Sources of Economic Growth in Nepal

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Abstract

This paper seeks to identify the sources of economic growth in Nepal for the period of 1975-2001, employing both non-parametric as well as parametric approaches. As a non-parametric approach, growth accounting framework, and as a parametric approach, modified versions of the growth model have been used. The results of growth accounting framework show that economic growth in Nepal is accounted for by increases in factor inputs. The contribution of TFP to economic growth has remained very low and even declined marginally over the previous decade. This is the prime reason for the slow and even unsustainable growth in a capital-scarce country like Nepal. The results of the growth model show that capital, foreign capital, and exports are the prime sources of economic growth while human capital has not significantly contributed to growth.

Introduction

Economic growth is essential not only because developing economies enjoyed higher standard of living through their robust performance but also because they have enjoyed less income inequality, a lower incidence of poverty, and a higher level of human development (Naqvi, 1995) and above all, improvement in human welfare. It is also a means to achieve people's security, freedom, and employment (Sen, 1997). Human development, the prime goal of economic development of a country, is achieved through increasing the real GDP, along with per capita real GDP, which leads to sustainable development through mitigating poverty, and providing entitlement, capabilities, and freedom (Meier, 2001:3). Despite a huge investment and implementation of state-led, market-led, NGO-led, and community-based development paradigms during ten periodic plans spanning over the period of forty-eight years commenced from 1956, Nepal's economic performance seems to have remained rather dismal and weak. "For low-income countries, economic growth is not an option. It is imperative for reducing poverty and generating the resources required for basic human development"(UNDP, 1997). Because, a fast growth rate of per capita GDP (say in excess

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of 3 percent per annum) is, as a rule, negatively related with poverty (Naqvi, 1999). But nobody concerned is aware of the fact what causes growth and what causes stagnation. There may have been so many factors, which explain this poor performance (Wheller, 1984; Skinner, 1987; Grier and Tullock, 1989; Fosu, 1990,1991,1992;Brempong, 1991).

The country has confronted with rapid population growth, low human capital development, inadequate infrastructure, protracted civil war between the government and the Maoist, structural problems, lack of good governance and repressive regimes, which have aggravated the economic performance of Nepal. More importantly, the inappropriate domestic policies — fiscal policy, monetary policy, openness, liberalization, investment policy and taxation policy— pursued by the country have contributed to this weak and disappointing overall growth performance. Besides, the role of external forces such as declining terms of trade, high world real interest rates, sluggish world demand, and lack of foreign capital cannot be undermined.

Robinson (1971) analyzed the sources of growth of thirty-nine less developed countries for the period 1958 to 1966, using an aggregate production. He found that capital, factor transfers to nonagricultural sector, and foreign exchange are the major sources of growth. Nishimizu and Hulten (1978) studied the sources of Japan's post war economic growth for the period 1955-71,using Solow's growth accounting model. They found that capital accumulation accounted for between 52 percent and 58 percent of the growth in gross private domestic product, labor for 17 percent, and productivity change for between 32 percent and 25 percent. They concluded that productivity change and the growth in the quantity and quality of labor had a negligible influence on the growth of the Japanese economy. Elias (1978) made an attempt to identify the main sources of growth in seven Latin American countries applying the growth accounting framework for the period 1940-74. He found that labor and capital played an important role in determining the rate of growth of total inputs, with capital having the precedence. In most of the periods observed for all the countries, the capital input accounted for more than 50 percent of the product rate of growth, while the labor input accounted for at most 30 percent of this growth, and the residuals (TFP) has a highest value of only 20 percent relative to the product rate of growth. Ahmed (1993) tried to explain the factors behind the high growth performance of Pakistan, using a standard statistical growth analysis. He found a rapid pace of physical capital accumulation, the positive contribution of labor force growth, and greater competition from external trade, liberalization, and improvements in TFP as the main determinants of growth. Ghura (1995) used pooled time series and cross section data for thirty-three countries in sub-Saharan Africa for the period 1970-90 in order to find out the sources of growth. In addition to the positive role of physical and human capital, export growth, terms of trade; and adverse role of inflation, government consumption, macro instability, and political and civil instability on economic growth, he found world real interest rate has had negative effect on growth. Hadjimichael et al (1995), using cross- section data during 1986-92, have demonstrated that after population growth and unfavorable weather, inappropriate macroeconomic policies were the most important factors contributing to the poor per capita growth performance of sub-Saharan African countries. Ghura and Hadjimichael (1996) investigated empirically the determinants of growth with panel data for twenty-nine countries

in sub-Saharan Africa using annual data for the period 1981-92. They reveal that, in addition to the positive impact of both private as well as government investment, economic growth is stimulated by public policies that lower the budget deficit in relation to GDP, reduce the rate of inflation, maintain external competitiveness, promote structural reforms, encourage human capital development, and lower population growth. The positive effect of terms of trade and the negative effect of inadequate rainfall has also been found.

