions of the economy with the rest of the world. In that context

Singh emphasised on the crucial importance of the manufacturing sector for external balance.

A number of analysts attribute deindustrialisation in the economically advanced countries (the North) mainly to external factors, specifically the impact of trade with the less developed countries (global South). For example, Alderson (1999), Kucera and Milberg (2003), Sachs et al. (1994), Saeger (1997), and Wood (1995) attach deindustrialisation primarily to the impact of trade from the South. On the other hand, Krugman (1996) and Rowthorn and Ramaswamy (1999) are amongst those economists who do not consider trade as a primary factor in deindustrialisation of the North. As there are opposing views on the impact of foreign trade on deindustrialisation, the sign of the regression coefficient of per capita export (PCX) and import (PCM) are left here as a matter of empirical issues.

Government expenditure variable is included in the model following Bacon and Eltis (1976). These authors argue that government constrains manufacturing sector by over-allocation of resources to the service sector, in particular the government sector. In the Bacon-Eltis hypothesis, manufacturing suffers from a shortage of resources, being crowded out by increases in government spending. Hence following Bacon-Eltis hypothesis the coefficient of  $\ln PCG$  is expected to be negative ( $\beta_6 < 0$ ).

Electricity is an energy input required in manufacturing production and hence it is entered as an explanatory variable in the regression equation. For a longer time period there is insufficient supply of electricity in Nepal which has direct impact in carrying out production activities in manufacturing as well as other industries. Nepal has suffered from the load shedding (power outage) problem. Therefore the prior expectation on the sign of per capita electricity supply is negative ( $\beta_7 < 0$ ).

## **5. DATA ANALYSIS AND DISCUSSION**

In aggregative analysis of the main economic activities of a country it is customary to group them in three broad sectors: agriculture, manufacturing and services. These are also known as the primary, secondary and tertiary sectors. Trends of contribution of agriculture, manufacturing, and service sectors in the gross value added (GVA) of the economy of Nepal over the period 1975-2016 is respectively given in Figure 1, 2 and 3. The figures are computed by expressing first the current price level values of the corresponding variables at constant price of Nepal's fiscal year 2000/01, and then each is expressed as percentage of the gross value added.

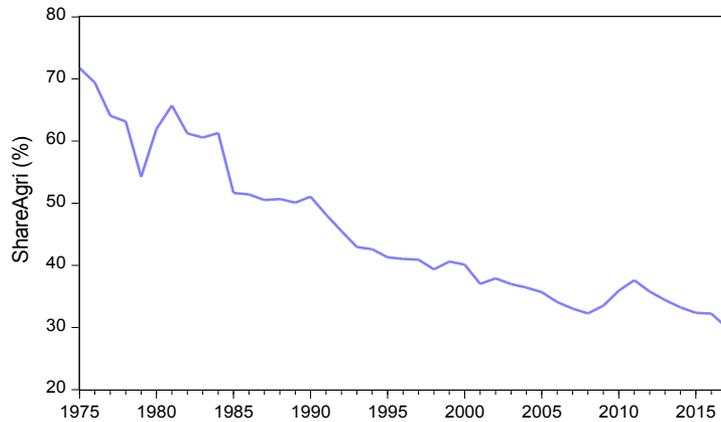


Figure 1 : Trend of the Share of Agriculture Output in the Gross Value Added of Nepal's Economy

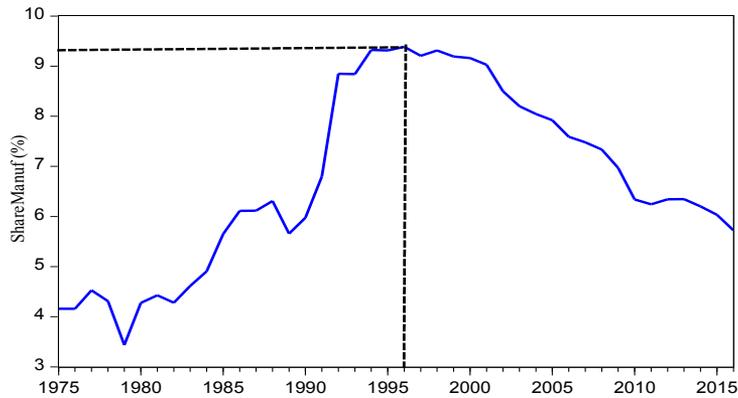


Figure 2: Trend of Share of Manufacturing Output in the Gross Value Added of Nepal's Economy

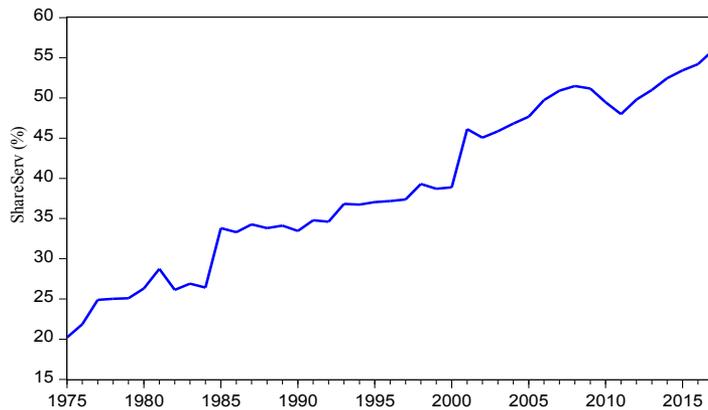


Figure 3: Trend of Share of Service Sectors Output in the Gross Value Added of Nepal's Economy

Figure 1 reveals that the share of output originating from the agriculture sector (ShareAgri) is in continued decline but Figure 3 shows that the share of output of the services sector (ShareServ) is in continued rise over the period 1975-2016. On the other side from Figure 2 it is obvious that the share of output originating from the manufacturing sector (ShareManuf) of the economy peaked and is in contained fall after 1996, and at the peak the share of manufacturing in GDP was about 9.4 percent. Over the period of 1996-2006 Nepal was under the fire of Maoist armed conflict. From the view point of peace and security this was not a favourable period for further expansion of the manufacturing sector in the country.

