Population Composition and Its Effect on Economic Growth

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Abstract

Background: The relationship between population and economic growth has always been a subject of debate. There has never been any clear consensus amongst economists about the nature and extent of influence that population has on the economic growth of a country.

Objective: This paper aims to explore the influence exerted by the age structure of the population on the economic growth of a country.

Method: The paper uses secondary data to find the relation between Gross Domestic Product (GDP) per capita levels of countries and their respective Age Dependency Ratio.

Result: There is a significant negative relationship between them, which implies that, if a country has a rise in a high proportion of the dependent population, per capita income will tend to be lower.

Conclusion: The paper then makes a special study of the prospect of demographic dividend in India. The country is in the third phase of demographic transition, implying that the proportion of the working-age population is greater than the dependent population. This provides an ideal condition for the Government to reap the benefits of demographic dividend and achieve higher levels of economic growth.

Keywords: Demographic Economics, Demographic Dividend, Age Distribution, Economic Growth, Public Policy

Paper Type: Research paper

JEL Classification: H00, O4

Introduction

The relationship between population and economic growth has always been a subject of debate. There has never been any clear consensus amongst economists about the nature and extent of influence that population has on the economic growth of a country. This topic received extensive research by economists using different theoretical concepts for decades. However, there has not been any clear empirical evidence that shows a clear relationship between the two variables.

The relation between population and economy's performance was first advocated by Thomas Malthus in his book 'An Essay on The Principle of Population'. He stated that the population grows in geometric progression while 'subsistence' or food multiply arithmetic progression. Therefore, there will always be a scarcity that the human population will face. 'The power of population is so superior to the power in the earth to produce subsistence for man, that premature death must in some shape or other visit the human race' (Malthus et al., 1970).

Till the 1960s, the opinion about the population as a deterrent to economic growth was popular among economists. Due to this, many countries at that time adopted population control measures to bring the population under control. Fertility rates during that time fell rapidly in many countries. There were also some works like that of Kuznets where Kuznets (1960) stressed how the rise in population leads to the labor force. He explained that the limited resources and capital available in the country will lead to a fall in the productivity of each worker. Coale and Hoover (1958) studied the economic growth prospect of a high population density country like India. The study found that without nationwide population control, there would not be enough food to feed its entire population and India would have to export manufactured goods to import food. Though in the 1980s, India did face economic problems due to a rise in oil prices and spells of droughts, India was able to overcome the problems and it is now the second-largest food-producing country, after China. Therefore, it was felt there are other factors about demography that are influencing the economic growth of a country.

A new theory started emerging that it is not the population as a whole, but the structure of the population that determines economic growth. It was seen that a high population country like China was also enjoying a high economic growth rate. This led the researchers to look more closely at the demographic trends and other country-specific aspects for determining the economic growth prospect of the country. At present, most of the researchers agree that the population composition and structure determine economic growth in a country. An important theory based on this principle is the demographic dividend. The theory of demographic dividend states that a country will progress if the share of the working-age population is high and the share of its dependent population is low. This is a popular theory and has been accepted by economists as a real phenomenon.

It has been said by economists that developed countries usually have achieved economic development by utilizing the demographic dividend due to the rising working-age population in these countries in the past. Recently, China has achieved considerable economic development due to the rising working-age population. Economists have claimed such rapid development due to China's strict efforts to reduce the fertility rate that thereby helped it to achieve demographic dividend at an earlier period. India has achieved the period where its working-age population is at its highest level. Therefore, it requires an urgent need for policies to utilize this population productively. This study examines how the age structure of a population affects economic growth, first for the countries in the world and then for India.

This paper contains eight sections. Section I introduces an area of examination and its relevance to the present scenario. Section II explains the concepts of demographic transition and demographic dividend. Section III discusses relevant concepts used in the study. Section IV reviews the relevant literature to the study. Section V describes the methodology applied to this study. Section VI discusses the findings of this paper. Section VII explores the situation in India related to the demographic dividend. Finally, Section VIII draws the conclusion based on the discussion in previous sections and suggests measures to accelerate economic development in India.

Demographic Transition and Demographic Dividend

Demographic transition refers to the entire process of conversion of a country from a situation of high birth rate and high death rate to a situation of low birth rate and low death rate. The birth rate refers to the number of births per thousand persons in a country. The death rate is the number of deaths per thousand persons in the country. If the birth rate is higher than the death rate, then there is a natural increase in the population. The situation of high birth rate and high death rate implies a situation of underdevelopment where there are no population control measures and lack of adequate health care and nutrition for the people. Therefore, with a gradual development of health and education facilities, the country can achieve the situation of low birth rate and death rate over time. The original demographic transition model as suggested by Warren Thompson in 1929 has four stages:

Stage 1: High birth rate and high death rate: This refers to the initial situation of an economy before it starts its process of development. Illiteracy and lack of awareness lead to a high birth rate. The death rate is high because the government is unable to provide adequate nutrition and health facilities for its entire population due to a lack of resources.

