

# THE IMPACT OF DEMOGRAPHIC TRANSITION ON THE ECONOMIC GROWTH AND DEVELOPMENT IN SRI LANKA FROM 1963 TO 2007

Journal of Social Review  
Volume 2 (1)  
June 2014  
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Social Sciences

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## Abstract

There is a reciprocal relationship between demographic transition (age structure transition) and economic development. As a result of country's socio-economic progress, Sri Lanka has been entered the third stage of demographic transition and reaching the final stage of it. Many researchers have been shown that the demographic transition has greatly been affected to the economic development process in many countries. Therefore, this study has paid attention, whether the demographic transition in Sri Lanka has affected to the economic growth and development of the country. A regression model is estimated using the published data on GDP growth rate, population growth rate (PGR), labour force growth rate (LFGR) and infant mortality rate (IMR). The results show that there is no significant effect of PGR, LFGR and IMR as a whole, on economic growth in the country. But when we take the population growth rate and infant mortality rate individually, are effectively impacted on the determination of GDP growth in the country.

## Introduction

Sri Lanka is well advanced in its demographic and epidemiological transition. It was one of the first developing countries to achieve below-replacement level fertility and its population is rapidly aged during the course of this country. Demographic transition in Sri Lanka started quite early in comparison to other low-income countries (Karunaratne, 2000, p.211). Implementation of free health facilities reduced the death rate by one-third in mid 1940s. Furthermore, legalization of family planning programs in the early 1970s led to a significant decline in the birth rate. In addition, expansion of educational facilities and other social development achievements also influenced the rapid

demographic transition. As a whole, a drastic reduction with respect to demographic indicators such as crude birth rate, crude death rate, fertility rate, maternal mortality rate, infant mortality rate and child death rate has been recorded within the past four decades.

The population in one way is a labour force which could be utilized in the country's production. On the other hand, it is also a consumer group that

uses largely the resources of the country. However, certain demographers in early times have pointed out that the increase of population and the rapid growth of population in a country is tied to its economy. But the

opinion of some other demographers is that although the population grows rapidly in a country, as the natural and physical resources are limited, this situation can be an obstacle to the economic development of the country. In the midst of these arguments the demographic transition theory which shows clearly the close relationship between the population growth and the economic development occupies an important place.

The dynamics of population deals with the determinants and consequences of changes in the structure, growth and distribution of population over time. The structure of population is the distribution of a given population by age and sex. The size of a population, its growth and age-sex structure have many important socio-economic implications. In other words, the shift in the age structure produced by the demographic transition has several social and economic implications.

However, both the developed and developing countries are experiencing substantial changes in their age structures with potentially important implications for long run economic growth (Mason, Undated, p.81). Bloom and others say that, many countries in the world already have used this age structure transition for their economic development (Bloom, Canning, Fink and Finlay, 2007, p.5). Thus, the main objective of this paper is to examine the impact of demographic transition on economic growth and development in Sri Lanka.

## Data and methodology

The impact of demographic transition on economic growth has been explored in the context of Sri Lanka for the period 1963-2007. I used annual time series data covering the period 1963-2007 for studying

the relationship between demographic transition and economic growth. The data on demographic variables has been obtained from Census of population (various issues), Registrar general's reports, Statistical abstracts, Sri Lanka demographic and health survey reports (various issues) and Sri Lanka labour force survey reports (various issues). Data on Gross Domestic Product Growth rate (GDPG) has been retrieved from Annual reports of the Central bank of Sri Lanka. A multiple regression model has been used to estimate the impact of demographic transition on the economic growth in Sri Lanka.

## Literature Review

A study done by Croix, Lindh and Malmberg (2007) related to the demographic change and economic growth in Sweden from 1750-2050. They have found that demographic change is a key determinant of long-term growth in per capita income. Kothare (1999) pointed out that India has become one of the world's fastest growing economies, primarily due to the rise in population growth creating a positive effect on its long run economic growth. Graham and Beeler (2000) have examined the effect of population growth on economic development, they pointed out that the rapid population growth is not harmful for long term economic growth, but can be disturbing in the short term. Kannan Navaneetham (2002) studied the age structural transition and its linkages with the economic growth in the countries of South and Southeast Asia using time series analysis. This study was found that the age structural transition and its impact on the economy are not uniform among those countries. Prskawetz, Kogel, Sanderson and Seherbov (2004) have done a study related to the effects of age structure on economic growth. They pointed out that a negative and significant effect of the youth dependency ratio and the output per working age person in the base year, as well as a positive and significant effect of social infrastructure.