Observing the trends exhibited in figures 1, 2, and 3 it is clear that there have been structural changes in the development trajectories of Nepal, and the service sector has taken the lead; service sector has surpassed agriculture and manufacturing as source of economic growth in Nepal. The performance of the manufacturing sector of Nepal seems discouraging. The low and declining share of the manufacturing sector signals that some form of pre-mature deindustrialisation have set in Nepal; the share of manufacturing output in GDP has evidently followed an inverse U-shaped path (Figure 2). Therefore it appears that Nepal's manufacturing sector has not performed as the engine of growth over the period of 1975-2016.

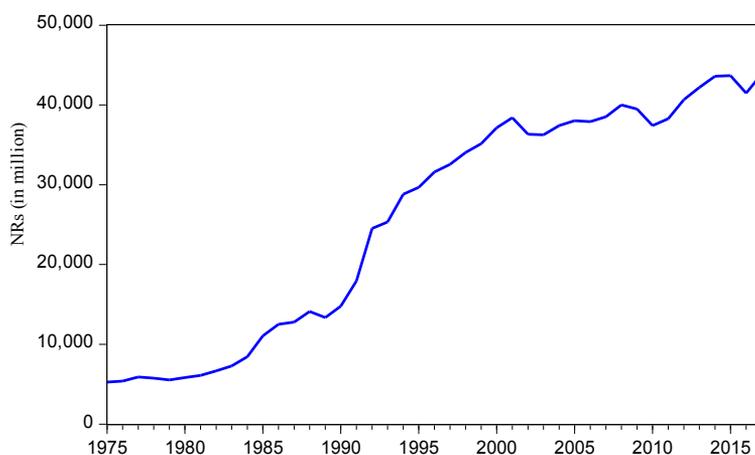
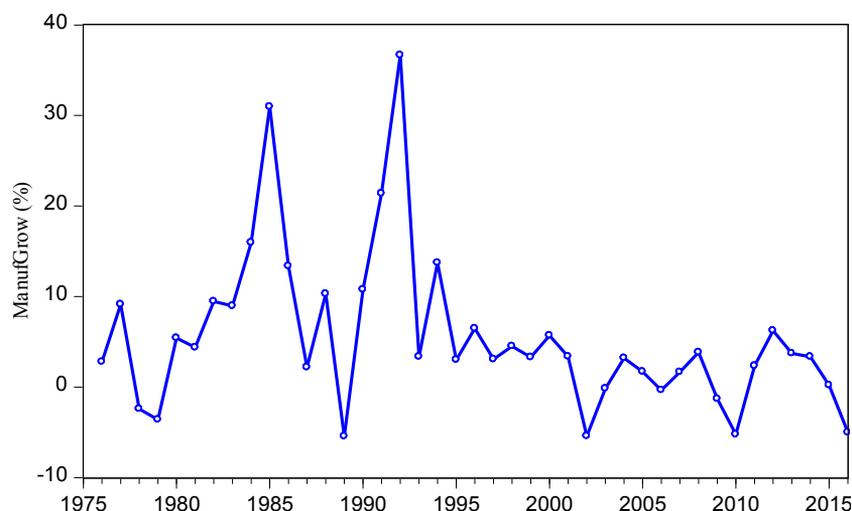


Figure 4: Trend of Constant Price Manufacturing Output in Nepal's Economy

The trends of the absolute size and growth rates of the manufacturing sector output at constant price (i.e., at 2000/01 price) are shown in Figure 4 and 5 respectively. The absolute size of the manufacturing sector's output slowed down after the year 2000. The growth rates of the manufacturing output are rather volatile (Figure 5). The growth of the manufacturing sector was high in 1985 and 1991. Since 1992 the growth rate of constant price manufacturing output is in continued decline.



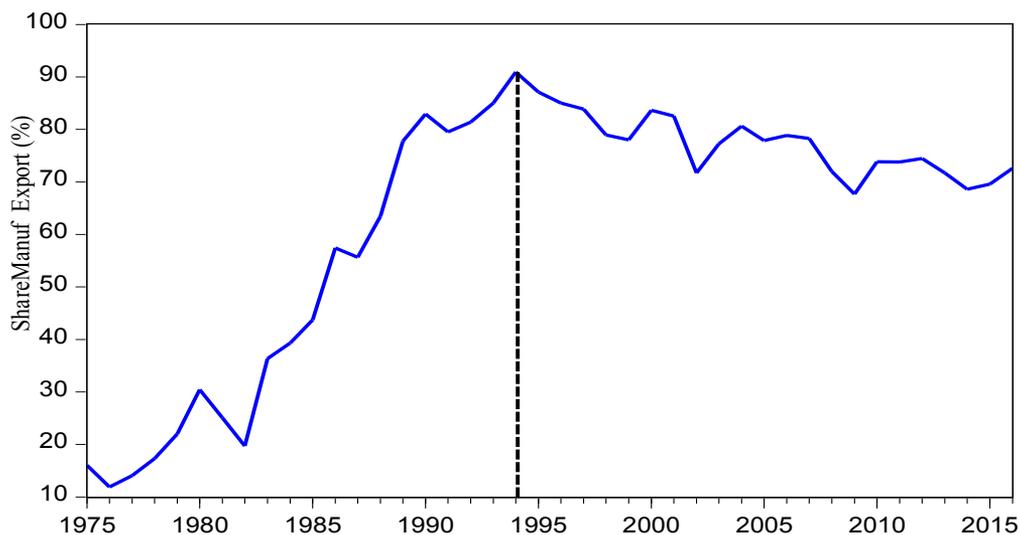
**Figure 5: Trend of Growth of the Output of the Manufacturing Sector of Nepal**