Stage 2: High birth rate and falling death rate: This situation starts increase of population in the country. Due to the introduction of health and medical care, the life expectancy of people rises and this leads to a falling death rate. The birth rate is, however, still high.

Stage 3: Falling birth rate and a low stable death rate: In this stage, both birth and death rates fall. The birth rate falls due to rising awareness about family planning and the increase of education for the population. However, the population still rises as the birth rate is still higher than the death rate.

Stage 4: Birth rate equals death rate: In this stage, the population growth rate is stationary, in the sense, there is no increase in population. This is the situation of developed countries.

Figure 1: Stages of Demographic Transition
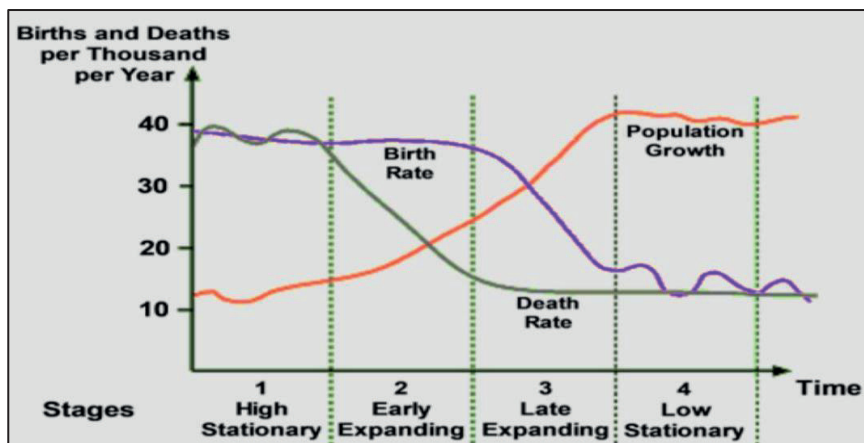
Source: Barcelona Field Research Centre Report (2020)

There has been an additional stage added to the original model and that is called the fifth stage of demographic transition. In this stage, there is a falling birth rate and stable death rate. This situation leads to a population decrease as the birth rate starts falling more than the death rate. The government has to take measures to improve its population size.

The possibility of demographic dividend occurs during the third stage of the demographic transition model. When the population rises in the country, the country receives certain benefits that eventually improve its economic condition. This view is different from the traditional theories which held that population growth only has a negative influence over the country. However, in reality, it was discovered

that as the population rose and the working-age population rose eventually, the country was able to derive some benefits from it. These benefits are called demographic dividends. The following are how the rising growth of the working-age population increases economic growth:

Economic benefit: The country has a greater proportion of the population of the working-age group. Therefore, is a majority of the population productively contributes to the nation, accelerating its growth rate. The government has to pay fewer transfers of payments like pensions because of a small share of elderly people, thereby decreasing its burden. It can use its surplus resources in infrastructural and technological development. The people have adequate income to save more and it increases investment in the country. Also, as the birth rate falls, the government has more resources to invest in human capital formation in the future generation leading to a second demographic dividend in the future.

Technological benefit: The working-age group gets engaged in innovations and inventions. Therefore, an increase in this age group leads to better innovative technologies in production. This leads to the improvement of productivity and economic growth.

Social benefit: With the development in the economy and falling illiteracy, the shackles of prejudices and primitive mindsets are replaced with a progressive outlook amongst the people. The people will be more tolerant which will give rise to lesser discrimination and inequality in the country.

Political benefit: Development also leads to institutional changes. It reduces corruption and empowers the citizens. The government has also enough resources at its disposal to spend on the welfare of the people.

However, the presence of demographic transition does not imply that the country gets the demographic dividend. The conditions in the country should be conducive for it to be able to reap the benefit. Such conditions are discussed later in the paper in greater detail.

Review of Literature

With the emergence of the theory of population dividend, researchers started investigating more on the importance of population structure on economic development. In this section, I review the relevant literature on population structure and economic development. Bloom D., Canning, D., and Sevilla, J. (2003) found from their study that population composition, especially the age structure of the population, is important for a country's economic growth. Keeping this in mind, they advocated the reduction of the fertility rate in the country for achieving growth faster. However, the study also highlighted the importance of the right kind of education and health facilities for the country to reap the benefits of economic growth. Another study by Bawazir, Aslam, and Osman (2019) empirically examines the effect of demographic change on economic growth in Middle-East countries. The study finds that factors like population growth, working-age population, and old dependency ratio positively influence growth. However, the youth dependency ratio negatively influences economic growth. The study also finds that male workers contribute more positively to economic growth than female workers and so more efforts by the government are required to engage women actively in the labor market.

The effect of population growth on the economy is complex. According to Peterson (2017), high population growth in low-income countries slows down the development process. On the other hand, high population growth in developed countries leads to social and economic problem lower population growth and limited migration contributes to increased economic inequality, further reducing economic growth. Headey and Hodge (2009) analyzed studies in the literature linking population and economic growth. It states that literature has proved that the adult population has a positive effect on the growth of the economy. However, the impact of population growth on the economy is enhanced when regression controls for investment due to the resource-dilution effect.