## Population Growth in Sri Lanka

According to the latest estimates, Sri Lanka has a population of about 20 million. The ethnic division of the population is: Sinhalese 74%, Tamil 18%, Moor 7%, Burgher, Malay and Vedda 1%. Major languages in Sri Lanka are: Sinhala 74% (Official and National), Tamil 18% (National), other 8%. English is spoken by approximately 10% of the population, and is widely used for educational, scientific and commercial purposes. Population density of Sri Lanka is 319 per square km. in 2007. The growth of population in Sri Lanka from 1837 has shown in the following Table 1.

**Table 1 Growth of population in Sri Lanka from 1837**

Sri Lankan Population Reached		Sri Lankan Population Reached	
Population	Year	Population	Year
1 Million	1837	12 Million	1869 (4 yrs later)
2 Million	1871 (34 yrs later)	13 Million	1873 (4 yrs later)
3 Million	1881 (10 yrs later)	14 Million	1881 (5 yrs later)
4 Million	1901 (20 yrs later)	15 Million	1901 (4 yrs later)
5 Million	1921 (20 yrs later)	16 Million	1921 (4 yrs later)
6 Million	1931 (10 yrs later)	17 Million	1931 (8 yrs later)
7 Million	1948 (17 yrs later)	18 Million	1948 (5 yrs later)
8 Million	1953 (5 yrs Later)	19 Million	1953 (3 yrs Later)
9 Million	1957 (4 yrs later)	20 Million	1957 (5 yrs later)
10 Million	1961 (4 yrs later)	21 Million	1961 (5 yrs later)

Sri Lankan Population May Reach	
22 Million	2021 (10 years later)
23 Million	2031 (10 years later)

Sources: Johnes & Selverathnam, 1971; Central Bank of Sri Lanka Annual Report, 2007; Dept. of Census and Statistics, 1974; Korale, 1988; De Silva and Samarasekara, 1999.

According to the above data, Sri Lanka's population rose from 2 million in 1871 to 12 million in 1969 i.e., around six fold increase in a century. The first doubling from 3 to 6 million took approximately 50 years, while the second doubling from 6 to 12 million took only about 38 years. According to the projections, the next doubling from 12 to 24 million would take approximately 65 years.

## Relationship between Population Growth and Economic Development

There exists a close and a reciprocal relationship between population growth and economic development in a country. The demographic transition theory clarifies the relationship between population growth and economic development.

Firstly, we can examine the effect of population growth on economic development of a country. In one hand, through a rapid population growth, there will be an economic development. On the other hand, it is also controlled, because of a large population; a large market has to be supplied. This market will attract the future industrialists. They will utilize the most technological methods in order to obtain the maximum use out of the available resources. In this way, the growing population will speed up the economic growth

in a country. For example, Japan can be cited as a country that had a high population but achieved a high living standard by developing her economy. But, when we consider some countries such as India, it is clear that the growing population is a big problem to the country and this affects to the economic development. However, as a whole, the steadily growing population seems to be a hindrance to her economic development.

We can also consider the effect of economic development on population growth. In a country before its economic development, the birth and death rates occupy a higher value. The birth rates take a higher value on a number of factors such as the early marriages of women, social beliefs, customs and the using of children to get an income out of them for their families. Also, the death rate goes up when less nutrition food consumed unhealthy sanitary conditions and non-availability of medical facilities. But when a country enters a sound economic development, more nutritive food is consumed by the people. Advanced medical care also will improve the living conditions of the people. Through new medical findings an ample supply of food items, the death rate will drop. But with the comforts received from the economy, the birth rate will continue to be at a high rate. The result of this is that the growth of population will speed up and there will be a dangerous situation when the population explosion takes place.

However, when a country reaches a higher level in its economy, the birth rate will start to be at a low level. Then people will realize the appropriateness of having small families and will be interested in planning their families. Then children will be considered not as a treasure for parents but as a burden for them. The presence of small families and having a low death rate are special

characteristics of this period. In short, the demographic transition theory indicates this situation.