After the restoration of multiparty parliamentary democracy in Nepal in 1990 Nepal furthered the policy of economic liberalisation and privatisation. Government of Nepal introduced “The Industrial Policy 1992” which was afterward enacted as Industrial Enterprise Act 1992. The industrial policy 1992 made sweeping changes to the licensing requirements and created an environment favourable for increased private investment. This policy emphasised deregulation, competition, and reliance on market forces for resource allocation in manufacturing activities (Government of Nepal, Central Bureau of Statistics, 2014). In the decade of the 1990s many public enterprises (PEs) were privatised.

Nepal became the 147<sup>th</sup> member of the World Trade Organisation on 23<sup>rd</sup> April, 2004 (Pandey, Adhikari & Wagle, 2014). In 2010 the government of Nepal introduced new Industrial Policy which replaced the 18-year old Industrial Policy 1992. The new policy promises easy exit to the investors, recognises subcontract manufacturing, promises tariff protection to local industries, incorporates intellectual property protection provisions, and emphasises employment creation and poverty reduction (Government of Nepal, Central Bureau of Statistics, 2014). But despite all these promises brought through policy changes the performance of Nepal’s manufacturing sector is not encouraging. After 1996 the growth of the manufacturing sector has continuously shrank (Figure 5). There is room for raising questions like: Where has the effectiveness of industrial policy change gone? Has the policy of economic liberalisation and privatisation been a cause of deindustrialisation? It seems that new industrial policies introduced after 1990 and the policy of liberalisation and privatisation could not build

climate for the expansion of the manufacturing sector of Nepal because the contribution of the manufacturing sector in the GDP of the country has continuously dropped after 1996 (Figure 2).

While analysing the issue of deindustrialisation, it is worthwhile to consider the trend of manufacturing export. The trend of the share of manufacturing sector in the export trade of Nepal is revealed in Figure 6.

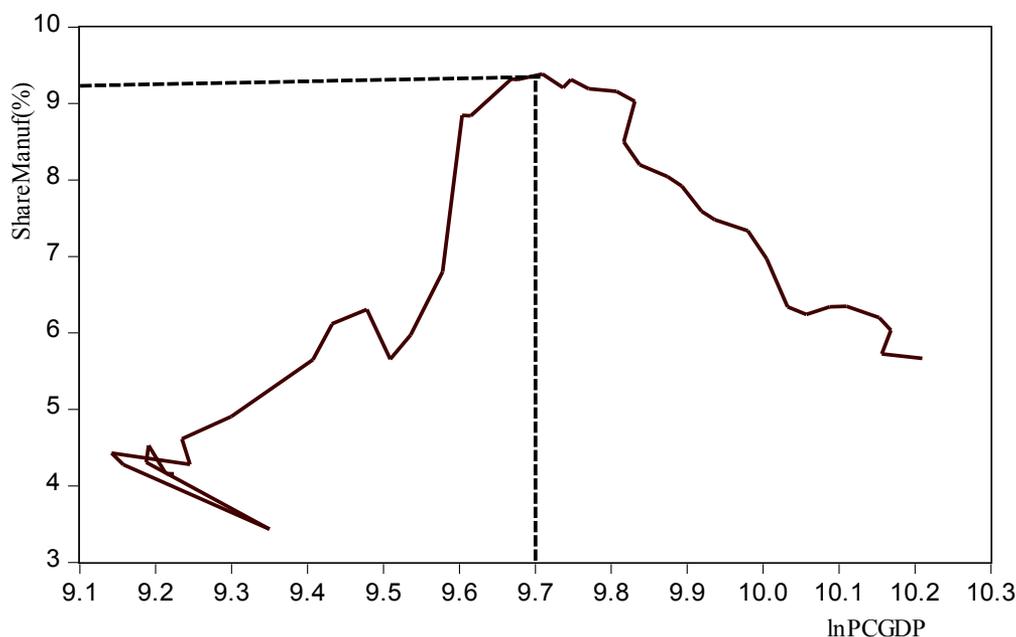


**Figure 6: Share of Manufacturing Export in Nepal's Export Trade**

The message of Figure 6 is obvious: the share of manufacturing sector in the export trade was increasing until 1994 and then after it has continued to decline. The curve representing the share of manufacturing in Nepal's total export also seems following an inverted-U path. This may be taken as a supportive sign of deindustrialisation in Nepal.

### *The Turning Point*

Figure 2 clearly indicated an inverse-U curve path of the share of manufacturing when it is graphed against time. The figure indicates that the turning point occurred in the year 1996. The tendency observed in Figure 2 further demanded the search for the relation of the manufacturing share with the per capita GDP. The share of manufacturing in GDP is graphed against per capita GDP which is given in Figure 7.



**Figure 7 : The Inverted U- Relation between Share of Manufacturing Output and Per Capita GDP**

The humped relation between manufacturing share and per capita GDP is obvious from Figure 7. The share of manufacturing as percent of GDP peaked when real per capita GDP was at about 9.7 in natural logarithmic scale. After taking antilog of 9.7, it amounts to 16,317.61 which would mean that the share of manufacturing reached its highest level (around 9.4 % of GDP) at real GDP per capita equal to Nepalese Rupees (NRs) 16,318 on the average. When this value is converted into US dollar of the year 2000/01, it just becomes nearly US\$218 (using period end middle exchange rate of NRs75.03=1US\$). This implies that deindustrialisation as measured by the share of manufacturing in GDP in Nepal set at very low level of per capita GDP.