Bloom, Canning, and Sevilla (2003) highlight age structure as an important determinant of economic growth. With population growth, age structure changes, which in turn, influences economic growth

because changes in economic behavior have a significant influence on economic growth. Therefore, increased opportunities for the adult population helps to achieve a demographic dividend. Openness to trade and flexible labor markets help to achieve this. Baker, De Long, and Krugman (2005) argued that real economic growth needs to rely on a rapidly expanding economy to finance social security. Therefore, population growth has a detrimental effect on economic growth in the long run, unless there is corresponding productivity growth. Mamingi and Perch (2013) provide an empirical investigation of Barbados yields the result that population growth positively impacts economic growth whilst economic growth negatively impacts population growth. International migration, however, has a negative influence on population growth which hampers economic growth in Barbados.

Another study by Lee and Mason (2010) showed the reason for advocating low fertility in a country. They claimed that a low fertility rate leads to greater human capital accumulation that leads to high per capita consumption because, if the number of children in a family is less, parents have greater resources to spend on each child. The study found that countries with lower fertility are spending more on human capital accumulation. High human capital accumulation also gives rise to the possibility of a second population dividend in the country. Bloom, D., Canning, D., and Fink, G. (2010) advocated an increase in the life expectancy of the population. Increasing life expectancy leads to people working longer in their lives thereby prolonging the demographic dividend. The study found that developing countries are facing a rapid decline in their fertility rate compared to the developed countries. This affects the entering of young people into the job market because the old age group continues to work. This accelerates the positive effect of population structure on economic growth. In a recent study, Barsukov (2019) asserted the importance of socioeconomic policies in achieving demographic dividends. This is because a country experiencing demographic transition does not need to automatically get the demographic dividend. The study compared the various aspects of the demography of countries in the world. The study found that some developing countries experience a higher level of reduction of fertility rate than the developed countries when they had a demographic transition. Therefore, the depth of demographic dividend is more substantially experienced in developing countries than the developed ones.

Several studies contributed to the discourse of the demographic transition and its effect in India. Aiyar and Mody (2013) argued that, in India, substantial growth was witnessed from the 1980s due to the country's age structure. Using inter-state demography, the study found age structure as an independent factor that positively influences economic growth. Desai (2010) had compared the demographic situation of China and India. The author argued that China's stringent one-child policy of population hastened its demographic dividend and India's fertility rate fell gradually. Therefore, India expects to experience a lesser old-age dependency ratio sooner than China. However, India needs to include the female working-age group productively otherwise it will lose considerable economic growth and will not be able to realize a demographic dividend.

Research Method

This paper is a descriptive analysis of the effect of the composition of the population on the economic growth of a country. It uses secondary data released by the World Bank from the year 1980 to 2019. Data has been taken for the following parameters: GDP per capita as a proxy of income level and also the growth of GDP per capita as representative of economic growth in a country. A total of 151 countries has been considered in our study. Of these 20 countries belong to high-income; 118 countries to middle-income countries; and 13 belong to low-income countries. Age dependency ratio data has also been taken from the World Bank database.

This paper deals with the relation between economic growth and the age dependency ratio in the world. For the analysis of the relationship between per capita GDP and age dependency ratio, the following simple linear regression model has been used:

$Y_i = a_i * X_i + e_i$, where Y_i = GDP per capita of ith country,

a_i = parameter capturing the effect of Age Dependency Ratio on GDP per capita of ith country,

X_i = Age Dependency Ratio of ith country,

and, e_i = error term for i^{th} country.

The regression results have been obtained using STATA 14 software. The regression analysis has been done with the help of STATA 14 software.

Data Analysis and Results

We find a negative relationship between GDP per capita and age dependency ratio. This implies that countries with high age dependency ratio have lower GDP per capita and vice-versa. This result is logical because a higher age dependency ratio implies a greater proportion of the population depending on the productive age group. The working-age group, therefore, has to bear a greater burden as they have more mouths to feed and each person in the population gets a lesser share of the pie. The standard of living is, therefore, lowered and people are worse off. The negative relation between GDP per capita and age dependency ratio is significant and the overall R-square is 28 percent. Therefore, 28 percent of the GDP per capita is explained by the dependency ratio. The within-group variation is 1.89 percent and between-group variation is 47.71 percent.

Table 1: Chart showing regression result of relation between per capita GDP and Age Dependency Ratio

```
Random-effects GLS regression              Number of obs     =      6,040
Group variable: country                    Number of groups  =        151

R-sq:                                       Obs per group:
    within  = 0.0189                                          min =         40
    between = 0.4771                                          avg =       40.0
    overall = 0.2800                                          max =         40

                                            Wald chi2(1)      =     161.48
corr(u_i, X)    = 0 (assumed)               Prob > chi2       =     0.0000
```

gdppercapita	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
agedependencyratio	-118.7454	9.344462	-12.71	0.000	-137.0603	-100.4306
_cons	17549.92	988.5745	17.75	0.000	15612.35	19487.49

sigma_u	9088.4872	
sigma_e	7890.8603	
rho	.57018515	(fraction of variance due to u_i)

Source: World Bank data (2020)

In some countries, the dependency ratio is very high due to the higher fertility rate and birth rate. So, the proportion of the population below 15 years is much higher in these countries. Households in these countries are typically characterized by large families and only one or two workers. These households suffer from poverty and malnutrition as the low income is not enough to feed sufficiently all the members of the family. Education is also neglected due to the dire economic condition in the family. This is the reason for the negative relationship between income per capita and age dependency ratio in the countries.

