Economic Growth as a Key Factor in Raising Living Standards Worldwide: Analytical Essay

What is the relation between the GDP Per Capita and the life expectancy?

Abstract

A variety of statistical studies have shown the relationship between income and life expectancy. For example, the Preston curve indicates that people born in wealthier countries can expect to live longer on average than people born in poor countries. Nonetheless, the most important thing is not real income growth, but poverty reduction. Studying such relations can help world governments, policymakers, public officials, and representatives to find solutions that are both effective and efficient in improving life expectancy globally.

What Is GDP?

Gross Domestic Product (GDP) is the aggregate financial or market value of all manufactured services and goods in a specific time period within the boundaries of a country. It can be studied in order to determine the economic health of the country.

Although GDP is generally calculated on an annual basis, it can also be calculated on a quarterly basis. For example, in the United States, the government is releasing an annualized estimate of GDP for each quarter and a whole year. Most of the individual data sets will also be given in real terms, which means that the data will be adjusted for price changes and thus net of inflation. Improved understanding of such correlations can help policymakers, public officials, aid organisations, and global wellbeing policymakers to find improved solutions that are more effective and efficient, thus working toward better lifestyles and life expectancies globally.

Calculations to do:

- Linear Regression Line
- Pearson’s Correlational Coefficient
- Chi-Squared test

Introduction

The increase in life expectancy has become a critical topic in population studies in recent years, as it is conditionally dependent on economic growth and health improvement expenditure.

According to the 1998 World Bank report, life expectancy improvement is strongly linked to per capita income. A prosperous country is expected to have a strong impact on its inhabitants' life expectancy. However, less developed countries experience a reduction in mortality rates in clusters of different age groups such as younger or working ages.

Kelley and Schmidt (1995) explored that population growth is neither good nor bad for economic growth. Rodgers (1979) investigated the existence of a relationship between life expectancy, income distribution, and income distribution. Becker, Philipson, and Soares (2003) did not suggest such a relationship.

On the other hand, economic growth is a key factor in raising living standards worldwide and a substantial part of it is the role of population growth in improving living standards (see Heady & Hodge, 2009). There is plenty of literature on the relationship between economic growth and population growth (Heady & Hodge, 2009), and past research shows that high-income countries have relatively low population growth rates (Baker, Delong, & Krugman, 2005). Significant effects of population growth are however observed on economic disparity and life expectancy.

Various research analysts have investigated empirical evidence showing that robust population growth is boosting economic growth. On the other hand, few researchers have found reverse evidence of this conclusion. In addition, the literature reveals that the effects vary with the level of development of a country, the source or nature of population growth. Further factors leading to non-uniform effects on economic growth still need to be investigated.

The fundamental targets of the investigation are many folds, (1) to watch the reliance of financial development on populace development and life expectancy. (2) to investigate the sort of connection between life expectancy, populace development, and GDP in G7 nations:

- US, UK, Canada, Italy, France, Germany, and Japan.

Literature Review

E. Wesley F. Peterson in 2017 examined the effect financial growth had on population growth of high and low-income nations respectfully and examined the literature that was produced for this study. They found that the low-income group had a high increase in population, which in turn would expand the demographic distribution in these nations as the youngsters will eventually become working adults. While on the other hand, high-income countries have a lower growth rate. Although a few of these nations have in fact negative growth rates which suggest that the population has a substantial amount od elderly citizens. Using data from the previous 200 years, they studied the connection between growth rate, growth per capita output, and economic growth as a whole. The findings showed that a high rate of growth in low-income countries and a low rate of growth in high-income countries can cause socio-economic problems

Also in that very year, Linden M. and Ray D. studied 148 countries for the relationship between health and income from 1970 to 2010. They used the method of quantile regression to find a link between health and different groups of income. We concluded that the wealth difference of low-income countries is much greater than that of rich countries.

Income disparity is measured by the Gini criterion, which showed that the health effect of inequality is still remarkable in the countries ' least-income group. On the other hand, after the year 2000, the high-income group of countries became insignificant.

Cervellati,&Sunde (2011) tested the non-monotonic impact of life expectancy on per capita

income growth. They used literature data from 47 countries to test the hypothesis (UN Demographic Yearbook, Maddison(2003)). Their outcome confirms earlier observations on the causal effect of life expectancy on per capita growth in income.