It is clear that the past, economists and demographers considered the inter-relationship between population growth and economic development in an optimistic vision as well as in a pessimistic vision. When considering in an optimistic vision, they adopted a friendly attitude towards population increase. That is, they considered that it is not necessary to reduce the population of a country. Their view was that the growth of population does not bring bad results. But the pessimists assert the view that before a country reaches development, the speed of population growth should be reduced. That is, when reaching economic development, they point out that the population should be controlled. All pessimists' view is that a higher fertility rate and a rapid population growth inhibit economic development (Echrlish, 1968; Coale & Hoover, 1958).

According to optimists like Keynes, development in a country without a population growth will cause problems. When the population increases, they expect that the savings and investments may increase. When the population decreases, the production, capital accumulation, employment, earning incomes and savings will decrease and may negatively affect the development. Also, according to Keynes, the growth of population will be able to have the hope of establishing a good market as well as the demand for capital will also increase. Hirschman (1958) also argues that in order to increase investments, population growth is necessary and by a stable population, the investments will be weakened. Optimists like Lewis Arthur (1954), and Jorgenson (1961), have pointed out that population growth does speed up economic development.

According to Boserup (1981), using improve technology can have a positive impact of production. Some demographers have concluded that slower population growth would be beneficial for development for most developing countries and the relationship between population and development is contextual (The National Research Council, 1986). As well as, the study by Kelly and Schmidt have concluded that population size and density have a transitional impact on the economic growth (Kelly and Schmidt, 1995). Further studies have reported that the shift in age structure has had a significant impact on economic growth through savings and investments (Mason, 1988; Bloom and Williamson, 1997).

According to Bloom and Canning, there is strong evidence that demographic change has a major impact on the course of economic growth. For an example, they say, rising life expectancy tends to increase savings and education level, increasing investment in physical and human capital (Bloom and Canning, 1999, p.3). Kwak and Kim say that, the relationship between demographic factors and economic growth depends on development stages and patterns in a country (Kwak and Kim, Undated, p.3). They say, that the high growth rate of population is, likely to obstruct economic growth by holding down the capital formation and due to expansion of the consumption in developing countries. On the other hand, in developed countries, it expands the consumption market and increase effective demand.

Coale and Hoover have expressed their views about the relationship between population growth and economic growth. According to their views, an economy based on agriculture, shows a high mortality and high fertility rates (Coale and Hoover, 1958). Generally, on problems of disasters

and foods, the rate of mortality is high in this era. On account of less nutrition, bad health habits, the limitation of public health programmes and the weakening of sanitary facilities, the mortality rate was high level. However, these countries that give up this type of agricultural economy and change on to a technological economy, improve their capacity production and thus develop their economy (Coale and Hoover, 1958).

Livingston (2002), shows that Malthus and neo-Malthusians believe that population growth is negatively correlated with economic growth. But Julian Simon argues that the correlation is positive. According to the Simon (1977), younger cohorts age will enter the work force with higher education than the previous cohorts, as well as they will be more productive than older cohorts resulting in greater economic development.

However, the consequences of population growth on the development of backward economies are not at all favorable. In such economies, population growth has created additional barrier to economic development. These economies are poor, capital- scarce and labour surplus. Thus we can say, population growth creates positive and negative impacts on the economic development of a country.

### **Demographic Transition in Sri Lanka**

Sri Lanka is well advanced in its demographic and epidemiological transition. It was one of the first developing countries to achieve below-replacement level fertility. Demographic transition in Sri Lanka started quite early in comparison to other low income countries (Karunaratne, 2000, p. 211). Implementation of free health facilities reduced the death rate by one- third in the mid 1940s. Furthermore, Legislation of family planning programmes in the early 1970s led to a significant decline in the birth rate (Table 2). In addition, expansion of educational facilities and other

social development achievements also influenced the rapid demographic transition. As a whole, a drastic reduction with respect to demographic indicators such as crude birth rate, crude death rate, fertility rate, maternal mortality rate, infant mortality rate and child death rate has been recorded within the past five decades. Sri Lanka has witnessed rapid demographic transition since the middle 20<sup>th</sup> century. Following fertility decline and extend life expectancy, population in Sri Lanka has transformed from a phase with high fertility, high mortality and low natural growth to a phase with low fertility, low mortality and low natural growth. However, according to Caldwell, Sri Lanka has almost completed the demographic transition with low mortality rates and low fertility rates approaching replacement levels (Caldwell, 1982). This was in contrast with most of the other parts of South Asia where mortality and especially fertility rates remained high. In 1945, the crude death rate was 21.5 per thousand, but it was dropped to 11.0 per thousand ten years later. Similarly life expectancy was increased by 16 years in less than ten years from 42.2 years in 1946 to 58.2 years in 1953. By 1991; life expectancy was marginally below that of the developed countries since it stood at 72.5 years (Economics commission for Africa, 2001, p.48).

