

Demographic Dividends for India

Satyendra Nath Chakrabartty

Indian Ports Association, Indian Statistical Institute, Kolkata, India.

E-mail: chakrabarttysatyendra3139@gmail.com

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Abstract: India, the most populous country in the world with about 17% of the world's population and over 70% of South Asia's population and is now one of the youngest population of the world. Share of working-age population (between 15 – 64years) exceeded the same for combined share of children and elderly population since 2018 and is likely to continue till 2055. Favourable demographic dividend of India is expected to peak around 2041, with 59% share of the working-age population. Mid-bulging shape of age-structure implying increasing size of India's workforce in association with its endeavor to reform labour market by following illustrative measures may put the country in a competitive advantageous position against many developed countries. The paper described issues relating to the measurement of demographic dividend and also relationship between age-structure and economic growth. The relationship between change in age-structure and economic growth using time series data or panel data are rather complicated. Estimation of demographic window period, the first demographic dividend and the second demographic dividend pose several methodological challenges since influence of demographic change on economic growth, and other macro-economic features are depended on policies and institutions respond to the challenges and opportunities the future. Comparison of approaches to measure year-wise demographic dividend needs further investigations to conclude.

Keywords: Demographic dividend, Economic growth, Age-structure, Support ratio, National Transfer Accounts, Life cycle wealth.

1. Introduction

Children and elderly persons consume more than they produce unlike those in the working ages who support their own consumptions plus produce for the economically dependent sector of the country. Developing countries like India are transiting from rural based agrarian society with high rates of fertility and mortality to urbanized industrial society with low rates of fertility and mortality with higher proportion of working-age population (demographic bulge) can open windows of economic opportunities and growth of per capita income (Lee and Mason, 2006). That is the first

demographic dividend (FDD). For an open economy, Bloom and Canning, (2004) observed significant positive relationship between percentage share of working-age population and economic growth rate.

However, dividend period is long, lasting for several decades causing reduction of size of labour force due to lower fertility, higher investments in health care with emphasis on health care of elderly people tend to reduce old-age mortality rate and results in increased share of elderly people in the population along with higher degree of motivation to saving and asset accumulation in the working years to support old-age consumptions and security. The additional savings accelerate real output, employment and help to generate higher economic growth (Ribaj and Mexhuani, 2021). That is the second demographic dividend (SDD). While FDD is a transitory bonus, the SDD transforms the bonus into greater consumption which is related to saving and investment leading to formation of assets and sustainable development. Both FDD and SDD are contributed primarily by the working-age population. Debates continue on impact of age structure of population (distribution of population across different age groups) on economic growth of countries (Bloom and Williamson, 1998).

2. Age-structure of Population

India is now the most populous country in the world with about 17% of the world's population and over 70% of South Asia's population. According to UN estimates, population of India exceeded that of China in the end of April 2023 (The Economic Times, 20th April, 2023). Distribution of population across different age groups in a country depends primarily on life expectancy at birth and total fertility rate (TFR). India with median age 28 is now one of the youngest populations, against 37 in China, 45 in Western Europe and 49 in Japan. Share of working-age population (between 15 – 64years) exceeded the same for combined share of children and elderly population since 2018 and is likely to continue till 2055. In India, life expectancy at birth increased to 68.1 years from 65.8 years for males and from 69.8 to 72.3 years for females in 2021–2025 from 2006–2010. During the periods considered, TFR in India declined from 2.6 to 2.0. Such changes resulted in growth rate of India's population over 2% keeping the birth rate at the level of 30 per 1000 populations (Ladusingh and Narayana, 2012).

The United Nations (2004) defined the “demographic window” or window of opportunity in terms of dependency ratios (DR) computed as:

$$DR = \frac{\text{Child population} + \text{OldAge population}}{\text{WorkingAge population}} = \text{Child DR} + \text{Old AgeDR}$$

DR showing proportion of working age population in different time periods can reflect duration of window of demographic opportunity. Based on DR, duration of

the demographic dividend of India is between 2015 and 2050 (United Nations, 2019). However, the composite indicator DR does not reflect variations in values of earnings and consumption by age. NTA based on the economic life cycle approach overcomes the limitation (Mason et al. 2017).