Global level studies have documented different turning points associated to different level of income. For example, Rowthorn and Coutts (2004) have estimated the turning point at around \$ 9,500 per capita income (at 1995 purchasing power parity). As documented in Dasgupta and Singh (2007) in the past this historical turning point occurred at a per capita income of nearly US\$10,000 in current prices which in later times is reported to have taken place at levels of income as low as US\$3,000 in some countries. The study of Boulhol and Fontagné (2006) also reports similar values of

income at the occurrence of deindustrialisation. The exact values approximated by these researchers have depended on the base chosen in constant prices.

What might be the causes of the observed premature deindustrialisation in Nepal? Definitely the causes may be internal or external or a combination of both; they may be the factors arising from the supply or demand sides or a mixture of both. The several possible factors in the global perspectives are briefly discussed earlier under the subtitles of “causes of deindustrialisation” and “causes of premature deindustrialisation” in the conceptual framework section. Majority of the causes may also be relevant in the context of Nepal too. One of the possible causes not discussed earlier but relevant to Nepal may be the “political instability” factor that has particularly continued in Nepal in between 1990-2017.

Of the sample period 1975-2016 of this study, the period of 1990-2017 is a period of political instability in Nepal. Kolstad (2008) offers three conceptualisations of political instability. First, it is the “propensity for regime or government change”. Second, it is sensed as “the incidence of political upheaval or violence in a society, such as assassinations, demonstrations, and so forth”. The last one sees political instability “in policies rather than instability in regimes (i.e., the degree to which fundamental policies of, for instance, property rights are subject to frequent changes)”. All the three definitions of political instability fit more or less in Nepal’s political environment of the period 1990-2017. There have been frequent changes of government, and several Nepal *bandhas* (a form of protest, similar to general strike) called by opposition and other political parties and their sister organisations.

In 1990 multiparty parliamentary democracy was restored in the country. Over the 19 years period of 1990-2008, there became 14 prime ministers leading different governments, and in this period the country also came under the direct rule of the king though for shorter period. There were several policy changes over this period. Maoist armed conflict affected the country for a ten years period of 1996-2006 during which large amount of physical assets was destroyed and lots of people lost their life. Since 1990 Nepal further accelerated economic liberalisation with privatisation of a number of public enterprises (PEs). These changed events seem unfavourable to manufacturing industrial activities of Nepal as indicated by the gradual fall in the share of manufacturing output in the country’s GDP.

Over the ten years period of 2008 till 2017 November, there became 10 prime ministers leading almost coalition governments. In 2008 there was election for the Constituent Assembly which in its first meeting of May 28, 2008 abolished the monarchy. As the first constitutional assembly could not draft the constitution, the second Constituent Assembly election was held on November 19, 2013. The second constitutional assembly finalized the *Federal Constitution of Nepal 2015* which was passed and promulgated on 20<sup>th</sup> September, 2015 by the Constituent Assembly. During this period government and the Constituent Assembly members got involved in settling political issues for promulgating the constitution rather making industrial climate in the country.

Unstable politics have negative impact on the economic growth of a country (Aisen & Veiga, 2013; Alesina, Özler, Roubini, & Swagel, 1996; Gurgul & Lach, 2013). Alesina et al. (1996) argue that political instability increases policy uncertainty which exerts negative effects on productive economic decisions such as investment and saving. A high likelihood of a change of government indicates uncertain future policies, so that risk-averse economic agents may wait to take productive economic initiatives or might even “exit” the economy by investing in a foreign country. Similarly, foreign investors are likely to have a preference of stable political situation. Governments during time of political instability do not have strong commitment to implement the programme and policy introduced by earlier government. During time of high political uncertainty the government initiated funds and programmes are misused by political parties to fulfil their personal and party needs (Pandey, 2005). Most of the government initiatives and plan remain limited in paper and politicians do not show genuine interest of implementation (Dahal, Uprety & Subba, 2002).

Moreover political instability in Nepal also affected the budgetary spending of the government. The government expenditure is commonly divided into two broad categories: recurrent and capital. Recurrent expenditures consists of expenses incurred while running the government mechanism while capital expenditure is partly directed towards infrastructure building (e.g., transportation, electricity, and economic services) in the country. In the latter years especially over 2009-2016 the frequent change of the government has affected the capital spending. The government have not been able to spend all the budgetary allocation on capital spending; actual capital expenditure has remained below the allocated amount (Aryal, 2014). The capital expenditure is very low in comparison to the recurrent expenditure (Government of Nepal, Ministry of Finance, 2016, p.21). One of the effect of low capital expenditure is the slow development of transportation and communication facilities in the country,

shortage of electricity supply. Such physical infrastructures are the basic ingredients essential for the industrial development of country. Ironically in spite of the abundant water resource availability, Nepalese people have been compelled to face the problem of load shedding (power outage) for a long time. Industrial sector of Nepal is severely affected by the power shortage problem.

### *Employment in the Manufacturing Sector*

Deindustrialisation is analysed in terms of the share of manufacturing employment in total employment of a country. Because of the lack of time series data on total employment and sectorwise employment for the economy of Nepal, it is not possible to compute the share of manufacturing employment as a share of total employment. Instead a glimpse of the occupational involvement of the people by broad economic sectors data of Nepal is shown in Table 1.