According to the department of Census and statistics in Sri Lanka, current life expectancy is 75 years (Department of Census and Statistics, 2008). Further, in five years between 1945 and 1950, the infant mortality rate dropped by more than 40 percent. Between the 1950s and the 1990s it dropped by more than 75 percent to reach a rate of less than 20 per thousand. Similarly, maternal mortality fell from 1650 per 100000 in 1945 to 50 per 100000 in 1985, which is a drop of more than 95 percent. This fall in mortality levels was attributed

to an efficient and effective public health system.

**Table 2 Crude birth rate, crude death rate and annual population growth rate in Sri Lanka, 1871-2010**

Year	Crude Birth Rate (Per '000)	Crude Death Rate (Per '000)	Average Annual Growth Rate %
1871	-	-	-
1881	27.4	22.7	1.4
1891	29.4	24.3	0.9
1901	34.4	27.6	1.7
1911	38.1	28.8	1.4
1921	36.6	30.4	0.9
1931	39.8	26.5	1.7
1946	37.4	20.3	1.5
1953	38.7	10.9	2.8
1963	34.1	8.5	2.7
1971	30.4	7.7	2.2
1981	28.2	5.9	1.7
2001	18.9	5.9	1.1
2010	17.6	6.2	1.0
2011	17.4	5.9	1.0

**Source: Department of Census & Statistics**

Fertility is the key factor of determining age structure in any country. The total fertility rate in Sri Lanka started to decline from the 1960s. Specially, after 1963, level of fertility rate began to decrease (Abeykoon, 2000, p.56). The total fertility rate, which was 5 per woman in 1962-64, declined to 3.4 in the 1980-82 and reached 2.1, which is the replacement level in the 1995-2000. De Silva has shown that during the period 1995-2000, the TFR was 1.96 (De Silva, 2004, p.137). According to him, Sri Lanka has obtained

lower level than the replacement level of fertility in Sri Lanka, which is 2.1. As well as there is no other country in the SAARC region, except Sri Lanka, this has reached the replacement level of fertility. It is generally agreed that one of the most important factors behind Sri Lanka's remarkable performance in reducing fertility is the high level of female education (Abeykoon, 2000, p.56). Also this fall in fertility was attributed to changing marriage patterns and a strong family planning programs (De Silva, 1994). With these improvements, other demographic and socio-economic indicators in Sri Lanka, such as infant mortality rate, literacy rate, life expectancy, health facilities and infrastructure etc, also have been increased during the last four five decades.

When considering the SAARC countries as a whole, Sri Lanka seen to be a leading country in demographic transition (Cassen, 1978, p.342). Also, speed of population growth of Sri Lanka has reached a very low level of 1.0 in 2011. Along with these changes population structure of Sri Lanka has also changed, as a result of many socio-economic changes and government policies.

### **The Impact of Demographic Transition on Economic Growth in Sri Lanka**

For study the impact of demographic transition on economic growth, I used three main variables related to the demographic transition: Population Growth Rate (PGR), Labour Force Growth Rate (LFGR), and Infant Mortality Rate (IMR). Each of these variables is closely connected to the demographic transition. These variables used as independent variables. The economic growth is measured from growth rate of Gross Domestic Product (GDPG) and used as a dependent variable.

### **The Model**

To analyze the impact of demographic transition on economic development, estimate a regression model using the relevant data of the said variables. The relationship can be examined through the Ordinary Least Square (OLS) method. The model has the following form:

$$GDPG = \beta_0 + \beta_1 PGR + \beta_2 LFGR + \beta_3 IMR + U$$

Where,

GDPG = Gross Domestic Product Growth rate

PGR = Population Growth Rate

LFGR = Labour Force Growth Rate

IMR = Infant Mortality Rate

$\beta_0$  = Constant Term

$\beta_1, \beta_2$  and  $\beta_3$  = Population Parameters

U = Disturbance Term

This equation suggests that there is a linear relationship between dependent variable i.e. GDPG and independent / explanatory variables i.e. PGR, LFGR, and IMR. Further, a positive relationship is expected between GDPG and LFGR and a negative (inverse) relationship is expected between GDPG and PGR and also between GDPG and IMR. Accordingly, the model expected to estimate is:

$$GDPG = \beta_0 - \beta_1 PGR + \beta_2 LFGR - \beta_3 IMR + U$$

### **Gross Domestic Product Growth rate (GDPG)**

The variable of the model GDPG, represent the economic growth of the country. Economic growth of a country is traditionally measured by the rate of growth of Gross Domestic Product in real terms (GDP). The increase of the rate of growth of GDP means that the increase of the production capacity of the country. Sri Lanka has experienced a fluctuated economic growth. In Sri Lanka,

