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# Age Structure, Demographic Dividend and Growth of India

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## Abstract

*The present study analyse the age structure demographic dividend of Indian population and their impact on economic growth by using secondary data. With demographic transition the age structure of the nation is also changing over time which resulted in huge base of youth population in the country at present. It has been found that demographic dividend will exist in India up to 2050. However, the current employment situation reveals about lack of skill among the workers. As a result of which the country is not able to reap the benefit of demographic dividend reflected by low domestic saving rate. It is also observed that the share of illiterate worker are gradually decreasing in the context of Indian labour market.*

## 1. Introduction

Demographic transition from a condition of high fertility and high mortality to low fertility and low mortality, effects, not only the size of population but also the age structure of the said population. In the initial period of transition due to fast falling of death rate accompanied by a slower decline of birth rate, boost up the growth rate of economy in a later period when population in the working age group (15-64 in general and 15-59 in India) increases. This advantage of demographic transition is termed as the demographic dividend [3].

Increase in the population under working age group will reduce the burden of dependency on the working population, which will have a strong positive impact in the national saving. This is supported by the life cycle hypothesis of Modigliani [20], which stated that the young and the old has a tendency to consume more than they produce, whereas working-age people has a tendency to save more. The increased household savings will push up the economic growth through capital accumulation. Moreover, with decline in fertility, women are more inclined to enter in workforce, resulting in higher participation rate during this period [10]. With few children to care for, people can invest more on their health, and productivity can be increased [2].

In India, higher growth of population in the share of the working age population have grown faster than others [16]. Since, the age structure of population is in favour of working age group, India is expected to

get benefit from the demographic dividend. The share of the working-age population in the total population of India is expected to continue increasing until about 2035 to 2040, before it start falling down. It is expected that the share of the working-age population in India will remain above 65 per cent until 2050. Hence there is a huge opportunity for India to reap the benefit of demographic dividend [2]. However, some of the literature stated that in the light of current prevailing situation of employment, education and health, growth in the working age ratio has negatively influencing the economic growth [6, 28].

## 2. Review of Literature

Literature examining population growth, age structure, and demographic dividend are abundant around the globe. Various literature had proved the log run significant correlation between age structure and economic growth.

Coale and Hoover in their study found that decline in fertility promote growth through decrease in the dependency ratio. Moreover, they had also studied the changes in the birth and death rates typically associated with economic development [8]. [9, 15, 26] found that with population growth, development can be enhanced by employing more workers in more productive activities that can yield larger surpluses, without depriving them from the basket of goods they currently consume.

Another study done by [4] found no automatic link between demographic change and economic growth, both theoretically and empirically. They found that only age distribution create the potential for economic growth. Another study done by [3] on 78 Asian and non-Asian country found a powerful positive impact of growth of the working age population on economic growth. Similarly [1] also found a strong positive relation between share of the working age population and the share of economic growth.

Examining the impact of demographic change on China's economic growth [17] observed that the share of working-age population is positively correlated with economic growth, whereas birth rate has an adverse impact. Examining the relationship between the dependency ratio, savings rate and real GDP for Australia [29] found a positive significant

impact of changes in population age structure on real GDP per capita in Australia. However, rapid increase in the dependency ratio as a result of ageing of the population can adversely affect this advantage of the age structure. [13] examine about the rising working population and the gradual shift of rural workers from agriculture into industry and services in China. They found that sectoral change of working population has a significant positive impact on per capita income growth and aggregate productivity growth as predicted by the Lewisian dual economy model and had negative impact on productivity growth in the industrial and service sectors, per capita income and aggregate productivity growth. [31] stated that developed and developing countries are effected differently by demographic transition. An increase in the share of middle-aged workers positively affect economic growth and an increase in the share of the senior population negatively affect economic growth in case of developed country. Whereas for developing country, economic growth is negatively affected by an increase in the share of young workers. [12] found a positive interaction between fertility, education and economic growth. Moreover, education has relatively fostered economic growth and fertility transition. [32] studied the economic implications of demographic age structure in the context of regional development in China and found significant correlation between economic growth and age structure, as reflected by shifts in both the size and internal demographic composition of the working-age population. Analysing the overall effect of demographic transition on economic growth [7] found positive relation between GDP per capita growth and the growth differential between the working-age population and the total population, and negative relation to child and old-age dependency ratios.