The window is said to be open when the proportion of population ≤ 15 years falls below 30% and the proportion of people ≥ 65 years is below 15 %. India's DR is projected to reach its lowest point at 31.2% by 2030 (EY estimate). Projections of age-structure of India's population by Ladusingh and Narayana, (2012) works favourably against the open window suggested by United Nations (2004) as depicted in Table 1.

Table 1: Age-structure of India's Population

<i>Share of population</i>	<i>Open window</i>	<i>Projections</i>	<i>Remarks</i>
Children population	Below 30%	22% (2050)	Declining trend
Working-age population (19–59) years	Around 55%	56% (2045)	Increasing trend. Expected to match China in 2030 and reach the peak around 2041 with over 59% share of working-age population.
Elderly people	Below 15 %.	22%	Expected to decline

For the other SAARC (South Asian Association for Regional Cooperation) Countries, share of elderly people in the population is increasing at a rate which exceeds the rate of increase of overall population growth (Chauhan and Siddiqui, 2013). As per the projections by UN's World Population Prospects (2008 revision) for 2045–50, for the SAARC countries, likely range of TFR is minimum 1.9 (India, Nepal, Maldives & Sri Lanka) to maximum 3.1 in Afghanistan and Life Expectancy at Birth to range from minimum 73.3 (India) to maximum 80.0 (Sri Lanka). Jafrin et al (2021) observed that SAARC regions cannot fully realize positive impact of demographic dividend on the economic growth if underutilization of the workforce is continued and the countries need to implement appropriate policies in this regard.

Favourable demographic dividend of India is expected to peak around 2041, with 59% share of the working-age population (20–59 years). Mid-bulging shape of age-structure implying increasing size of India's workforce in association with its endeavor to reform labour market by following illustrative measures may put the country in a competitive advantageous position against many developed countries, which are facing declining birth rates, rather tight labor markets and could help India to unlock sustainable long-term economic growth:

- Compulsory education,
- Up skilling of workers by Skill India program, Pradhan Mantri Kaushal Vikas Yojana (PMKVY) program and others,

- High priority on innovations and technology,
- Services-orientated economy (highest share of service sector in GDP),
- Measures adopted to improve female labour participation rate ((LFPR) like substantial initiatives for girls' education, skill development, entrepreneurship facilitation, safety in the workplace, advancing the agenda of 'women-led development' etc. have two major implications on (i) enhancing women's empowerment to promote equal economic rights, access to employment, and economic activities, and (ii) reducing gender inequality to achieve the targets of Goal-5 of Sustainable Development Goals by 2030 which includes among others recognition of contributions of unpaid and domestic work, equal opportunities, participation in education and employment (Dugarova, 2018).
- Large and increasing pool of English speaking graduates with Science, Technology, Engineering and Mathematics (STEM) background with higher potentials of employment.
- Strong wave of financial inclusion and investments to build digital payments infrastructure, etc.

Bringing back the untapped labour (unemployment rate in 2022 is 9.3%, exceeding the global average of 6.8% - World Bank estimate) to labour market could further improve long-term advantages (S&P Global Market Intelligence forecasts, 2023 (www.spglobal.com/market-intelligence)).

3. Economic growth

Regarding economic growth, Indian economy grew by 7.6% during the 12 months to the third quarter of 2023 and is likely to grow @ \geq 6% for the rest of this decade. The Reserve Bank of India (RBI) projected India's real GDP growth to 7% in 2023-24. As per the conservative estimates of IMF, India with expected GDP exceeding US\$5 trillion will emerge as the 3rd largest economy of the world by 2027. Approach to growth models combines elements of human capital approach and life cycle saving theory. The age-structure has significant transitional impact on the growth of the economy, though the mechanisms of influence of demographic transition on economic growth varied among the countries (Mason, 2003).

4. Measurement of demographic Dividends

Evidence based link between change of population structure and economic growth has added special importance in developing countries with varying stages of demographic transition from high to low rates of mortality and fertility. Based on data of 46 Asian countries during 1969–2021. Liu and Ma, (2022) found that gross domestic saving rate,

GDP per capita, and rate of growth of urban population are all significantly related to annual GDP growth rates. Impact of saving rate on GDP growth was more pronounced for high-income and in upper-middle-income countries, unlike lower-middle-income countries. While the FDD, sequel to growing working-age population can be realized only if employment opportunities expand to keep pace, reaping benefits of the SDD needs conducive environment to assets accumulation.