Economic Growth was slow during the pre-1977 period, which practiced inward looking economic policies except few years in the end of 1960s. With the economic liberalization in 1977; the economy grew at a reasonable rate compared to the previous era. The rate of growth of GDP ranged between 8.2 and -1.5 percent during this period from 1963 to 2007. Highest rate i.e. 8.2% recorded in 1968 and 1978 while the lowest rate (negative growth rate) i.e. -1.5, recorded in 2001. This was the lowest rate accounted in the history since independence. The reasons for the negative growth of 2001, global economic slowdown, drought weather conditions and some failures in the security establishments i.e. the ethnic war in the Northern and East in the country. In 2007, the GDP growth rate is 6.8%. As a whole, after 1977, the rate of growth of GDP in Sri Lanka has been increased than before 1977.

During the period 1984-1990, the average economic growth rate was 3.9. The reason for the average economic growth rate to be at lower level during 1984-90 is the commencement of ethnic war in the Northern and East provinces and spreading of civil struggles internally in the country. As a whole, from 1990 onwards, the country has reached fruitful economic level.

### **Population Growth Rate (PGR)**

The variable PGR in the model represent the population growth rate of the country. The population growth rate in each year is given as the value of the variable PGR in the model. Population growth may increase or decrease economic growth. That means, the relationship between GDPG and PGR may be positive or negative. On the one hand, population growth enlarges labour force and therefore, increases economic growth. A large population also provides a large domestic market for the economy.

Moreover, population growth encourages competition, which encourages technological advancements and improvements. On the other hand unrestricted population growth is one of the most serious obstacles to fighting poverty. When a country's population grows faster than its economic growth, the gross domestic product per capita goes down, resulting in greater poverty and fewer resources to fight it. In addition, population growth places pressure on the biophysical environment, often leading to unsustainable land use, increased pollution and the over exploitation of natural resources. This has major implications for food security, the environment, economic development and access to education, health and other social programs.

In Sri Lanka, the growth of population was increasing at higher level during the period of before gaining independence, but it has recorded to very lower level at present. Up to 1977, the per capita income in Sri Lanka rose by a lower range from US\$ 120 to US\$ 270. The reason for this is that the rate of exceeding the population growth by the rate of the growth of economy took place with a very low percentage. But after 1977, the per capita income increased up to US\$ 1617 in 2007 due to the fact that the rate of economic growth standing far ahead of the rate of the growth of population.

### **Labour Force Growth Rate (LFGR)**

The variable LFGR in the model represent the labour force growth rate of the country. Normally, the labour force of a country consists of everyone of working age (Age 15-64) who is participating workers, that is people actively employed or seeking employment. People not counted include students, retired people, stay-at-home parents, people in prisons or similar institutions, people employed in jobs or professions with



unreported income, as well as discouraged workers who cannot find work. In Sri Lanka, the labour force is defined as economically active population 10 years of age and over. The economically active population is defined as those persons who are/ were employed or unemployed during the reference period of the survey.

As a result of demographic transition, a bulge has been occurred in the labour force in Sri Lanka within last 4 decades, due to the rapid increased population in 1960. When we consider the current age structure in Sri Lanka it is favorable for economic expansion. The labour force in 1963 was 55% of the total population and later it was raised in 1995 up to 66% and which is risen up to 69% in 2007. While comparing the growth of population with the growth of the labour force, it could be seen that during the period 1946-1953, the growth rate of labour force has been lower than the growth rate of population. But during the period of 1963-1971 it was just the opposite. Viz. against the percentage of 2.2 in the rate of population growth, the growth of the labour force stood at 3.3%. During the period of 1971-81, the annual average rate of the growth of labour force was reduced to 2.5%. Between the period of 1981-1985, the labour force increased by a ratio of 3.6%.