However, [19] found that in case of India, the demographic change is not sufficient to provide an upward push to the rate of economic growth. [23] also found lack of association between demographic change and economic growth in South Asia. In the context of India, [14] conclude that India could only able to reap benefit of demographic dividend if India's policy are geared toward productive employment for this large working age cohort. Cannon, in his optimum population theory, stated that increase in population growth beyond a point can decline the economic growth [5]. In 1950's and 1960's a study done by western demographer conclude that India's growing population will lead to chronic food shortage in next decade.

Thus from the literature it has been observed that the relationship between population growth and

economic development is not a clear cut one. Some argued that population growth enhance economic development through formation of human capital whereas some other argued that population growth hinders the economic development by increasing the demand for home population. But it is proved that there exists long-run relationship between the dependency ratio, savings rate and real GDP [29]. On this backdrop, present paper will analyse the relation between age structure, demographic dividend and growth in the context of India.

### 3. Methodology

The present paper is based on secondary data. Data are collected from various sources like RBI website, NSSO website, Census Survey of different period, Government of India report etc. Data on age distribution of population, child and old dependency, work participation rate, educational qualification of workers, saving rate, GDP at constant price and Population are collected. After that data are presented trough tables, graph and percentage.

### 4. Results and Discussions

#### 4.1 Age structure and demographic dividend

Demographic transition, not only effect the size of the population, but also the age structure of the population. The initial fall in the infant mortality and improvement in child survival, leads in a boom generation with a large no of people in the younger ages. After 20-25 years when this babies enter in to the younger ages will result a bulge in the younger ages. The following table shows the age structure of Indian population from 1911 onwards.

**Table1. Age structure of population in India, 1911-2011**

Year	Age group		
	0-14	15-59	60 and above
1911	38.8	60.2	1.0
1921	39.2	59.6	1.2
1931	38.3	60.2	1.2
1951	37.4	57.1	5.5
1961	41.0	53.3	5.7
1971	41.4	53.4	5.2
1981	39.5	54.1	6.4
1991	36.50	57.1	6.4
2001	35.6	58.2	6.3
2011	29.5	62.5	8.0

Source: IAMR, Census of India 2001, 2011

The above data shows that up to 1971 children and young population mostly dominate the Indian age structure. In 2001, the share of age group between 0-14 as a percentage of total population had fall down

and the share of youth population increases. Besides this, it is observed that the share of old age group has increases over the period from 5.5 in 1951 to 8.0 in 2011. The main implication of this age structure is that in near future India will become one of the youngest country in the world.

From the above discussion it can be concluded that three major forces has been worked at the age structure, during the demographic transition that are visible in Indian age structure. The first was the growing size of the young cohorts, as a result of improvement in child survival rates at the start of the demographic transition. The second force was the subsequent decline in the relative size of young cohorts as a result of decline in fertility. The third force involve the movement of the large youth cohort into the adult with the passage of time [2].

Dependency ratio is an indicator of existence of demographic dividend. The following table represents the dependency ration of India from 1950-2016.

**Table 2. The trends in the dependency ratio in India**

Year	Combined Dependency Ratio	Child Dependency Ratio	Old Dependency Ratio
1950	73	67	6
1960	76	70	6
1970	79	72	7
1980	74	67	7
1990	69	62	7
2000	64	56	8
2016	51.2	43.6	8.42

Source: Population division of the department of economic and social affairs of the United Nations Secretariat, World population prospects, The 2004 revision and world urbanization prospects, <http://esa.un.org/unpp>.