**Table 1: Percentage Distribution of Economically Active Population by Major Economic Sectors**

Census Year	Major Sectors		
	Primary	Secondary	Tertiary
1971	94.37	1.17	4.45
1981	91.15	0.53	6.47
1991	81.23	2.56	14.87
2001	65.70	11.86	22.21
2011	64.27	9.27	24.02

Source: Suwal and Dahal (2014).

Manufacturing sector is the major segment in the secondary sector. When compared to 1971 the occupational involvement of people in the latter census is the secondary sector appears increased. But in the census of 2011 the occupational involvement of people in the secondary sector has decreased in the census of 2011. Involvement of the population in the service sector (the tertiary sector) is in continued rise in each of the successive censuses. Further segregation of occupational involvement of the population by industrial activities is given in Table 2.

**Table 2: Occupational Involvement of Nepalese People by Industrial Activities**

S.N.	Industrial Activities	Census				
		1971	1981	1991	2001	2011**
1.	Agriculture, Forestry and Fishing	4579552 (94.37)	6244289 (91.15)	5961788 (81.23)	6504689 (65.7)	6355735 (64.01)
2.	Mining and Quarrying	36 (0.00)	971 (0.01)	2361 (0.03)	16048 (0.2)	26026 (0.26)
3.	Manufacturing [Manufacturing, Recycling (Production Industry as per Census 2001)]	51902 (1.07)	33029 (0.48)	150057 (2.04)	872253 (8.8)	559282 (5.63)
4.	Electricity ,Gas and Water	1596 (0.03)	3113 (0.05)	11734 (0.16)	148218 (1.5)	25068 (0.25)
5.	Construction	5016 (0.10)	2022 (0.03)	35658 (0.49)	286418 (2.9)	335827 (3.38)
6.	Commerce(Commerce, Restaurant & Hotel as per 2001 Census)	63560 (1.31)	109446 (1.60)	256012 (3.49)	984662 (9.9)	**
7.	Transport and Communication(Transportation, Communication & Storage as per 2001 Census)	9637 (0.20)	7424 (0.11)	50808 (0.69)	161638 (1.6)	**
8.	Finance and Business Service (Finance & Real Estate as per 2001 census)	3466 (0.07)	9850 (0.14)	20847 (0.28)	76687 (0.8)	**
9.	Personal and Community Services(Community and Social Services as per 2001 Census)	137759 (2.84)	313570 (4.58)	752019 (10.25)	768916 (7.8)	**
10.	Others	0	0	28004 (0.38)	58273 (0.6)	**
11.	Not Stated (Unidentified)	0	127272 (1.86)	70298 (0.96)	22395 (0.2)	242549 (2.44)
<b>Total</b>		<b>4852524</b>	<b>6850886</b>	<b>7339856</b>	<b>9900197</b>	<b>9929562</b>

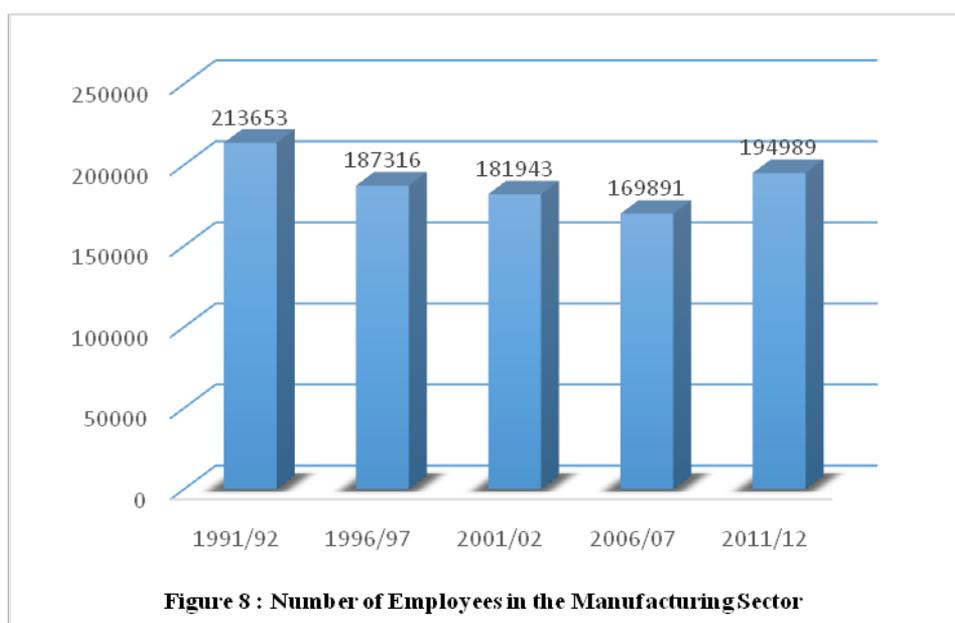
Note:(i)\*\* In the National Census of 2011, Central Bureau of Statistics of Nepal has organised the occupational involvement of people more differently by including different economic activities than the earlier censuses which has made it difficult to find a common ground to compute the figures.

(ii) The figures within the parentheses represent the percentage of the respective number of people as percent of the total.

Source: Compiled by the author from Population census data of the years 1975,1981,1991,2001, and 2011 published by Central Bureau of Statistics, Government of Nepal.

The employment share in the manufacturing sector contracted in the census year of 1981 and 2011 relative to immediate previous census. In real sense of the term people's involvement in the manufacturing sector activities is low. When taken together the number of people involved in service sector-oriented activities is in increasing trend and agriculture-oriented activities is in decreasing trend.

The employment trend in the manufacturing sector according to the census of manufacturing establishment (CME) is shown in Figure 8.



Source: Government of Nepal, Central Bureau of Statistics (2014).