To get a closer look at the differences between the developed and underdeveloped countries, we divided the countries into the following three groups: lower income group, middle-income group, and higher-income group. The classification has been done keeping in mind the criteria of classification of countries based on their per capita income by the World Bank: high-income countries $44617.48, middle-income countries $5573.24 and low-income countries- $810.09. When we plot the GDP per

capita and age dependency ratio of high-income countries, we find no significant relationship between the two. For developed countries, the proportion of the dependent population does not influence the economic growth in these nations. When we look at the relationship between GDP per capita and age dependency ratio for middle and low-income countries, we find a negative relationship. For these countries, the age dependency ratio significantly influenced economic growth. This is an interesting finding and requires considerable insight.

Table 2: Chart showing regression result of relation between per capita GDP and Age Dependency Ratio for high income countries

```
Random-effects GLS regression               Number of obs     =         800
Group variable: country                     Number of groups  =          20

R-sq:                                        Obs per group:
    within  = 0.0000                                           min =          40
    between = 0.0097                                           avg =        40.0
    overall = 0.0008                                           max =          40

                                             Wald chi2(1)      =        0.00
corr(u_i, X)    = 0 (assumed)                Prob > chi2       =      0.9754
```

gdp	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
agedepratio	3.41018	110.5192	0.03	0.975	-213.2035	220.0239
_cons	34820.29	5916.272	5.89	0.000	23224.61	46415.98
sigma_u	9551.1395					
sigma_e	18907.819					
rho	.20329439	(fraction of variance due to u_i)				

Source: World Bank data (2020)

Table 3: Chart showing regression result of relation between per capita GDP and Age Dependency Ratio for middle income countries

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Random-effects GLS regression               Number of obs     =       4,720
Group variable: country                     Number of groups  =         118

R-sq:                                        Obs per group:
    within  = 0.0899                                           min =          40
    between = 0.0719                                           avg =        40.0
    overall = 0.0072                                           max =          40

                                             Wald chi2(1)      =      430.69
corr(u_i, X)    = 0 (assumed)                Prob > chi2       =      0.0000
```

gdp	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
agedepratio	-114.6259	5.523301	-20.75	0.000	-125.4514	-103.8004
_cons	14000.83	776.3483	18.03	0.000	12479.22	15522.45
sigma_u	7278.546					
sigma_e	4338.9183					
rho	.73780906	(fraction of variance due to u_i)				

Source: World Bank data (2020)

Table 4: Chart showing regression result of relation between per capita GDP and Age Dependency Ratio for low income countries

```
Random-effects GLS regression              Number of obs     =        520
Group variable: country                    Number of groups  =         13

R-sq:                                       Obs per group:
    within  = 0.0777                                          min =         40
    between = 0.1051                                          avg =       40.0
    overall = 0.0856                                          max =         40

                                            Wald chi2(1)      =      43.96
corr(u_i, X)    = 0 (assumed)               Prob > chi2       =     0.0000
```

gdp	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
agedepratio	−5.330102	.8039293	−6.63	0.000	−6.905774	−3.754429
_cons	887.6372	82.65364	10.74	0.000	725.639	1049.635
sigma_u	131.60639					
sigma_e	189.89797					
rho	.32446164	(fraction of variance due to u_i)				

Source: World Bank data (2020)

The possible explanation for this curious situation is that when a country is developing, the effect of a larger dependent population heavily affects the growth prospect of the nation. In other words, a poor country is more adversely affected by the increasing population than a rich country. This can be better understood if we take the example of a family. Let us consider a poor family that can barely make its ends meet. If an additional member is added to the family, then the expenditure on each existing member has to be cut down to provide for the new member. Each member will get less food and the children may be forced to quit schools because it cannot be afforded anymore. By contrast, if an additional member is added to a rich family with enough savings, it will hardly affect the lifestyle of the existing members in the family to provide for one more person. Therefore, the adverse effect of a new member is more in a poor household compared to a rich household that has plenty of money at its disposal to provide for the new member. Similarly, for a poor nation, the burden of its dependent population is more felt as it has to cut down on its development expenditure, health care, and education to provide for its increasingly dependent population. Therefore, we find a negative relationship between income per capita level and the proportion of the dependent population. On the other hand, the developed countries' income level does not get reduced by the proportion of their dependent population and the former remains unaffected by the latter. The regression results show an insignificant relation between income per capita and dependency ratio.

We now consider the relationship between the growth of per capita income and the change of age dependency ratio. This relationship is important to be discussed because it will show the nature and extent of influence that the age dependency ratio has on the economic growth of a country.

Table 5 shows a negative relationship between the growth of the proportion of the dependent population and the economic growth of countries. However, the relation is insignificant that implies a change in the dependency ratio does not influence the growth of the economy.

When we consider the growth of the proportion of old-age in the population, then we find no relation between it and economic growth. In other words, it does not affect economic growth. However, if we consider the young age group, we see a positive relationship between its growth and per capita income growth. This implies an economy at early stages with a high young population will encounter high-income growth. It can also be because the population below 15 years affects the economic growth positively. This can be explained intuitively. As the number of members in a household rise, the working members tries to earn more to provide for them. It engages more time in productive activity.

Therefore, the substitution effect becomes more powerful than the income effect as the opportunity cost of working reduces and that of leisure rises. So people are induced to work more and be more productive which, thereby, has a positive impact on the nation's income level.

Table 5: Chart showing regression result of relation between growth of per capita GDP and growth of age dependency ratio