Analytical Framework

In this study, both non-parametric and parametric approaches have been used to determine the sources of growth. As a non-parametric approach, the standard neoclassical growth accounting framework has been used. Growth accounting is based on the concept of an aggregate production function whereby the increase in output can be accounted for by the increase in factor inputs and technical progress, commonly referred to as TFP. TFP is generally referred to as the residual since it represents that part of the increase in output that cannot be accounted for by the increase in inputs. A general form of production is written as:

$$Y = F(K, L)\ldots\ldots\ldots(1)$$

Where Y = output (GDP), K = Capital, L = Number of Workers.

The time variable (t) is included to represent the possible shift of the production function over time. So, by including a time variable the resulting shifts of production can be represented by:

$$Y_t = F(K_t, L_t, t)\ldots\ldots\ldots(2)$$

Differentiating equation (2) with respect to time, gives

$$dY/dt = (\partial F/\partial K).(dK/dt) + (\partial F/\partial L).).(dL/dt) + (\partial F/\partial t)\ldots\ldots\ldots(3)$$

Denoting the proportional growth rates of output, capital and labor by putting a dot over the variable as $\dot{Y}, \dot{K}$ and $\dot{L}$, obtains

$$\dot{Y} = (\partial F/\partial K).\dot{K} + (\partial F/\partial L).\dot{L} + (\partial F/\partial t)\ldots\ldots(4)$$

Dividing equation (4) throughout by Y leads to an expression for the proportionate rate of change in output

$$\dot{Y}/Y = (\partial F/\partial K).(\dot{K}/Y) + (\partial F/\partial L).(\dot{L}/Y) + (\partial F/\partial t)/Y \ldots\ldots\ldots(5)$$

Where $(\partial F/\partial t)/Y$ is the proportional rate of shift of the production function. It is taken to represent TFP or technical progress and is denoted by $\dot{A}$

$$\dot{Y}/Y = (\partial F/\partial K).(\dot{K}/Y) + (\partial F/\partial L).(\dot{L}/Y) + \dot{A}\ldots\ldots\ldots(6)$$

Equation (6) can be rewritten as

$$\dot{Y}/Y = (\partial F/\partial K).(K/Y).(\dot{K}/K) + (\partial F/\partial L).(L/Y).(\dot{L}/L) + \dot{A} \ldots\ldots\ldots (7)$$

Where,

$(\partial F/\partial K).(K/Y)$ denotes the share of income going to capital and is denoted by S_K, and $(\partial F/\partial L).(L/Y)$ denotes the share of income going to labor and is denoted by S_L.

Equation (7) can be rewritten as

$$\dot{Y}/Y = S_K.(\dot{K}/K) + S_L.(\dot{L}/L) + \dot{A} \ldots\ldots (8)$$

Where,

$$\dot{A} = (\dot{Y}/Y) - S_K.(\dot{K}/K) - S_L.(\dot{L}/L) \ldots\ldots (9)$$

As a parametric approach, modified version of the growth model has been used to assess the effects of various factors on real GDP growth. There are no generally accepted models of the growth process and therefore no standard analytical frameworks that are appropriate for studies such as this one (Abramovitz, 1983). The pioneering work in this literature is that of Harrod-Domar in which Physical capital accumulation and the expansion in labor force are posited to play the crucial role in determining economic growth (Harrod, 1948:63; Domar, 1946:57).

$$Y = F(K, L) \ldots\ldots\ldots (1)$$

Differentiating equation (1) with respect to time yields

$$dY = (\partial F/\partial K).dK + (\partial F/\partial L).dL \ldots\ldots\ldots (2)$$

Dividing both sides of equation (2) by Y gives

$$dY/Y = [(\partial F/\partial K).K]/Y.(dK/K) + [(\partial F/\partial L).L]/Y.(dL/L) \ldots\ldots\ldots (3)$$

Equation (3) can be rewritten in terms of coefficients as

$$RY = a + \beta_1 RK + \beta_2 RL \ldots\ldots (4)$$

Where RY = rate of growth of real GDP, RK = rate of growth of capital, RL = rate of growth of labor.