When compared to the manufacturing census year of 1991/92 the employment in the latter years is lower and declining. Thus observing the employment trend in the manufacturing sector it appears that the symptoms of premature deindustrialisation have grown up in Nepal.

### *Results from Econometric Estimates*

This paper has applied multiple regression technique in order to quantify whether a humped relationship exists between share of manufacturing sector's output in GDP and per capita GDP. First the descriptive statistics of the variables are considered which are given in Table 3.

**Table 3: Statistical Description of the Variables**

Statistics	Variables							
	SHAREMANUF	lnPCGDP	lnPCGDP <sup>2</sup>	lnPCGFCF	lnPCM	lnPCX	lnPCG	lnPCELCT
Mean	6.728	9.662	93.455	8.071	8.198	6.980	7.156	3.933
Median	6.341	9.693	93.956	8.175	8.420	7.104	7.238	4.044
Maximum	9.385	10.168	103.397	8.993	9.234	7.812	7.594	5.195
Minimum	3.434	9.142	83.576	7.252	7.049	5.904	6.420	1.771
Std. Dev.	1.820	0.321	6.184	0.469	0.650	0.513	0.308	0.911
Skewness	0.015	-0.104	-0.065	-0.054	-0.253	-0.194	-0.398	-0.446
Kurtosis	1.778	1.796	1.797	2.172	1.882	1.823	2.038	2.213
Jarque-Bera	2.613 (0.271)	2.612 (0.271)	2.562 (0.278)	1.220 (0.543)	2.634 (0.268)	2.680 (0.262)	2.728 (0.256)	2.477 (0.290)
Sum	282.596	405.805	3925.114	338.998	344.320	293.140	300.565	165.191
Sum Sq. Dev.	135.770	4.213	1568.108	9.014	17.341	10.798	3.883	34.053
Observations	42	42	42	42	42	42	42	42

Note: Figures within the parentheses are the probability values of corresponding Jarque-Bera Statistics

Source: Author's estimation

The descriptive statistics given in Table 3 indicate that the variables considered in the study are not normally distributed which may be due to some of the outlier observations of the variables.

The results of the ordinary least squares(OLS) estimates on the possibility of an 'inverted-U' curve relationship between manufacturing output as a share of GDP and per capita GDP is given in Table 4. The sample period is 1975-2016 with 42 observations.

**Table 4 : OLS Results; Dependent Variable is SHAREMANUF**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
lnPCGDP	138.963	21.887	6.350	0.000
lnPCGDP <sup>2</sup>	-7.630	1.137	-6.710	0.000
lnPCGFCF(-1)	2.345	0.907	2.585	0.014
lnPCM	2.913	0.552	5.274	0.000
lnPCX	2.384	0.273	8.748	0.000
lnPCG	0.061	0.305	0.201	0.842
lnPCELCT	-0.205	0.142	-0.1443	0.159
Intercept	-681.827	103.205	-6.607	0.000
R-squared	0.970	Mean dependent var	6.791	
Adjusted R-squared	0.964	S.D. dependent var	1.796	
S.E. of regression	0.342	Akaike info criterion	0.863	
Sum squared resid	3.851	Schwarz criterion	1.197	
Log likelihood	-9.688	Hannan-Quinn criter.	0.985	
F-statistic	153.216	Durbin-Watson stat	1.654	
Prob(F-statistic)	0.000			

Source: Author's estimation

There is strong evidence of a hump-shaped relationship between share of manufacturing output and per capita GDP. The output share of manufacturing rises in the earlier stages of economic development and falls back at high levels of per capita GDP. This would mean that for low income countries incremental increases in real per capita income first rise relative to manufacturing output but beyond a certain threshold of affluence, additional increases cause manufacturing's share of total national output to decline.

The gross fixed capital formation term ( $\ln PCGFCF$ ) is entered in the estimation by lagging by one period assuming that capital formation takes time to show its impact on manufacturing output. The coefficient of the  $\ln PCGFCF$  term is positive as expected but implausibly large. The coefficient of  $\ln PCX$  (per capita export) and  $\ln PCM$  (per capita import) are positive and implausibly large. Such a large coefficient of the trade variables was also obtained by Rowthorn and Coutts (2004) in their pooled data regression estimate of the relationship of manufacturing employment share with per capita income. The positive coefficients of  $\ln PCX$  and  $\ln PCM$  suggest that export and import trade have been contributive to the manufacturing output of Nepal. The imports of Nepal consists of machinery, equipments and chemicals which are essential for manufacturing industries.

The positive coefficient of government expenditure variable ' $\ln PCG$ ' is statistically insignificant. Hence this result does not support the Bacon-Eltis hypothesis that government expenditure might cause deindustrialisation. The regression coefficient of the variable electricity supply ( $\ln PCELCT$ ) is negative but statistically insignificant at the conventional levels of significance. The negative coefficient signals that available electricity supply has not aided to manufacturing output. Because of insufficient production of electricity the industrial sector has been suffering from the load shedding problem in Nepal.

As indicated by the adjusted R-squared about 96 percent of the sample variation in the dependent variable is explained by the estimated regression model. The statistically significant F-statistic suggests the overall significance of the estimated regression model. The Durbin-Watson statistic of magnitude 1.65 does not indicate the problem of first order autocorrelation in the model.

### ***Stability Diagnostics of the Estimated Model***

The stability of the estimated regression model is diagnosed by performing regression equation specification test (RESET) (Ramsey, 1969) and CUSUM and CUSUM of squares tests (Brown, Durbin, & Evans, 1975). The result of the RESET test is given in Table 5 in which number of fitted term is 1, the square of the fitted dependent variable.