Researchers used different approaches to estimate FDD and SDD. Illustrative example of studies undertaken without estimating the dividends are: Navaneetham (2002) used regression analysis of the growth rate of GDP on changing share of different age cohorts, controlling selected macroeconomic indicators, where no regression coefficient was found to be statistically significant. Similar regression analysis by Lal (2006) found inadequacy of theoretical framework to reveal FDD and SDD. Desai (2010) considered female labour force participation rates by years of schooling and household income and concluded that India may fail to realize its demographic dividends to the fullest extent unless significant changes are made to improve participation of women in labour force. However, panel data regression can lead to biased estimators in traditional linear regression models.

However, the effect of demographic dividends and income growth is not automatic but depends on forward-looking policies incorporating population dynamics, education, skills and technology advancement, healthcare, gender sensitivity, participation in labour force, providing rights and choices to the younger generation and encouraging savings and investment. For example, increase in share of working-age population may lead to rising unemployment, fueling economic and social risks in absence of appropriate policies. Extent of the dividends depends on how much people produce and consume at each age i.e. per capita labour income and per capita consumption, which are governed by the ratio of effective numbers of producers to effective numbers of consumers, known as support ratio (SR). Navaneetham and Dharmalingam, (2009). computed SR as:

$$SR = \frac{\text{Working age population}}{0.9 * \text{Child population} + \text{OldAge population}}$$

Better measure is to use the economic support ratio as the ratio of economically active population (producers) to the economically inactive population (consumers). The effective number of workers or consumers of each age is calculated as the population at each age weighted by the labour income or consumption profile (Mason et al., 2017).

The SDD has typically been larger than the FDD and the combined effects of the two are taken as sum of percentage contribution of each of FDD and SDD to GDP per effective consumer (Lee and Mason, 2006). Estimates of FDD and SDD were obtained by Mason (2005) for a number of countries and found that duration and magnitude of

the estimates varied. Ladusingh and Narayana, (2012) used National Transfer Accounts (NTA) framework to estimate demographic dividends and found that for India. The NTA framework helps to introduce age into national income and product accounts (NIPA). Here, growth rate of per capita income is taken as product of labor productivity and the support ratio $\frac{\text{Effective number of producers}(L)}{\text{Effective number of consumers}(N)}$ is computed from the age profiles of aggregate labor income and consumption. Here, FDD is expressed as the economic support ratio (ESR) i.e.

$$\frac{L}{N} = \frac{\sum_{a=0}^w \gamma(a) P(a, t)}{\sum_{a=0}^w \phi(a) P(a, t)} \quad (1)$$

where, $P(a, t)$ is the population aged a at time t , $\gamma(a)$ and $\phi(a)$ are the age patterns of labour income and consumption respectively.

Income per capita can be decomposed as
$$\frac{Y}{N} = \frac{L}{N} \times \frac{Y}{L} \quad (2)$$

where Y denotes the income, N is the total population and L is the total number of workers.

Equation (2) implies growth rate of $\frac{Y}{N} = \text{growth rate of } \frac{L}{N} \times \text{growth rate of } \frac{Y}{L}$.

In other words, per capita output would grow if growth rate of workers exceeded the growth rate of total population even if the output per worker did not change (Bhat 2001). For a given productivity the period of the positive growth rate of the ESR in the demographic transition is the FDD.

By differentiating (2) one can get growth rates as

$$g_y = g_z + (g_l - g_n) \quad (3)$$

where g_y : growth rate of per capita income; g_z : growth rate of income per worker; g_l : growth rate of labour force and g_n : growth rate of total population.

In equation (3), the per capita income is categorized into two components: support ratio and productivity. Increase in support ratio, keeping the productivity constant is called the accounting effect of the FDD.