Economic growth of the country depends not only on the number of employed workers but also their labour productivity. Thus, while increase the labour force participation, it will also be important to improve their productivity. However demographic indicate that Sri Lanka's labour force growth is already starting to slow, because of an ageing population. The International Labour Organization (ILO) analysis shows that from 1990-2008 Sri Lanka's labour force increased at the rate of 1% per year. But from 2009 to 2020 the labour force growth rate is projected to drop

to 0.3% per year. This says the ILO, can reduce the rate of Sri Lanka's economic growth. If the labour force growth rate were to slow to 0.3% from 2009-2020, the GDP growth rate will reduce from 5.1% to about 3.7%. This would be a 1.4% drop.

### **Infant Mortality Rate (IMR)**

The variable IMR in the model represent the infant mortality rate in the country. IMR indicates the number of deaths of babies under one year of age per 1000 live births. So, the rate in the country is the total number of newborns dying under one year of age divided by the total number of live births during the year, then all multiplied by 1000. Demographic changes starts with fall in mortality which improves the health status of the people. The most significant impacts are on the health of children, with falling levels of infant mortality leading to a short-lived increase in family size. Achieving low rates of infant mortality is importance for social well-being and human development. Accordingly, IMR is a useful indicator of a country's level of health or development and is a component of Physical Quality of Life Index (PQLI). Indeed health is one of the most important determinants of a country's economic success. It has a major impact on raising labour productivity.

There are various channels through which health affects productivity. On the one hand, healthy people are better workers. I.e. healthy person will be more productive than an unhealthy one. They can work longer and harder and also think clearly. This is a direct channel by which health influences output. On the other hand, improved health in children has an impact on school attendance and on student performance. Healthy students have a lower rate of absence and higher cognitive functioning and thus receive a better education for a given level of schooling. This channel is indirect effect of health on output.

Over the period 1946-2000, Sri Lanka has been one of the most successful developing countries in the world in terms of infant mortality reduction. The infant mortality rate fell from 141 infant deaths per 1000 live births in 1946 to mere 13 infant deaths by 2000. Moreover, IMR has decreased to 11 infant deaths per 1000 live births by 2007. Mainly, due to improvements in basic health care, though high technology medical advances etc. have helped for this decline.

### Estimation of the Model

The linear regression model presented above estimated for the data with the help of SPSS computer package. The result is given in Table 3 below.

**Table 3 Regression, Coefficients, Standard Errors and t values**

Model	Coefficients(a)		t - statistics
	B	Std. Error	
(Constant)	2.971	1.155	2.572
PGR	2.249	1.049	2.144*
LFGR	.138	.162	.854
IMR	-.074	.031	-2.398*

\*Dependent Variable: GDPG

\* Significant at 5% significant level

Evaluation and Interpretation of the Model  
 Ordinary Least Square (OLS) methodology has been used to check the impact of demographic variables on economic growth. Results of estimations are reported in Table 3. Four parameters have been estimated in the model, i.e.  $\beta_0$  (Constant),  $\beta_1$ ,  $\beta_2$ , and  $\beta_3$ . Out of these four  $\beta_1$ ,  $\beta_2$ , and  $\beta_3$  can be interpreted as the partial derivatives of GDPG with respect to PGR, LFGR and IMR respectively.

Even though the parameters of LFGR and IMR have fulfilled the theoretical criteria i.e. priory expectation of its sign, the parameter of PGR has not satisfied that requirement. The priory expectation was negative sign for the parameter of GDP and PGR, it has taken opposite sign. The value of the parameter of PGR is 2.249. This implies that there is a positive relationship between GDP growth rate and population growth rate. Similarly, the degree of parameter implies that when the growth rate of population increase by one unit, the GDPG will be increased approximately by 2 units. Also, this parameter is statistically significant at 5% significant level since the calculated t value is higher than the relevant table value ( $t^* > t$ , i.e.  $2.144 > 2.02$ ).

Generally, there should be an inverse relationship between the population growth rate and the GDP growth rate but, the result through the study, it has revealed a positive relationship. The reason for the same is that, the PGR has not increases after 1963, but, gradually decreases and at present it has come down to a lower percentage of 1%. On the other hand, the GDP has gradually gone up to a higher level as 6.8%. It could be noted that the GDP growth has drown surpassing the growth rate of the PGR. Accordingly, due to the increase of the growth rate of GDP than that of the PGR have been caused towards a positive relationship between the GDP and the PGR. Therefore, we can conclude that the growth rate of PGR in Sri Lanka has an important factor determinant of the growth rate of GDP.