```
Random-effects GLS regression              Number of obs      =       5,889
Group variable: country                    Number of groups   =         151

R-sq:                                       Obs per group:
    within  = 0.0005                                            min =         39
    between = 0.0527                                            avg =       39.0
    overall = 0.0003                                            max =         39

                                            Wald chi2(1)       =        1.63
corr(u_i, X)   = 0 (assumed)                Prob > chi2        =      0.2021


─────────────────┬──────────────────────────────────────────────────────────────
     growth_gdp  │     Coef.    Std. Err.      z     P>|z|    [95% Conf. Interval]
─────────────────┼──────────────────────────────────────────────────────────────
growth_agedepratio│  -.0344891   .0270352   -1.28    0.202   -.0874771    .0184989
           _cons │   .0454149    .001834    24.76    0.000    .0418204    .0490094
─────────────────┼──────────────────────────────────────────────────────────────
         sigma_u │          0
         sigma_e │  .14080273
             rho │          0    (fraction of variance due to u_i)
─────────────────┴──────────────────────────────────────────────────────────────
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Source: World Bank data (2020)

India and Demographic Dividend

India is a middle-income country with a majority of the population very poor and cannot afford the necessities of life. However, initiatives by the Government of India have helped to improve their living conditions.

In Table 6, a regression analysis explores the extent to which the age dependency ratio has affected the income per capita of India. Data considered is from 1960 to 2019.