By adding deficit (def), inflation (inf), foreign capital (Fc), exports (X), total enrollment (enrt), and enrollment in primary level (enrp), an empirical counterpart of equation (4) can be rewritten in empirically estimable form as:

$$RY = \alpha + \beta_1 RK + \beta_2 RL + \beta_3 def + \beta_4 inf + \beta_5 Fc + \beta_6 X + \beta_7 enrt + \beta_8 enrp + et \ldots (5)$$

Empirical Findings

Table 1 shows the sources of real GDP growth based on factor accounting approach. The results suggest that 73.1 percent of real GDP growth in Nepal is accounted for by increases in factor inputs. Over the entire period of 1975-2001, the contribution of capital and labor to the average GDP growth of 4.4 percent per year is 48.2 percent and 24.9

percent respectively, leaving only 26.9 percent coming from TFP growth. The greater importance of capital in explaining growth was especially marked in the 1980s and the 1990s, with an average contribution of 50.6 percent and 58.6 percent respectively. However, the contribution of labor to growth was substantial and by far the highest for the earlier period 1975-80, which has been declining over the three successive periods.

Although TFP growth for the overall period of 1975-2001 represented marginal increments over the second half of the 1970s, and it declined over the 1980s as shown in Table 1. Very low and even stagnant TFP growth coupled with ever declining share of labor input caused Nepal to remain underdeveloped. If the growth process of Nepal were not accompanied by TFP, she would face structural economic crisis sooner or later. Although the foundation for sustained growth has not been laid as yet, Nepal would face continuous economic crisis in the years to come. However, the present economic crisis can be overcome by the TFP growth, which combats such crisis by increasing productive efficiency of the economy because same physical amount of total inputs can produce a larger volume of output and achieves sustainable development.

Table 1: Contribution of Factor Inputs to Real GDP growth

(In Percentage)

Period	Real GDP growth	Capital input $S_K.K/K$	Labor input $S_L.L/L$	TFPG
1975-80	2.6	1.0 (39.5)	1.2 (46.9)	0.4 (13.6)
1981-90	4.2	2.1 (50.6)	1.2 (29.1)	0.9 (20.3)
1991-01	4.8	2.8 (58.6)	1.1 (22.7)	0.9 (18.7)
1975-01	4.4	2.1 (48.2)	1.1 (24.9)	1.2 (26.9)

Note: Parenthical figures represent their respective contribution to real GDP growth (in percentage).

Source: Author's Calculation based on Data from Bajracharya, Pushkar and Shilu Manandhar Bajracharya (2002), "Total Factor Productivity Growth in Nepal: An Estimate", *Economic Journal of Development Issues* 3(1): 101-10, and Key Indicators Of Developing Member Countries of ADB (Various Issues), Asian Development Bank (Various Issues).

The regression results of the modified version of the growth model are presented in Table 2. As shown from all the equations, the coefficient of capital variable is positive and statistically significant. It signifies that physical capital played a very significant role in Nepal's growth performance over the last quarter of the twentieth century.

Foreign capital appeared as an important factor that has played a determinant role in the growth process of Nepal. Regression equations 5 and 6 investigate the effects of foreign capital and exports on economic growth of Nepal. Both the coefficients are uniformly positive and statistically significantly different from zero. It indicates that foreign capital and exports act as a prime mover of growth of the country. But, equity capital has greater growth potential than debt capital (Greenwala, Kohn, and Stiglitz, 1990).

Table 2: Results of Growth Regressions (Dependent Variable: Growth Rate of Real GDP)

Independent Variables	Regression Equations					
	1	2	3	4	5	6
Constant	5.051 (2.906)*	5.634 (2.48**	5.309 (2.739)*	5.618 (2.382)**	1.287 (0.785)	-0.833 (-.0346)
RK	0.183 (2.810)*	0.183 (2.769)	0.189 (2.746)*	0.185 (2.552)*	0.205 (3.416)*	0.211 (3.298)*
RL	-0.858 (-0.281)	-0.993 (-1.158)	-0.891 (-1.115)	-0.984 (1.089)		
Def		-1.39E-02 (-0.409)		-1.24E-02 (-0.24)		-9.19E-02 (-1.44)
Inf			-4.59E-02 (-0.329)	-8.63E-02 (-0.041)		-0.210 (-1.022)
Fc					1.031 (2.112)**	0.901 (1.996)***
X					0.376 (2.164)*	0.390 (2.317)**
Enrt					-0.419 (-1.988)***	
Enrp						-1.89E-02 (-0.882)
R^2	0.396	0.400	0.399	0.400	0.496	0.521
Adjusted R^2	0.343	0.319	0.317	0.286	0.400	0.370
F	7.531*	4.895*	4.862*	3.505**	5.160*	3.442*
D.W.	2.198	2.245	2.212	2.237	2.200	2.085

