



## Effect of Changing Age Structure of India Especially Working Age Population on Economic Growth

### KEYWORDS

Working age population, Economic Growth, Employment, Demographic Dividend

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**ABSTRACT** *The development of any country is reflected in the growth of GDP, rise in literacy & employment levels, removal of poverty and inequalities. Population is a very important macroeconomic variable that plays a very significant contributor for the development and growth of the country. Recently India is tagged as one of the youngest nation of the world because of increasing size of persons in the working age bracket. The window of opportunity in India had already opened up in the recent past and now India is at the point of reaping the demographic dividend. Among the variety of other macroeconomic factors working age population is one factor that works towards the growth performance of the country. The present paper tries to analyse the effects of changing age structure of India especially working age population on its economic growth.*

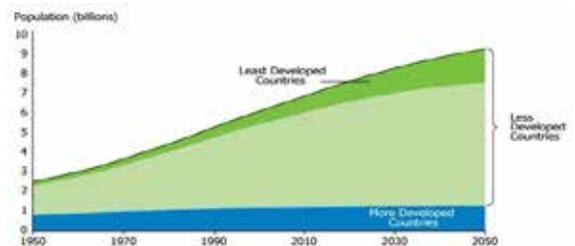
### Introduction

Indian economy is a vibrant economy, a unique milieu of culture, tradition, values & religions. Its size, demographic diversity, level of economic development presents the inherent growth potential of the country. The economic growth is a process of progressive change in the socio-economic structure of the country which in turn is accompanied by greater commercialization of different economic activities. The growth performance of any country is reflected in the rate of rise in the GDP of the country, increase in the literacy & employment levels and removal of poverty and inequalities. Every nation of the world is endeavouring towards the noble process of economic development. Although this is a complex one, which in turn depends upon variety of factors such as, availability of natural resources, capital stock, rate of capital formation, stage of economic development, condition of foreign trade, social organizations, political freedom, state of technology and very importantly size and quality of human resource. India's population is very large in size; only next to china it is the highest populated country in the world. It supports 16-17% of the world population in its 2.4% geographical area of the world [7]. This very factor sounds a pessimistic view as rapidly growing population arrests the rate of growth process in the economy. But there is another side of this truth; population is also an asset considering the available resources. When this population is equipped with the good education & skills with good health, it plays a very constructive role in the process of economic growth of the country. This particular factor hints about strength of Indian economy- (i.e. its working age population), which is the heart of the paper. The Demographic Transition theory suggests that decline in infant and child mortality leads to decline in overall fertility levels [4]. This in turn results into Temporary Baby- Boom and later when this cohort enters into working age, within a period of 15-25 years, the state of Demographic Dividend arrives as at this point the country has comparatively higher share of workers as compared to the dependent population. This is equally true in case of India.

India is also passing through a phase of these unique demographic changes, wherein the proportion of the working age population (15-59 years) is likely to rise from around 58 per cent in 2001 to over 64 per cent by 2021 (**accord- ing to the Economic Survey11-12**) The present paper

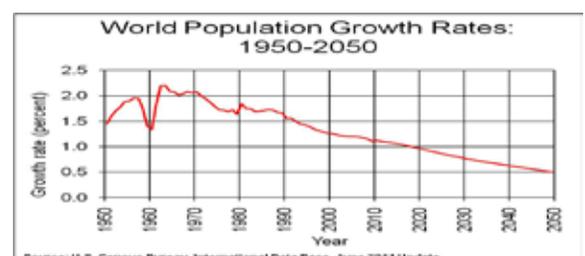
tries to analyse the relationship of changing age structure of India especially working age population on its economic growth which is taken in terms of GDP.

**Figure 1: Trend of World's Total Population**



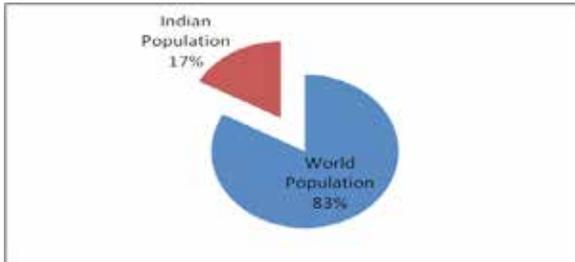
**Source:** United Nations Population Division, World Population Prospects: The 2010 Revision, medium variant (2011).