**Table 5 : Ramsey RESET Test**

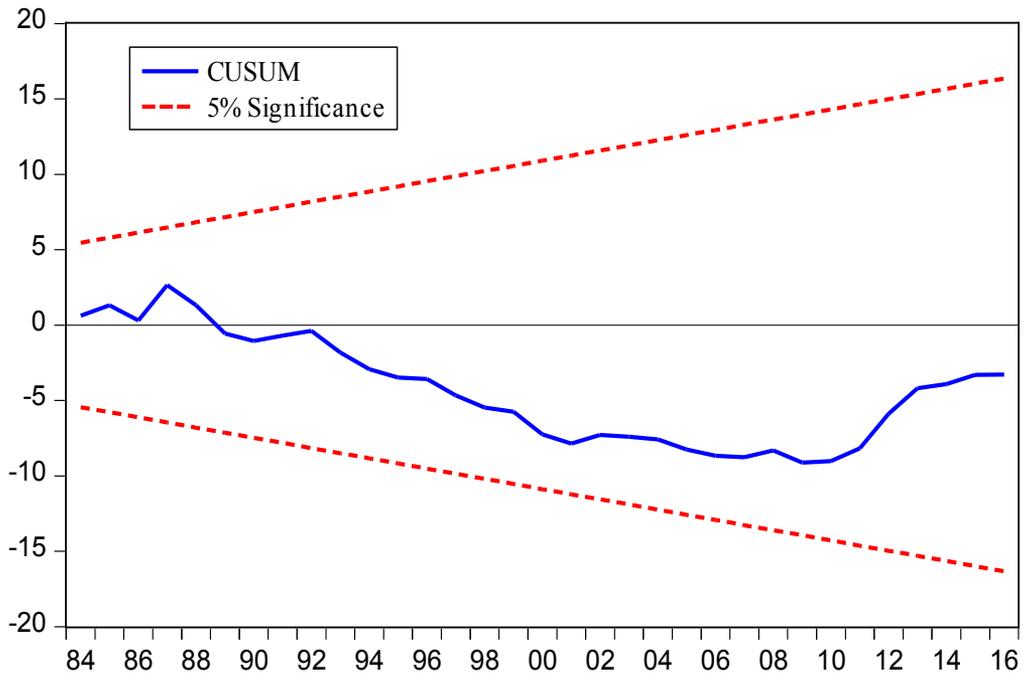
	Value	df	Probability
t-statistic	0.946	32	0.351
F-statistic	0.894	(1, 32)	0.351
Likelihood ratio	1.130	1	0.288

Source: Author

As the probability values of the computed statistics in the Ramsey RESET test are greater than 0.05 (0.351, 0.288 > 0.05), the functional form of the regression model does not seem misspecified.

**CUSUM Plots**

The stability of the parameters of the estimated model is judged by plotting the cumulative sum of recursive residuals (CUSUM) and CUSUM of squares tests. The CUSUM plot is given in Figure 9 and CUSUM of squares is given in Figure 10.



**Figure 9: CUSUM Plot of Estimated Model**

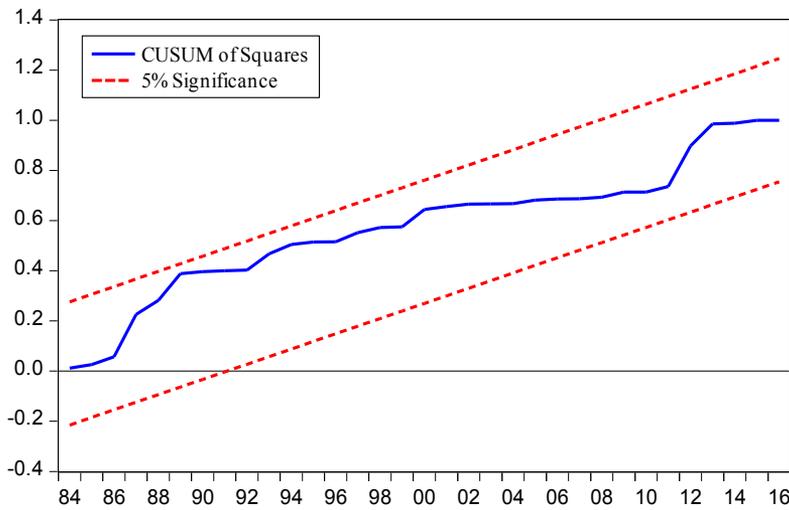


Figure 10: Plot of CUSUM of Squares

The CUSUM curve in Figure 9 and the CUSUM of Squares curve in Figure 10 fairly stay within the 5 percent significance line. This suggests that the parameter space of the estimated model is stable and the model is not misspecified.

**Residual Diagnostics**

The residuals from a regression model are calculated as the difference between the actual values and fitted values:  $e_i = y_i - \hat{y}_i$ . Each residual is the unpredictable component of the associated observation. The residuals of the fitted regression model are diagnosed in order to know whether the assumptions of the regression approach are violated or not. In this study the diagnosis of the residuals of the estimated model are tested through histogram normality plot, serial correlation LM (Lagrangian multiplier) test, and heteroskedasticity test. The histogram plot of the residuals is given in Figure 11.

