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Linking Demographic Dividend and Gross Domestic Savings: Role of Boomers in India's Journey of Economic Growth

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Abstract
India's demographic dividend offers an exceptional potential for economic growth, with the boomers significantly influencing the country's fate. Boomers entered in the workforce after 1995 lead in consumption, investment, and productivity in India. The boomers being technologically proficient are propelling entrepreneurship and boosting output across economic sectors of the country as their capacity to foster economic growth is intricately connected to their savings habit, which affects gross domestic savings (GDS). The gross domestic savings rate in India has varied over the years, shaped by macroeconomic factors including per capita income, rate of inflation, and interest rates among others. In this regard, the study using data from 1995-2020 and deploying time-series analysis finds that the boomers favoring high-yield investment opportunities and entrepreneurship, are transforming conventional saving behaviors and consequently India is shifting from consumption-driven growth to savings-driven growth gradually. However, the United Nation's classification of youth as NEET is presently a matter of concern for the country.

Keywords: Demographic Dividend, Gross Domestic Savings, Economic Growth, NEET, Population Composition

JEL Code: J10, J18, Q01

I.Introduction
According to United Nations Population Division, the Indian population in the age-band of 15-34 years as a share to the total population it tapers off from 2010 itself while in absolute numbers it tapers off after 2030 **(Figure 1)**. Though it tapers off marginally from 35.4% in 2010 to 34.5% in 2020 and further to 32.4% in 2030 in the next three decades, it will rapidly follow to 29.7% in 2040 and further to 26.6% in 2050. However, the youth segment of the country's population will still be as large as 441.1 million in 2050. As most of the youth is expected to enter the labour market right by the age of 15, the youth segment of the India's population will also have to be considered in line with the larger working-age population in the age-band of 15-59 years **(Figure 2)**. According to the estimations and projections of the United Nations Population Division, the population share in the age group of 15-34 years reaches its peak as 35.4% in 2010 and tapers off from then onwards while the population share in the age group of 15-59 years reaches its peak as 64.6% only in 2035 and tapers off gradually over the next 15 years reaching to 61.6% in 2050.

Contemporary economic theories have shifted away from analyzing the rate of population growth to changes in population composition incorporating the demographic characteristics to analyze their effects on aggregate savings and economic growth (Bloom & Freeman, 1988;

Bloom & Williamson, 1998; Mason, 2001). The population composition representing certain groups, broadly as young population (0–14 years), working-age group (15–64 years), and ageing population (65 years & above), emerged as important demographic shifts to study (Bloom et al., 2003; Lee & Mason, 2006). The United Nations (UN) emphasizes that like other nations, India is also experiencing a demographic transition towards the increased share of working-age group, which is around 60% of total population. These age-structure based studies resulted in the life-cycle hypothesis (LCH) and the theory of demographic dividend. The Life-Cycle Hypothesis analyzes the consumption patterns across the phases of demographic transition including the young dependent population, the working-age group, and the elderly dependent population and explains that savings diminish gradually with ageing, thereby significantly impacting the economic growth, particularly during demographic transitions into certain age groups. Numerous research has conducted empirical analyses based on the extended LCH theory of Modigliani (1986), investigating the implications of evolving economic needs over individuals' lifetimes and varying population growth patterns over time including the theories about life expectancy, mortality and fertility rates, dependent population, and working-age group have developed (Bloom & Williamson, 1998).
Globally, nations undergo demographic transitions resulting in an expanded working-age population for differing durations, contingent upon shifts in population composition but all of the countries are not going to witness the demographic dividend. The available literature on this phenomenon indicates that merely moving to a substantial working-age population doesn't yield the dividend (Bloom, 2011; Mason, 2003) with the rationale that if the increasing labor supply from the increasing working-age population remains unutilized, this substantial demographic will not be translated into increased aggregate savings or output. Consequently, the working-age population must engage productively in the labor force to enhance per capita GDP (Bloom & Canning, 2004; Mason, 2003). Therefore, the demographic indicators including life expectancy, total fertility rate, birth and death rates, size of the households, the share of dependent population relative to the working-age one, the unemployment rate and labor force participation are also included.