Across the globe the population grew very dramatically during the twentieth century. In the same direction India also experienced the rapid population growth. According to UN population estimates the population of the world reached 7 billion in 2011, an addition of 4 billion people since 1960 and another 1.4 billion people will be added by 2030. Further the world population size will experience a new level when there will be 9 billion people on this Green Planet by the year 2050. The world population is shown in the above figure-1 according to the category of countries. More developed countries are having stabilised share of world population since 1950 but the share of less and least developed countries are increasing.



**Figure-2: Trend of World Population Growth Rates**

The above figure-2 shows the world population growth trend from the year 1950 to 2050. There are seen fluctuations in the trend line during the decade 1950-1960. There is an upward trend of population growth because of sharp decline in mortality. Later a dip occurred because of effective population control measures.



**Figure-3: India's population as a proportion to world population**

The figure-3 shows the proportion of the world population that lives in India as its residents.

**Literature Review**

Demographic changes in a country have significant economic implications; this fact is equally true with respect to the great country like India. Alexia et.al (2004) [1], believed that age structure might have an important effect on economic growth. They used the probabilistic demographic projections for India to derive the uncertainty of predicted economic growth rates caused by the uncertainty in demographic developments. Stephan Klasen et.al (2007) [16] used a case study of Uganda. They examined the link between population and per capita economic growth and one more very important economic factor- poverty. They found that the Uganda's currently high population growth puts a considerable break on per capita growth prospects of the country. Moreover, it contributed significantly to low achievement in poverty reduction efforts. Bilal Savas (2008) [14], found the relationship between population and economic growth was strong and positive in the Central Asian Economies over the period of the analysis of the paper. Utsav kumar (2010) [10] tried to analyse the relationship of population and economic growth at very micro level while taking the cases of Indian states individually. Bloom (2011) [6] explained demographic change in India. He found declined in infant and child mortality in India also as happened in many countries. When this cohort moves into working ages, India found itself with a potentially higher share of workers as compared with dependents. Judith Banister et.al (2010) [8], analysed China's age stricter especially aging population and its impact on the country's economic growth. Sijia Song (2013) [15] focused on Asia examined the effects of demographic changes on economic growth in thirteen Asian countries. His findings confirmed that rapid economic growth in Asia could be attributed to the favourable demographic changes that taken place in the different countries specifically.

In this research we have considered WAP (Working Age Population) is a very important macroeconomic factor on which the country's economic growth depends. We tried to find the relationship between WAP and GDP.

**Objective of Research Work**

Our objective is to find out whether WAP is actually participating in the economic growth process or not and if it is participating then how strong its relationship.

**Analytical Framework**

It is assumed that there exist a correlation between working age population and economic growth. So we have,

$$r(WAP, GDP) = \frac{Cov(WAP, GDP)}{\sqrt{Var(WAP)} * \sqrt{Var(GDP)}} \tag{1}$$

Where,

WAP = Working Age Population

GDP = Gross Domestic Product

Here economic growth is measured in terms of GDP (Gross Domestic Product).

We also assumed that there is a functional relationship between employment rate & working age population.

$$Employment\ Rate = f(Working\ Age\ Population) \tag{2}$$

**Methodology of Research Work**

To study the behaviour of working age population, economic growth and employment rate of India, we have used two statistical tools, i.e , correlation and regression analysis which is done by SPSS 21.

**Data and Variables**

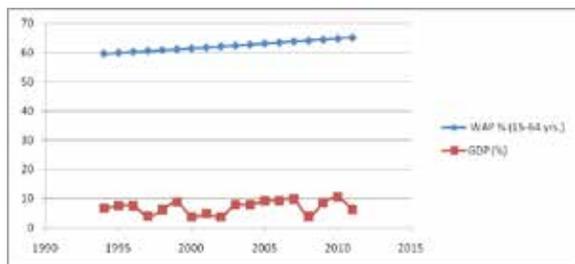
We have collected 18 years data i.e from 1994 to 2011 from the World Bank data bank. Table 1 shows data of WAP, ER and GDP year wise.

**TABLE 1: Data of WAP, ER and GDP**

YEARS	WAP % (15-64 yrs.)	ER (%)	GDP (%)
1994	59.6	58.6	6.7
1995	59.9	58.1	7.6
1996	60.2	57.9	7.5
1997	60.5	57.3	4
1998	60.8	57.4	6.2
1999	61.1	57.1	8.8
2000	61.4	56.6	3.8
2001	61.7	57.1	4.8
2002	62.1	57.2	3.8
2003	62.4	57.7	7.9
2004	62.7	58.1	7.9
2005	63.1	58.1	9.3
2006	63.4	57.1	9.3
2007	63.8	56.3	9.8
2008	64.1	55.1	3.9
2009	64.4	54.2	8.5
2010	64.8	53.5	10.5
2011	65.1	53.6	6.3

**Empirical Results & Discussion**

Correlation between WAP and GDP



**Figure 4: Scatter plot of WAP and GDP**

The above figure shows the positive relationship exists between in WAP of India and its GDP during the period.