Table 6: Chart showing regression result of relation between per capita GDP and Age Dependency Ratio for India

```
      Source │       SS           df       MS        Number of obs   =         55
─────────────┼──────────────────────────────────    F(1, 53)        =       5.93
       Model │  1.32308966         1  1.32308966     Prob > F        =     0.0182
    Residual │  11.8173288        53  .222968467     R-squared       =     0.1007
─────────────┼──────────────────────────────────    Adj R-squared   =     0.0837
       Total │  13.1404184        54  .243341082     Root MSE        =      .4722


─────────────┬──────────────────────────────────────────────────────────────────
 log_gdpper~a │      Coef.    Std. Err.      t     P>|t|     [95% Conf. Interval]
─────────────┼──────────────────────────────────────────────────────────────────
 agedepratio │   -.0161983   .0066496    -2.44    0.018    -.0295358   -.0028609
       _cons │    2.76505    .4596812     6.02    0.000     1.843046    3.687053
─────────────┴──────────────────────────────────────────────────────────────────
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Source: World Bank data (2020)

The study finds a negative relationship between the age dependency ratio and per capita GDP. This proves that in the case of India, a higher percentage of the dependent population has a negative influence on economic growth. For India to accelerate its development level, it requires a high working-age population and adequate opportunities for the population to productively contribute to the nation's development.

India has tried to curb the population explosion using awareness about family programs and the availability of contraceptive methods. It has not used coercive measures like China due to which the effects of the awareness are being realized years later. Presently, India is said to be in the third stage of demographic transition because the birth rate is declining and the death rate is stable.

**Figure 2: Demographic Transition**
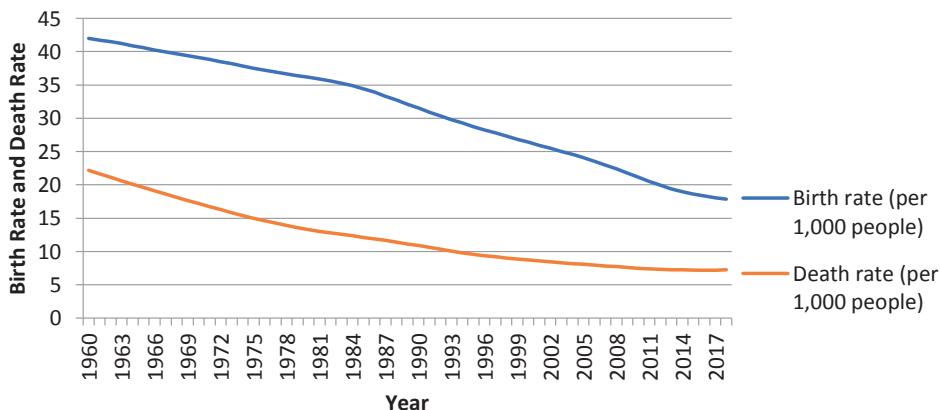
Source: World Bank data (2020)

Since the crude birth rate is independent of population structure and composition. Therefore, it may not capture the actual decline of infertility. So, it is important to consider the trend of the total fertility rate also.

Figure 3: Total Fertility Rate in India from 1960 to 2016
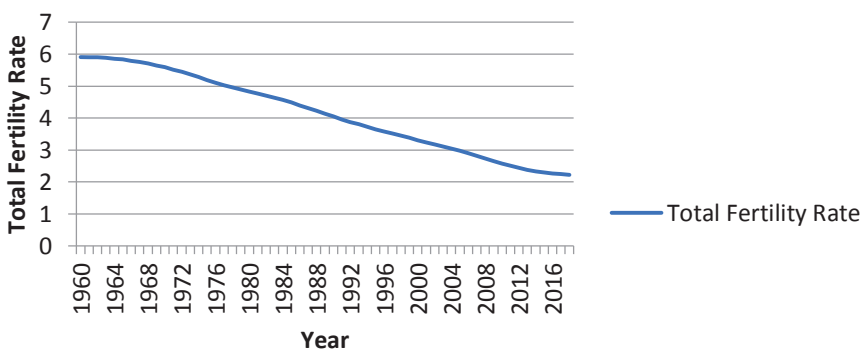
Source: World Bank data (2020)

The life expectancy rate has also increased in India. It is rising as the economy is developing and the government spends more resources on improvement in education, health care, and living standards of the people. The life expectancy rate indicates the productivity of people. If a person is healthy, then he/she will also have larger productivity compared to a person suffering from malnutrition. So rising life expectancy rate implies that the productivity of workers is increasing in India and, thereby, accelerating economic growth.

Figure 4: Life Expectancy Rate at Birth in 1960 to 2016
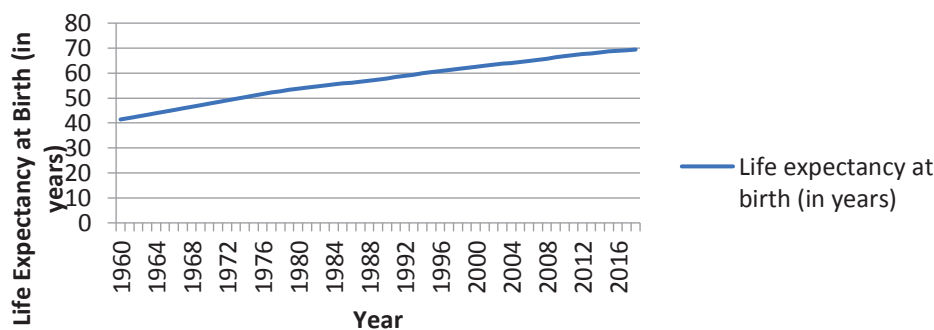
Source: World Bank data (2020)

A high life expectancy rate leads to higher economic growth if the share of the dependent population falls and the working-age population increases. This can be determined by studying the demographic pyramid of India. A demographic pyramid can be expanding, stationary, or contracting in shape.

Expanding pyramid: If the shape of the pyramid is such that the base of the pyramid is broad and the pyramid tapers to the top, i.e. it is the shape of a mountain, then it is expanding in nature. It implies that the proportion of the young age group is highest in the country because the fertility rate is very high. Also, the death rate is high due to which proportion of old an age person is least. This is applicable for all the countries before they start experiencing the development process.

Stationary pyramid: This occurs after the expanding pyramid. In this case, the proportion of the young age group and the lower portion of the working-age group are of equal breadth. Therefore, it takes the shape of a square with a semi-circle at the top. It implies that the birth control measures of the government become effective due to which the base of the pyramid is not broadening anymore.