It can be observed from the table that up to mid1970's, the dependency ratio is also increasing with the growing size of population. This, in turn, implies proportion of working age group doesn't increases with demographic transition. Up to that period, child dependency ratio increases very rapidly because of high fertility and low mortality rate. So, population in age group between 0-14 increases very rapidly. After mid 1970's where child dependency ratio decline very rapidly because of gradual fall down of fertility rate. Whereas, old dependency ratio has increased as a result of improvement in medical services, improvement sanitation facility and higher standard of living. Thus the combined dependency ratio is keep on falling upto 2016.

Moreover it is projected that upto 2040, population in the working age group will keep on increasing. After that, it will slightly decreased in 2050. Thus it expected that India will experience demographic dividend upto 2050, where, the population in the working age group will extend very rapidly that are expected to accelerate the economic growth (Table 3).

**Table 3. Projected age structure in India**

Age Group	2001	2010	2020	2030	2040	2050
0-14	35.5	30.8	26.7	22.8	19.7	18.2
15-59	57.8	61.6	63.5	64.8	64.6	62.2
60 +	6.9	7.5	9.8	12.4	15.6	19.6

Source: United Nations (2009)

#### 4.2 Quality of worker:

For the success of demographic dividend, quality of workforce is very important. Hence an analysis of employment trend as well as quality of employment is needed.

**Table 4: Growth of employment by sex and area in India (1993-94-2011-12) in Million**

		1993-94	1999-00	2004-05	2009-10	2011-12	% inc rease 1993-2005	% Inc rease 2005-12	% inc rease 1993-2012
Rural	Male	187.7	198.6	218.9	231.9	234.6	16.6	7.2	25.0
	Female	104.7	105.7	124.0	104.5	101.8	18.4	-17.9	-2.8
	Total	292.4	304.3	342.9	336.4	336.4	17.3	-1.9	15.0
Urban	Male	64.6	75.4	90.4	99.8	109.2	39.9	20.8	69.0

a n	F e m a l e	15. 4	16. 8	20. 5	22. 8	27. 3	33. 1	33. 2	77. 3
	T o t a l	80. 0	92. 2	11 0.9	12 2.6	13 6.5	38. 6	23. 1	70. 6
T o t a l w o r k e r s	M a l e	25 2.3	27 4	20 9.3	33 1.7	34 3.8	22. 6	11. 2	36. 3
	F e m a l e	12 0.1	12 2.5	14 4.5	12 7.3	12 9.1	20. 3	- 10. 7	7.5
	T o t a l	37 2.4	39 6.5	45 3.8	45 9.0	47 2.9	21. 9	4.2	27. 0

Source: NSSO various rounds (50<sup>th</sup>, 55<sup>th</sup>, 62<sup>nd</sup>, 66<sup>th</sup>, 68<sup>th</sup>)

The above table depicts the number of employment in India by area and sex from 1993 to 2012. The table reveals that the number of employment has increased in both rural and urban area over the period. However rate of increase is higher during 1993-2005 than 2005-12. Only, employment of female in rural areas shows a negative trend over the period.

Moreover, considering the educational category of employed person, most of the employed person in the rural area (both male and female) are illiterate followed by primary level. Graduates and above contain only a small portion. However, the share of illiterate and primary level are decreasing from 1993 to 2010, and that of graduate are increasing. In case of urban employment also their share are decreasing. In case of urban employment most of the worker are of secondary and above level (Table 5).

**Table 5. Percentage distribution of usually employed (15+) by educational category 1993-94-2009-10**

Educational Category	Rural				Urban			
	Male		Female		Male		Female	
	1993-94	19.09	20.10	19.94	20.04	19.94	20.04	19.94
Illiterate	44.4	26	79.9	49.8	18.5	10.4	48.3	23.6

Up to Primary level	29.4	25.3	13.8	21.9	26	16	18.5	17.2
Middle level	13.4	20.5	3.7	13.5	17.3	17.5	7.4	15.3
Secondary level	7.2	14.7	1.6	8.2	15.3	19.5	7.8	15.9
Higher secondary level	3.1	8	0.6	4.2	8.6	13.9	5.2	12.1
Graduate and above	2.5	4.5	0.5	2	14.3	19.8	12.6	14.6
Secondary and above	12.8	27.2	2.7	14.4	38.2	53.2	25.6	42.6