The relationship between demographic variables and aggregate savings utilizing a panel of 110 nations from 1963-2012, Eduardo et. al (2018) concludes that, consistent with theoretical assumptions, lower dependency ratios and increased life expectancy usually result in greater domestic savings. Nonetheless, these relationships are statistically significant solely in case of Asian nations. Specifically, Latin America, witnessed a notably equivalent "saving friendly" demographic shift after the 1970s, failed to see the same increase in aggregate savings. Also, the potential benefits from an advantageous demographic shift are not certain to be realized. A study on India's demographic revolution suggests that per capita private savings are rising due to India's expanding working-age population, thereby substantiating the 'economic life cycle hypothesis' and the demographic dividend for India can maximize private savings gains when paired with advantageous socio-economic policies (Jain & Goli, 2022). Furthermore, the expected economic benefits of the demographic dividend and expected detrimental aspects of population ageing, both evolve in the economic life cycle. The pattern of economic activities has been found to be broadly similar across countries with some significant variations. Using a simple age model to analyze the effects of demographic change on familial and public sector transfer systems, this study has made four important conclusions. Firstly, demographic pressures on government budgets are extremely low in most of the countries under study. Secondly, the situation will change drastically in the coming years as population ageing

increases pressures on public pension programs and on health care systems, to some extent. The public expenditure as a share of GDP is likely to increase in the region by 10-20% over the next two decades for maintaining social programs at their present levels of coverage and benefits. Thirdly, the rising need for government transfer programs is to be offset by decline in familial transfers to primarily support children turning the net impact on transfers negligible. However, this relies on a large shift in resources towards the public sector. Lastly, reducing education dependency rates makes the achievement of universal secondary education increasingly affordable for most of the countries in the region. However, waiting for favorable demographic conditions for investments in public sector would delay attainment of universal secondary education for coming decades. India is on a daunting growth trajectory since LPG reforms were introduced in the country at pan-level in 1991. In nominal terms, the Indian economy grew at a compound annual growth rate of 8.5% turning from $275 billion in 1991 to $2.7 trillion in 2019. In the short run, there is an immediate need to fix the liquidity crisis which has resulted in an economic slowdown. However, in the long-run, India is surely in nation-building mode if necessities are taken into consideration. Therefore, the changing demographics of the country need to be understood at this point of time (Pai and Holla, 2019).

Additionally, the increasing workforce **(Figure 4)** is going to accelerate the rate of economic growth in India is simply based on the this belief is based on the supposition that the share of the country's working population in the age group of 20-59 years will outmatch the population in the age group of 0-19 years and this will make Indian economy to grow and it is assumed that this outmatching population will prosper at their own **(Figure 5)**. The government, at times, indicates that its growth philosophy is based in the belief that entrepreneurship and innovation will be the hallmark of the country’s working-age population. Since there is increased number of people finding ways for their livelihoods, they will contribute to national growth and Indian economy will prosper. With the decline in population below 20 years of age, the number of people entering the work force will gradually start to come down and the 'demographic midriff' will appear initially which would be followed by the gradual rise in the median age of society after two-three decades. This phenomenon has already been observed various countries which entered into this demographic dividend phase earlier and are now known as 'ageing societies’ **(Figure 3)**. In addition, India can’t just rely upon the assurance that the number of its 'wealth creators’ is going to rise over the coming decades rather it requires to take policy initiatives to generate avenues and means for this energetic demographic group to attain relative prosperity, if not the secure adequacy of affluence (Mukopadhyayay, 2019). Moreover, a report released by Confederation of Indian Industry on country’s demographic dividend suggests that beside smaller window of opportunity, only increasing India's working-age population is insufficient to sustain the economic growth rate. India is projected to have 183 million people to the working-age group during 2020-50 but its demographic dividend may convert into a liability if without enough gainful employment and the needed skilled workforce. Therefore, a whopping 22% of the increased global workforce in upcoming three decades will be contributed from India and if India is unable to generate enough jobs and its workers are inadequately ready for those jobs, its demographic dividend may become a liability harder to discharge. Further, improvements in educational levels and skill development are going to be the biggest enablers for reaping demographic dividend (Confederation of Indian Industry, 2022).

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II.Data Sources and Methodology