Contracting pyramid: This occurs after the stationary stage. The pyramid's base becomes narrower while its middle portion becomes broader. In other words, the fertility rate falls and the dependent population is low. The share of the working-age population increases due to which the middle part of the pyramid becomes broader.

By looking at the demographic pyramid of India, we find that in 1960, the shape of the demographic pyramid was expanding. This shape is found in all the demographic pyramids till the year 1990. In the demographic pyramid of years 2000 and 2010, the shape was stationary. This is because the population control policies of the government began to be effective around this time. In the demographic pyramid of the year 2020, the shape is contracting in nature because the base is getting narrower than the middle portion that comprises of working age group population. This occurs because the fertility rate is declining.

Figure 5: Demographic Pyramid of India from 1960 to 2020
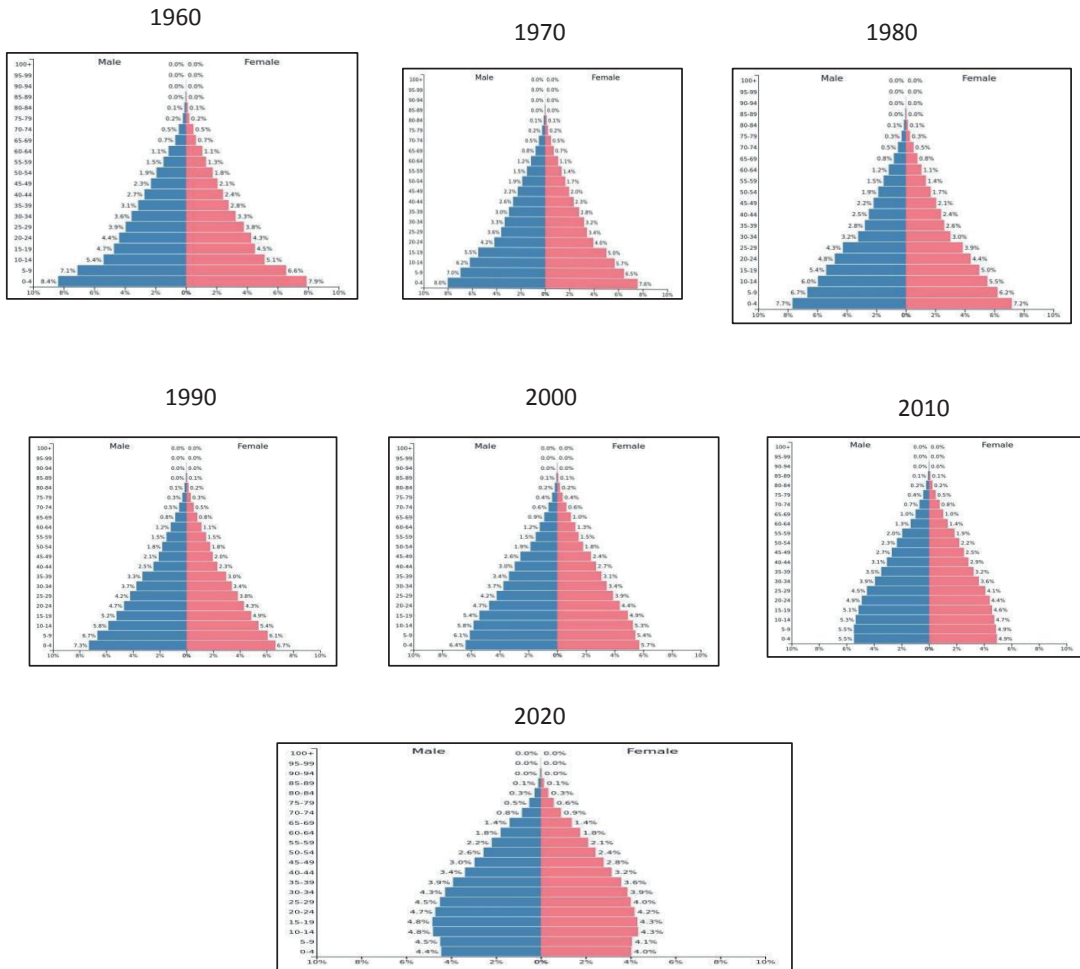
Source: Population Pyramid India (2020)

The phenomenon of the rising proportion of the working-age population in the country puts India in a perfect position to reap the benefits of demographic dividend. However, such benefits can be reaped only if appropriate measures are adopted by the government. It is important to discuss the importance of some measures that will help the country to achieve a demographic dividend. Such measures are as follows:

Measures of population control: From the demographic pyramid, it is evident that population growth in India is slowing down. The efforts of the government become effective and more families prefer smaller families in India. The fertility rate is also falling which is also a good sign. The government should continue with its present measures to make birth control measures affordable and accessible to all its citizens. However, it is important to understand that if the fertility rate falls too low, then prospects of population growth and the demographic dividend get destroyed. Therefore, the government should maintain a balance without jeopardizing the hope of economic growth in the future.

Reduction of female infanticide and early marriage: Malpractices like female infanticide should be severely punished not only out of moral obligation but also from the economic development point of

view. Such practices create a skewed distribution of population that will adversely affect the future share of the working-age population and economic growth. Child marriage should also be stopped in remote areas so that population growth is reduced.

Education: Free and compulsory education for all, irrespective of gender, religion, and caste, is a prerequisite for economic development. This helps people raise awareness about population education. Girls will have the option of earning for themselves rather than getting married and depending on their husbands for survival.

Improvement of life expectancy rate: In recent years there has been improvement in the life expectancy of people in India. The life expectancy rate in India in 2018 was 69.4 years. However, it is still low compared to China (76.7 years), United States (78.5 years), Bhutan (71.5 years), Indonesia (71.5 years), and Bangladesh (72.3 years). These data have been taken from the World Bank database. Higher life expectancy helps the nations to increase the productivity of people, enabling them to work longer. This prolongs the span of demographic dividends. Therefore, the government should focus on improving the health and nutritional facilities of the young and working-age group of the population.

Training programs: This measure helps to improve the productivity of the workers. Training programs reduce unemployment and bring more people into the workforce. While the share of the high working-age population is important, if unemployment is high, then it will not lead to a demographic dividend. Therefore, training programs are important to employ individuals productively in the labor force. Training programs can also improve the productivity of the existing workforce by making them acquainted with new technologies that will increase work efficiency and reduce time and effort.