Note: Figures in parenthesis indicate their respective t values.
Source: Author's Calculation Based on Data from the Economic Survey (Various Years), Ministry of Finance, HMG/Nepal; Quarterly Economic Bulletin (Various Issues), Nepal Rastra Bank; and Key Indicators of Developing Member Countries of ADB (Various Issues), Asian Development Bank (Various Issues).

The coefficient of labor is not statistically significant, which is indicative of a rather low contribution of labor to growth. As such, the contribution of factor transfers to the nonagricultural sector is very significant and is more important in the less developed countries, which probably reflect a wider spread in productivities between sectors, and so greater agricultural disequilibrium in the factor markets in those countries (Robinson, 1971). The faster the share of the labor force in agriculture tends to decline, the higher the growth of agricultural output, so that agricultural productivity rises very quickly among the fast growers than among the slow growers (Hann and Siermann, 1966). Indeed, the highly significant relationship between the rate of structural transformation and growth rate of GDP can now be regarded as the fundamental law of economic development (Reynolds, 1983). The structural transformation will be completed when the dualistic characteristic of the economy - i.e. the labor surplus condition- is eliminated (Ranis, 1989).

Moreover, the coefficient of human capital is negative and statistically insignificant as opposed to the results of most prominent studies (Ghura and Hadimichael, 1996; Ghura, 1995; Barro, 1992;Mankiw et al, 1992). Development of human capital is essential which promotes sustained economic growth by augmenting productivity through enhancing technological progress. The theory of human capital focuses on the fact that the way an individual allocates his time over various activities in the current period affects his productivity level in future periods (Lucas, 1988). In addition to physical capital formation, the rate of human capital formation must be raised to sustain high growth of over long periods of time partly because the latter also raises total factor productivity (Lucas, 1993; World Bank, 1993). This is one of the important lessons of development experience, which all low income countries must thoroughly learn if they wish to increase the growth rate of per capita income from an average of 3 percent or so to about 6 percent or so (Naqvi, 1999). Therefore, government policies that promote human capital development through increasing the investment in education can have large payoffs in terms of enhancing efficiency.

Although the coefficient of inflation is not statistically significant from zero, its negative sign indicates that the government should control it within reasonable limits because higher inflation lowers private investment, capital accumulation and growth by raising the cost of capital. Likewise, the negative coefficient of deficit, though insignificant, indicates that Nepal should lower budget deficit ratio in order to achieve faster growth because large budget deficit tends to push up the inflation rate, raise interest rate, discourage savings and private investment on the domestic side, and they tend to raise the current account deficit and external indebtedness, which in turn, constrain the growth performance.

Concluding Remarks

In an attempt to identify the sources of economic growth in Nepal for the period of 1975-2001, non-parametric as well as parametric approach have been employed. As a non-parametric approach, growth accounting framework and as a parametric approach, modified versions of the growth model have been used. The results of non-parametric approach show that a substantial part of growth comes from the increased use of factor inputs. The

contribution of capital to growth is much higher. But Nepal can no longer expedite the pace of economic growth by adding capital since the country is a capital-scarce one. Surprisingly, the contribution of labor to growth is not only low in labor-rich countries but also declining over the years, which clearly indicates the laxity of planners and policy makers to impart skill to the labor force in general. The contribution of TFP to economic growth has remained very low and even declined marginally over the previous decade. This is the prime reason for the slow and even unsustainable growth facing the country today simply because high and sustainable growth can never be achieved in the absence of TFP growth. The results of the growth model show that capital, foreign capital, and exports are the prime sources of economic growth while human capital has not significantly contributed to growth The growth process of the country seems to be obstructed in the years to come for lack of positive attitude of the government towards the education sector. The negative sign of inflation and budget deficit, though insignificant, indicate that the government should control these factors as their further increase negatively influences growth.

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