**Table 2: Correlation Coefficient**

Correlations			
		WAP	GDP
WAP	Pearson Correlation	1	.320
	Sig. (2-tailed)		.196
	N	18	18
GDP	Pearson Correlation	.320	1
	Sig. (2-tailed)	.196	
	N	18	18

Table 2 shows that the correlation between WAP and GDP is 0.320. It's a low correlation which indicates that the relationship exists but not very significantly as our significant level is 0.192 which is greater than 0.05 ie (0.192 > 0.05). Therefore we conclude that the working age population and GDP of India are not very significantly correlated to each other.

**Regression Analysis**

**Table-3 Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.793 <sup>a</sup>	.628	.605	.99140

**a. Predictors: (Constant), Working Age Population**

According to table 3, R is the correlation coefficient that tells us how strongly independent variables are related to the dependent variable. Here the value of R is 0.793 that means it is positively high correlation. R square is useful as it gives us the coefficient of determination. The value of R square is 0.628 that means 62.8% of variations in the working age population are explained with the help of employment rate. Standard error of the estimate is 0.99140.

**Table-4 ANOVA<sup>b</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	26.605	1	26.605	27.068	.000 <sup>a</sup>
	Residual	15.726	16	.983		
	Total	42.331	17			

Predictors: (Constant), Working Age Population

**Dependent Variable: Employment Rate**

The above ANOVA table tells us whether the regression equation is explaining a statistically significant portion of the variability in the dependent variable from variability in the independent variables. The value of the F-statistics is 27.068 significant at 5% level of significance. We find that the overall model is statistically significant.

**Table-5 Coefficients<sup>a</sup>**

Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	101.443	8.599		11.797	.000
	Working Age Population	-.718	.138	-.793	-5.203	.000

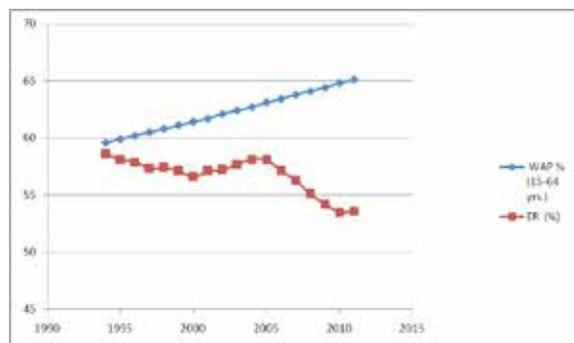
**a. Dependent Variable: Employment Rate**

**ER = 101.443 - 0.718 WAP**

The overall result reveals that there is a significant relationship between working age population and employment rate of India.

The two main variables of this paper- working age population of India and its economic growth in terms of GDP, when put down in the statistical model-correlation / regression, are found correlated in some way but not in a very significant manner. Here it is very important to quote that GDP is a very comprehensive phenomenon which depends upon a number of different other factors (as explained earlier) which sometimes work in the same direction or in other times they are polar apart, in fact this is dynamics of any economy of the country.

Another reason that is found in the present analysis is that the one important variable that is-working age population will contribute to the GDP growth rate when there will be availability of proper / perfect employment opportunities. (even when people will not be underemployed but will work up to their full potential) . When an individual is not gainfully employed in any productive activity, he is unemployed that means not participating towards the building up of GDP growth rate although he is in the working age and very capable of. According to the data and the statistical model the strong relationship is found between the working age population and the employment which supports that if individual in the working age are of good health and equipped with the education and skills, the intensity of the relationship between the working age population and GDP may be higher.



**Figure 5: Relationship between Working Age Population & Employment**

help the economy in gearing up its growth rate further.

The present graph exhibits the two important variables, the working age population of India and its employment scenario together from the year 1995 -2012.

In a perfectly ideal situation these two lines in the graph should coincide or at least be very near to each other, as against this these are diverging from each other and a marked gap is occurring. This clearly means that the individuals who are in working age are not getting the employment and thus these persons are not contributing actively for the economic growth of India, which also justifies the analysis of the paper.

#### Conclusion:

The window of opportunity in India had already opened up in the recent past, and it is high time to reap the demographic dividend. Otherwise in a later phase the population aging will create a challenge for the growth of India. Therefore, the sustainable growth of India can be achieved only when the WAP of India is productively employed and

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