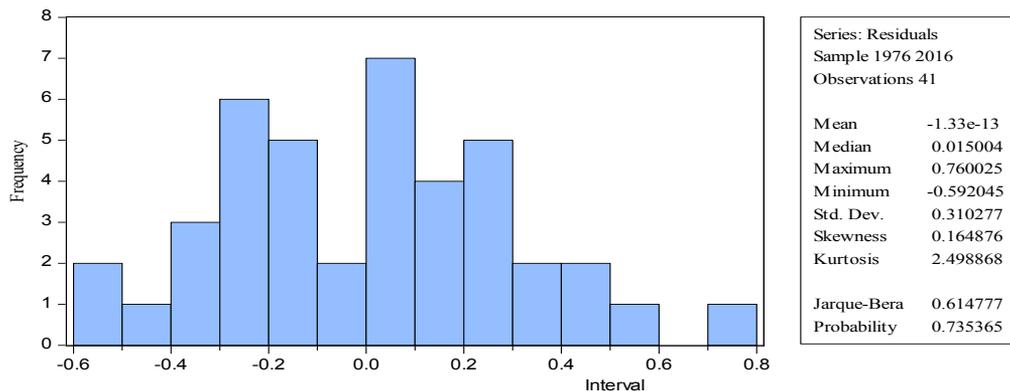


Figure 11 : Histograms of Residuals

Histograms show that the residuals fractionally fail to be perfectly normally distributed; for a normally distributed variable the Skewness (a measure of symmetry) should be zero and Kurtosis (a measure of how tall or short and thick the normal distribution is) should be 3(Gujarati & Porter, 2009).The positive value of the Skewness (0.164876) suggests that the residuals are slightly right skewed. The application of Jarque-Bera (JB) test shows that the JB statistic is about 0.61478, and the probability of obtaining such a static under the normality assumption is about 75 percent which is much greater than 5 percent conventional level of significance. Therefore we cannot reject the hypothesis that the residual terms are normally distributed although the sample size of 41 observations may not be large enough.

The result of the serial correlation and heteroskedasticity test of the residuals of the estimated regression model is given in Table 6.

**Table 6 : Serial Correlation and Heteroskedasticity Test of Residuals**

<i>Breusch-Godfrey Serial Correlation LM Test( Residual order 4)</i>			
F-statistic	0.319	Prob. F(4,29)	0.863
Obs*R-squared	1.730	Prob. Chi-Square(4)	0.785
<i>Heteroskedasticity Test: Breusch-Pagan-Godfrey</i>			
F-statistic	0.816	Prob. F(7,33)	0.581
Obs*R-squared	6.049	Prob. Chi-Square(7)	0.534
Scaled explained SS	2.937	Prob. Chi-Square(7)	0.891

Source: Author's estimation

As the probability value of the Breusch-Godfrey Serial Correlation LM test is greater than 0.05 (0.863 and 0.785 > 0.05), there is fair evidence of no serial correlation among the residuals in the model. Similarly the probability value of the Breusch-Pagan-Godfrey test for heteroskedasticity is greater than 0.05(0.581, 0.534 > 0.05), which is the evidence of homoskedasticity in the residuals of the estimated model.

## 6. CONCLUSION AND POLICY IMPLICATION

The analysis of the manufacturing sector of Nepal using data of the period 1975-2016 indicates that Nepal is sinking in low level premature deindustrialisation. The estimated multiple regression model evidences the existence of an inverse-U curve relationship between share of manufacturing output and per capita GDP. The estimated model passes several statistical test required for a model to be good. The level of per capita GDP at which the manufacturing sector's output has attained the peak is very low when compared to the income level of other developing economies that have experienced deindustrialisation. The current scenario of the manufacturing sector of Nepal is required to be reversed. Manufacturing share in GDP and total employment needs to be raised higher from the existing low level.

Reindustrialisation may be conceptualised as a sustained revival in both the share of manufacturing in total employment and GDP. The sinking manufacturing sector of Nepal requires revival because the manufacturing sector offers greater opportunities for (a) growth of output, productivity and capital accumulation, (b) technological progress, (c) economies of scale, (d) positive spillover effects, (e) transfer of surplus resources, if any, from agriculture to manufacturing, among other benefits. The expansion of the manufacturing sector, both in terms of size and productivity, can help Nepal in reducing poverty, generating gainful employment and accelerating economic prosperity as in other economies that have succeeded in achieving these objectives.

Tregenna (2016b) argues that reindustrialisation in developing countries may well be potentially more feasible compared to advanced economies. His view is that policy-induced deindustrialisation could be at least partially corrected via alternative policies and their successful implementation than in an economy that was not yet 'ready' for the original policy-induced deindustrialisation. Reindustrialisation is definitely not an easy task to begin in any place. It requires 'effort' to rebuild manufacturing production capacity, even where this capacity was missing over short time due to policy changes. If manufacturing production capacity has deteriorated, and linkages and spillovers have been missing, active policy intervention is required to revitalise the capacity. Moreover, regaining the previously lost capacity alone is not enough for reindustrialisation; it also requires establishing different manufacturing that are competitive and sustainable. Tregenna proposes that new industrial policy is essential both for preventing or moderating deindustrialisation, and for reindustrialisation.

In addition to formulating relevant manufacturing policy making, developing countries like Nepal are likely to face particular challenges of resource and state capacity constraints in implementing comprehensive industrial policies. But these constraints should not stop a country from undertaking effective industrial policy measures. This is proved by the experience of East Asian countries in implementing successful industrial policies even when they were at low levels of economic development. When political stability is maintained in Nepal, and sufficient electricity is produced for household and industrial purposes, there is high potential of the revival of industrialisation in the country. The development of manufacturing sector is also essential for the expansion of the service sector. Reindustrialisation is the road to economic recovery in Nepal. Manufacturing sector matters in boosting up Nepal's economic development because it is a source of good jobs for both highly educated and non-college-educated workers; it is the key driver of innovation, without manufacturing, research and design will not thrive; manufacturing is key to reducing Nepal's foreign trade deficit; it is the source of comparatively greater indirect employment in other economic sectors; expansion of manufacturing sector is essential to create employment opportunity to reduce the

outflow of Nepalese youth workers. At least this sector should be revived to contribute around 25 percent in the GDP and total employment in the country.

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