SDD depends on two main factors. First, some of the economic benefits of the FDD are likely to be invested in human capital through intergenerational transfers and capital. This will lead to an increase in output per worker. Second, the prospects of a longer life and an extended period of retirement will motivate individuals to save and accumulate more wealth. Savings and wealth accumulation for consumption in retirement intensifies with fewer children to support due to fertility declines. SDD can be estimated in terms of income index (income per equivalent consumer

relative to income) and consumption index (consumption per equivalent consumer relative to income per equivalent consumer) where equivalent consumer is the adult equivalent number of consumers in the population. Capital accumulation of working-age population can be taken as the wealth held to the population aged >50 years may be used to estimate the life cycle wealth and SDD (Mason, 2005). Thus, wealth accumulation is the function of the ratio of effective consumption with effective production and the difference between the number of years of effective consumption and production, which can be formulated as

$$w(\leq b, t) = \left(\frac{c(t)}{Y^l_t} \right) \left(\frac{PVN(\leq b, t)}{N(t)} \right) - \frac{PVL(\leq b, t)}{L(t)} \quad (4)$$

where, $w(\leq b, t)$ denotes the wealth in t -th year of people born on or before the b -th year.

$\frac{C(t)}{Y^l_t}$ denotes ratio between consumption per effective consumer and income/production per effective labour in t -th year.

$\frac{PVN(\leq b, t)}{N(t)}$ is the present number of future lifetime effective years of consumption for all persons born on the b -th year per effective producer in t -th year.

$\frac{PVL(\leq b, t)}{L(t)}$ denotes the present number of future lifetime years of production of total person born in the b -th year or earlier per effective producer in t -th year.

Evaluation of equation (4) is complex under the dynamic conditions, where the ratio of wealth to income varies with time. Moreover, life cycle wealth may not continue to increase as the share of the retired population increases.

As per estimates, India's income per effective consumer could increase by 24.9% from 2005 to 2035, of which 9.1% is from the first demographic dividend, and 15.8% is from the second demographic dividend. FDD in India may increase by around 25% in 2035 from 9.1% in 2005 and 15.8% from the SDD—and will be stable up to 2070, provided raising productivity is continued by appropriate institutional reforms, failing which it will be difficult for India to meet the fiscal challenges posed by aging population.

5. Way Forward

As India marches forward into the *Amrit Kaal* (an auspicious period most conducive to achieving the country's potential) and seizes the emerging opportunities, it will be critical to plan for factors that can foster the progress. Major areas requiring attention are:

- Simplifying and maintaining a business-friendly environment for a fast growth path
- Improving ease-of-doing-business including leveraging digital tools and lowering the regulatory burden, etc.
- Effective regulations related to trading across borders
- Improving Female Labor Force Participation Rate (FLFPR) by providing new skills and opportunities for women, befitting their participation in an envisaged \$3 trillion economy.
- Bringing back the unemployed youth to labour market by up skilling and job creations (unemployment rate in India in 2022 was 9.3%, exceeding the global average of 6.8% - World Bank estimate)
- Increasing uptake of consumer credit ecosystem and increased financial inclusion
- Arrest Jobless growth. India's labour force participation rate in 2017-18 for the age-group 15-59 years is around 53%, which is almost half of the working age population (NSSO Periodic Labour Force Survey 2017-18).
- Reorient growth strategy to make the growth process more employment-intensive.

In addition, for evaluation of measurement of demographic dividend, India need to:

- Update the NTA data to capture the progress made. State-specific NTAs need to be calculated and States need to be ranked for investing in the youth per annum.
- Put emphasis on transitioning from secondary education to universal skilling and entrepreneurship
- Ensure Health spending to keep pace with India's economic growth.
- Improve **health and education parameters for better rank of the country** in UNDP's Human Development Index,
- Coordination between States on emerging population issues like migration, ageing, skilling, FLFPR, urbanization, etc. and necessary corrective measures in areas showing poor performances.

6. Conclusions

The paper described issues relating to the measurement of demographic dividend and also relationship between age-structure and economic growth. The relationship between change in age-structure and economic growth using time series data or panel data (a combination of cross sectional data and time series data) are rather

complicated. Estimation of demographic window period and FDD and SDD pose several methodological challenges since influence of demographic change on economic growth, and other macro-economic features are depended on policies and institutions respond to the challenges and opportunities the future. Comparison of approaches to measure year-wise demographic dividend needs further investigations to conclude.

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