Source: NSSO rounds (50<sup>th</sup> and 66<sup>th</sup>)

**Table 6. Unemployment rates (usual status) by educational attainment, 2009-10 (in %)**

Education level	Male	Female	Rural	Urban	Total
Illiterate	2.4	0.3	1.1	3.5	1.5
Primary	3.2	1.5	2.5	3.8	2.7
Higher secondary	5.5	9.1	5.5	8.1	6.2
Graduate	14.3	26.2	18.6	17.0	17.7
Technical Degree	8.5	27.1	29.6	9.4	12.6
Diploma below graduate	18.9	34.5	28.4	18.9	22.3
Diploma above graduate	19.8	29.4	34.9	18.1	22.4
Total	5.5	6.4	4.7	8.9	5.8

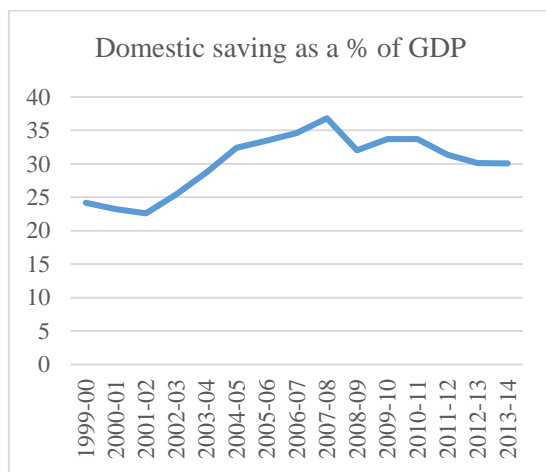
Source: NSSO rounds 66<sup>th</sup> and

The table depicts that unemployment rate is highest among the population in graduate level and lowest for illiterate and primary level. Moreover, unemployment among population with technical degree also high, mostly among female and rural area. With huge number of unemployment among graduate level, and technical degree reduces the possibility of reaping benefit of demographic dividend.

#### 4.3 Impact on growth:

Literature has says that demographic dividend enhance the economic growth through increasing domestic saving and work participation rate. Following figure depicts the trend in saving rate in India.

From the following figure (1), it can be observed that domestic saving rate as a percentage of GDP is increasing upto 2007-08. After that it slightly decreased in 2008-08, and then start increasing. During 2016, India's saving rate is 30 which is lower than average rate of East Asia and Pacific (excluding high income country) 43, but higher than world average of 24 [33].



**Figure1. Trends in saving as a percentage of GDP (Ministry of Finance, 2014)**

**Table 7. Trends in work participation Rate (Principal status + subsidiary status) in India from (1983-2012)**

Catagory	1983	1993-94	2003-04	2011-12
Rural Male	54.7	55.3	54.6	54.3
Rural Female	34.0	32.8	32.7	24.8

Urban Male	51.2	52.1	54.9	54.6
Urban Female	15.1	15.5	16.6	14.7
All Person	42.0	42.0	42.0	38.6

Source: NSSO various rounds (38, 50, 60 and 68)

The above table depicts that the work participation rate of both male and female are decreasing from 1983 to 2012 in both urban and rural area, as well as for all person also. Only in case of urban male, the rate are increasing.

## 5. Conclusion

With demographic transition the age structure of the nation is also changing over time which resulted in huge base of youth population in the country at present. This resulted in demographic dividend for the country that expected to raise country's economic growth in future. However, from the analysis it is observed that most of the worker in India are illiterate with lack of skill. However, the share of illiterate worker are decreasing over the year. Because of this unskilled worker, saving and GDP growth rate is not that much expected as compare to East Asia, but, higher than world average. Moreover, work participation rate for female are also decreasing. Hence for the success of demographic dividend, imputing skill among the worker, and increasing their participation rate is important.

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