Increase of Female Labour Force Participation Rate: This is an important measure in the Indian context because recent trend shows a fall in female Labour Force Participation Rate. Economists are still trying to find reasons for a declining trend, especially when the country is developing fast. Reasons such as discrimination in the labor market, low wages, and lack of mobility of female workers have been claimed to be the reasons. The government should take stringent action to curb this trend, because if almost half of the country's population is not engaged in the labor force, then the country can never achieve the full extent of demographic dividend.

Figure 6: Female Labour Force Participation Rate in India from 1990 to 2020
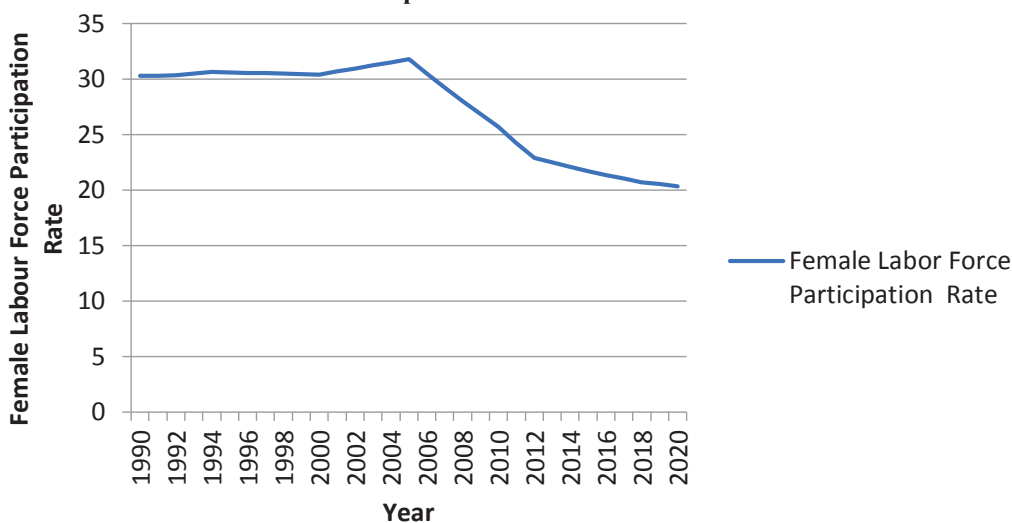
Source: World Bank data (2020)

These are some measures that can help to improve India's chances of achieving demographic dividend. The government needs to take this opportunity that will last around 40-50 years as it will accelerate the economic growth of the country and help it to become a powerful nation in the world. However, the above policies are general suggestions and it will be more effective if the government takes region-specific actions that will be attuned to the local culture and social norms. The effectiveness of a policy also depends on the stakeholders and economic agents and, therefore, it is important to adopt a bottom-up approach for policy formulation rather than a top-down approach.

Conclusion

This paper has explained the importance of population composition in determining a country's economic growth. Explaining the concepts like demographic transition and demographic dividend, this paper argues that, not just the population, but the age structure of the population determines the economic growth of a country. The demographic dividend, which is an important window of opportunity for the countries to accelerate their growth, depends on the age composition of the population, especially the working-age group.

This paper also relates the age dependency ratio with the income level of countries. Cross-sectional data analysis has been conducted for this analysis. The study finds a negative relation between per capita GDP and age dependency ratio. This implies that countries with high per capita GDP have a low age dependency ratio and vice-versa. This result proofs the significance of the productive contribution of the working-age population on the income level of a country. In case of India as well, there is a negative relation between income per capita and age dependency ratio.

This paper also studied the prospect of India in achieving demographic dividends. India is currently going through the third stage of demographic transition. There has been a fall in fertility rates and an increase in life expectancy levels, all of which point to the fact that it is in an ideal position to reap the benefits of demographic dividend. However, it needs to adopt certain measures which will be effective in improving the quantity as well as the quality of its workforce. A mere increase of working-age group will not automatically ensure that there will be a demographic dividend. It will be ensured only if the majority of the working-age population is productively engaged in the economy. To achieve this situation, the government needs to tackle the discrimination practices that are present in the Indian labor market. It excludes the marginalized sections of the population, such as the females, Scheduled Tribes, Scheduled Castes, Other Backward Classes, and the differently-abled persons. The government should aim at a more diverse workforce and ensure an inclusive work environment to attract more members of the working-age group into the workforce. Such policies will ensure improvement in the prospect of a country achieving demographic dividend.

It is important to consider that there can be other factors that influence the economic growth of a country as well, such as investment and capital accumulation, infrastructural development, and institutional changes. Such factors may have a greater influence on the growth of a country compared to population composition. However, the scope of the present paper is to highlight the extent to which population structure affects economic growth, without diminishing the importance of other factors. The specific need and situations prevailing in the economy will determine the factors that will be used by policymakers to achieve economic growth and development in the country.

Conflict of Interest

Author declares no conflict of interest.

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