The second explanatory variable of the model LFGR represent the growth rate of labour force of the country. Estimated parameter of the variable LFGR is 0.138. This expresses a positive relationship between growth rate of GDP and growth rate of labour force. When the rate of growth of labour force increases by one unit, the GDP will increase by 0.138 units. Thus, the parameter of LFGR has

fulfilled the theoretical criteria. But, this parameter is statistically insignificant at 5% significance level since the calculated t value is lower than the relevant table value. Therefore, the growth rate of labour force has not significant impact on increasing GDP in the country. It may be due to the fact that the economy is not absorbing the working age population into productive employment. Especially, since 1960, the quality of new entrants to the labour force of the country was significantly increased due to the expansion of free education throughout the country. But, the economy couldn't absorb this educated labour. One of the main reasons for this situation is the country's education system. The skills provided by the education system do not meet the labour market requirements. Also, in Sri Lanka, the unemployment is highest among peoples with G.C.E (O/L) and above educational qualifications. Therefore, the great part of human resource of the country wastes and it is burdened for economic development. Specially, graduates of Arts and Commerce stream are the adversely affected group recently. They enter in to the labour market at the age of around 27 years and with neither work experience nor sufficient English knowledge. The private sector employers prefer to employ young people with good knowledge of English and Computer skills.

The third explanatory variable of the model IMR represent the health status of the people in the country. Estimated parameter of the variable IMR is -0.074. This implies that there is a negative or inverse relationship between GDP growth rate and infant mortality rate. Also, it implies that when the infant mortality rate increase by one unit, GDP growth rate will be decreased by 0.074 units. This parameter is statistically significant at 5% significant level. Thus, it can be concluded that in relation to Sri Lanka, infant mortality rate was an

important factor determinant of GDP during the period in concern.

The value of R- square of the model is 0.136. This expresses that about 14 percent of the total variation of the dependent variable GDPG is explained by the demographic variables included in the model. Hence, the fit of the model is statistically inefficient.

In addition, the Durbin-Watson Statistics of the estimated model is 1.400. This implies that there is an autocorrelation problem in the model.

The overall significant of the model can be tested by the ANOVA table given below.

The hypothesis tested:

$H_0: \beta_1 = \beta_2 = \beta_3 = 0$   
(All parameters are equal to zero)

$H_1: \beta_1 \neq 0, \beta_2 \neq 0, \beta_3 \neq 0$   
(All parameters are not equal to zero)

**Table 4 Analysis of Variance ANOVA (b)**

Model	Sum of Squares	df	Mean Square	F*	Sig.
Regression	22.557	3	7.519	2.146	.109(a)
Residual	143.629	41	3.503		
Total	166.186	44	-		

a Predictors: (Constant), IMR, LFGR, PGR

b Dependent Variable: GDPG

According to the table 4, since  $F^* < F$ , i.e.  $2.146 < 2.84$ , the null hypothesis i.e.  $H_0$  is accepted. That is, the overall regression is insignificant. Accordingly, the results show that there is no significant effect of PGR, LFGR and IMR as a whole, on economic

growth in the country. But when we take the population growth rate and infant mortality rate individually, are effectively impacted on the determination of GDP growth in the country.

## Conclusion

From the foregoing analysis, it was found that the population growth rate has an important factor determinant of economic growth in the country. Infant mortality rate also has significant impact on GDP growth rate. The evidence suggests that reduction in mortality will foster economic growth. As the rate of infant mortality in the country continuous to fall, there will be increased opportunities for economic growth.

Although, Labour Force Growth Rate is positively impact on economic growth, it is insignificant to the model. Thus, it can be concluded that in relation to Sri Lanka, LFGR was not an effectively impacted on the determinant of GDP growth rate in the country in this period. It may be due to the fact that the economy is not absorbing the working age population into productive employment. Especially, since 1960, the quality of new entrants to the labour force of the country was significantly increased due to the expansion of free education throughout the country. But, the economy couldn't absorb this educated labour. One of the main reasons for this situation is the country's education system. The skills provided by the education system do not meet the labour market requirements. However, the results show that there is no significant effect of PGR, LFGR and IMR as a whole, on economic growth in the country. But when we take the PGR and IMR individually, are effectively impacted on the determination of GDP growth in the country.

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