An analysis of the impact of boomers (15-29 years) in the workforce on aggregate savings/gross domestic savings is conducted using time series data for 1995-2020 collected from the World Bank database. The study examines the impact of boomers in working-age population (15-29 years) on gross domestic savings (as a % to GDP) in the light of gross domestic product (PPP, constant 2021), gross domestic product per capita, the GDP deflator (inflation %), and real interest rates. The figures for the working-age boomers are derived from the population composition statistics provided by the UN's database World Population Prospects. Initially, the augmented Dicky-Fuller (ADF) test and KPSS tests are run on all the variables for the estimation. Since the period under study is shorter, the DF-GLS test (Elliot et al., 1992; Alimi, 2014) is used to assess the stationarity of the variable representing boomers in the working-age population. Subsequently, the cointegration test has been performed. The study used the ARDL model to examine the presence of cointegration among the variables. Ample literature is available to support the deployment of ARDL specification to study the effects of demographic dividend on the gross domestic savings and the gross domestic product of a nation thereby translating it into economic growth. Further, the rationale for utilizing the ARDL model is to examine the long-run interaction and short-run variations among the variables as the ARDL technique allows the selected variables to have optimal lags with varying time dimensions besides accounting for any endogeneity arising therefrom. The cointegration approach helps to validate the short-term and long-term relationships between variables. It uses the F-bounds test to check the long-run relationship among variables where lower bounds will be evaluated by integrating the variables at order zero, and the upper bounds will be tested by integrating them at order one. The value of F-statistic greater than the upper bound, it indicates the presence of cointegration while the value of F-statistic less than the lower bound indicates the absence of cointegration between the variables, thereby suggesting not to carry on analysis using the ARDL model. However, the value of F-statistic falling within the range of the lower and upper bounds indicates that the long-term relationship between the variables is indeterminate, and in these cases, the Error Correction Model (ECM) helps to conclude the estimation results for the long-run relationship between the variables under study (Belloumi, 2014).

To establish the relationship model formulated is specified as:

$$\Delta lnAS = \alpha_0 + \sum_{i=1}^{n1}\alpha_{1i}\Delta lnGDPPC_{t-i} + \sum_{i=0}^{n2}\alpha_{2i}\Delta lnGDPR_{t-i} + \sum_{i=0}^{n2}\alpha_{3i}\Delta lnRIR_{t-i} + \sum_{i=0}^{n2}\alpha_{4i}\Delta lnGDPD_{t-i} + \sum_{i=0}^{n2}\alpha_{5i}BWAP + \eta ECM_{t-1} + \mu_{t-1}$$

Following the estimation of long-run and short-run coefficients via the ARDL approach, regression results are estimated including the LM test for serial correlation, the Breusch–Pagan–Godfrey test for heteroscedasticity, the Jarque–Bera test for normality, and the RESET for checking error in model specification.

III.Results and Discussion

The empirical results of the tests are reported in this section. To analyse the impact of the boomers in the working-age population, the DF-GLS unit root test results are conducted. The test results (Table 1) suggest that variables BWAP, GDPR, RIR, and GDPD are stationary at level, while S and GDPPC are stationary at first difference. The KPSS test results (Table 2) for stationarity also suggest that the variables BWAP, GDPR, RIR, and GDPD are stationary at level, while S and GDPPC are stationary at first difference. The results of both stationarity tests are coherent. The integration of the variables is either at I(0) or I(1), which justifies the deployment of the ARDL model for further analysis.

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Table 1. DF-GLS Unit Root Test Results

Variables	Level Form	First Difference	Conclusion
lnAS	−0.43	0.63**	I(1)
lnGDPPC	−0.15	−4.74**	I(1)
lnGDPR	−3.61**		I(0)
lnRIR	−3.72**		I(0)
lnGDPD	−2.46**		I(0)
lnBWAP	−5.79***		I(0)

Source: Author
Note: Significance level *, **, *** at 10%, 5% and 1% respectively

Table 2. KPSS Stationarity Test Results

Variables	Level Form		First Difference		Conclusion
lnAS	0.8764	Non- stationary	0.2004***	Stationary	I(1)
lnGDPPC	0.9268	Non- stationary	0.1779**	Stationary	I(1)
lnGDPR	0.6940**	Stationary		I(0)	
lnRIR	0.5891**	Stationary		I(0)	
lnGDPD	0.4321**	Stationary		I(0)	
lnBWAP	0.8217***	Stationary		I(0)	
Critical values	1%—0.8394 (*)		5%—0.5791 (**)		10%—5320 (***)

Source: Author.
Note: Significance level *, **, *** at 10%, 5% and 1% respectively
The cointegration test is run using the ARDL model *F*-bounds test and the results are reported in Table 3 with the optimal lag structure based on the Akaike information criterion (AIC). The regression results of Gross Domestic Savings as a percentage of GDP as a dependent variable are reported with a maximum of two lags considering the sample size. It is found that there is a long-term relationship between the dependent variable and the independent variables of GDPPC, GDPR, *GDPD*, *RIR*, and BWAP.