Researchers also concluded that increasing life expectancy will indirectly influence income growth as well as increase the likelihood of witnessing the demographic transition.

In 2002, Hasan discussed the correlation of long-run growth rate with Bangladesh's Per Capita Income. His analysis showed that the long-run growth rate and GDP correlated. In addition, there is also a bidirectional relationship between growth rate and GDP (Hasan, 2002). In another study (Hasan, 2010), using Granger causality method, China's population-per-capita income relationship was examined. Empirical analysis shows the existence of a negative long-term causal relationship between per capita income and population growth and a short-term association between per capita income and growth. He also used neoclassical and endogenous growth models, indicating that growth in per capita income tends to reduce population growth.

Schnabel & Eilers (2009) investigated the nonlinear influence of life expectancy on wealth. We followed Preston's study findings, which had a curvilinear relationship between life expectancy and GDP.

They also used less asymmetrically weighted squares that combined curves of P-spline.

Specific smoothers have been applied to different countries on a large data set. In addition, with the passage of time, their developed models were used to estimate changes in individual countries ' life expectancy.

Model Selection and Data Analysis

GDP statistics (per capita income) and G7 countries ' life expectancy are taken from the website of the World Bank at www.world bank.com. The data ranges between 1960 and 2017. GDP is translated into USD for all countries. Both GDP's are in billion (13 digits or more) so that the GDP of each nation is separated by a billion to ease the analysis process.

The approach we used for the study is a two-variable multiple linear regression model. The regression equation is described as;

1. 1- GDP = C + b1lifeexpectancy + b2growthrate
2. 2- Log(GDP) = C+b1 log(lifeexpectancy) + b2 log(growthrate)

- “C” is a constant.
- “b1” is the coefficient that measures the effect of life expectancy on the GDP.
- “b2” is the coefficient that measures the effect of population growth rate on the GDP.

One group with positive population growth and another group with negative population growth over a period of time. Equation(2) which is a log-log regression method is used for France, Canada , and the United States (positive growth rate), while regular regression equation(1) is considered for the remaining countries (UK, Germany, Japan, and Italy).

The rates of GDP, life expectancy, and population growth for all G7 countries are plotted

separately and shown in Figure 1 to Figure 3.

Figure 1 shows that for the selected period, the annual GDP of all G7 countries has growing trends except for the non-linear trend of the USA. The US GDP sits at the top, while at the bottom are France, Italy, UK, Germany, and Japan.

Some countries have a linear trend of low growth rates.

1. Figure 2 indicates a linear increase in the G7 countries ' annual average life expectancy. In addition, at the start of the selected era, i.e. Japan has the lowest life expectancy in all G7 countries, but it is gradually increasing and gaining the graph's highest position. Although U.S. life expectancy increases gradually from 1960 to 2017, it occupies the lowest position of all. Comparing Figure 1 and Figure 2 it is found that US GDP has increased exponentially since 1992, but this pattern is not matched by the increase in life expectancy.
2. Figure 3, represents the G7 Countries ' annual population growth. They come up with no clear trend, they all move randomly, indicating an overall decline in the rate of growth. Germany has an unusual positive and negative trend activity among all G7 countries, especially in periods such as 1974 to 1986 and 2003 to 2012. In addition to Germany; for a specific period, Italy, Japan, and the UK also have negative growth rates. Comparing life expectancy and growth rate graphs (Figure 2&3) reveals that Canada's growth rate is popular despite having high and low peaks.
3. Table 1 displays GDP, growth rate, and life expectancy descriptive statistics for the selected period of the G7 countries. The average US GDP is high, i.e. 93.58, while Canada is the lowest of all, i.e. 10.2 billion. Although Japan's average life expectancy (77.45) is high, the U.S. has a minimum average value (74.534) on the other hand. In comparison, Canada has a high average rate of growth while Germany has the lowest average rate of growth among G7 countries. Compared to other G7 nations, Canada's high growth rate may be attributed to the fast and simple immigration policy. In comparison, Japan's standard life expectancy variation is highest, showing high volatility. On the other hand, the U.S. has less variation in life expectancy as the standard deviation among all is small. This fact can be seen in Figure 2. The population growth rate in Canada is the highest (1.28) followed by the US (1.04), the minimum population growth rate for Germany is observed (0.23).