Table 3. ARDL Bounds Test Results for Cointegration

Model Specification	*F-bounds Test*	*Cointegration*
lnAS ARDL (1,2,2,2,2,2) = f (lnGDPPC lnGDPR lnRIR lnGDPD lnBWAP)	*17.13***	*Yes*

Source: Author.
Note: Significance level *, **, *** at 10%, 5% and 1% respectively
Lag Length: AIC Criterion
The estimated long-run coefficients for the model are presented in Table 4. The results suggest that the variables representing boomers in the working-age population, real GDP, and real interest rate have a positive relationship with the gross domestic savings. The statistically significant coefficients indicate that any increase in these two independent variables will increase the country's savings rate over the period. Boomers, representing the share of the diminishing demographic dividend, are favourably impacting the gross domestic savings.

However, the variables representing per capita GDP, and GDP deflator have a negative relationship with the gross domestic savings. The statistically significant coefficients indicate that any increase in these two independent variables will increase the country's savings rate over the period. In India, the Real Gross Domestic Product positively impacts the Gross Domestic Savings, however the relationship turns negative when it comes to Per Capita GDP. This dichotomy stems from structural disparities in the distribution of income and wealth across population composition, alongside varying consumption and savings behaviors of boomers at distinct phases of economic development. The positive relationship between aggregate savings and Real GDP can be elucidated utilizing classical theory of economics. As the GDP increases, the total income of the economy rises, typically resulting in increased aggregate savings. The Life Cycle Hypothesis posits that an increase in national income enhances the saving ability of individuals and business entities. Increased national savings subsequently serve as a catalyst for domestic investment, so promoting more economic growth through enhanced productivity and output.

Table 4. Long-run Coefficients: ARDL Approach

Variable	Coefficients (Std. Err.)
lnGDPPC	-2.2384** (0.0754)
lnGDPR	3.5801** (0.1960)
lnRIR	3.0957*** (0.0328)
lnGDPD	-6.3061*** (0.0651)
lnBWAP	7.8832*** (0.7783)
Constant	-11.5063 (5.9641)

Source: Author.
Note: Significance level *, **, *** at 10%, 5% and 1% respectively
In addition, the estimated short-run coefficients are mentioned in Tables 5 and the results suggest that BWAP, GDPR, and RIR with one lag have a statistically significant and positive relationship with aggregate savings whereas the per capita GDP and GDPD with one lag have a statistically significant and negative relationship with aggregate savings in the short run. The error correction term is also negative and statistically significant, corroborating with the long-run relationship between the variables.

Table 5. ECM Results: ARDL Approach

Variable	Coefficient	t-Statistic
C	-11.7896***	-7.5534
D (lnGDPPC)	-3.6751***	-2.0098
D (lnGDPPC (-1))	-2.0703***	-3.5834
D (lnGDPR)	1.6954*	3.9125
D (lnGDPR (-1))	0.4398***	10.6382
D (lnRIR)	0.7123***	5.1128
D (lnRIR (-1))	0.5412**	3.8024
D(lnGDPD)	-0.1952**	-3.0012
D (lnGDPD (-1))	-0.3175**	-5.6188
D (lnBWAP)	-31.0031***	-7.5413

D (lnBWAP (-1))	29.1088***	5.0126
Error Correction Term	-0.9971***	-11.6987
Adj. R-sq.	0.8731	AIC

Source: Author
Note: Significance level *, **, *** at 10%, 5% and 1% respectively

In Table 6, the regression diagnostics indicate that the model variables have no serial correlation and heteroscedasticity as p-values are insignificant while the JB normality test with the significant p-value suggests that errors are not normally distributed. In addition, the Ramsey RESETsuggests that the estimated model has correct specifications since the *F*-statistic is not statistically significant.

Table 6. Regression Diagnostics: ARDL Approach

Serial correlation LM test: Breusch–Godfrey	F-statistic	7.81
Heteroscedasticity test: Breusch–Pagan–Godfrey	F-statistic	2.52
Normality Test: Jarque–Bera	Jarque–Bera	10.08***
Ramsey RESET	t-Statistic F-statistic	0.90 0.81

Source: Author.
Note: Significance level *, **, *** at 10%, 5% and 1% respectively

Further, the long-run positive impact and the short-run negative impact of the BWAP on aggregate savings is attributed to the demographic changes shifting age-structure that take place over the time and the jobless growth in India (accelerated economic growth unaccompanied by the rising unemployment rate) in the young population in the short run.

IV. Conclusion and Policy Implications

Historical evidence is there in Indian context substantiating that accelerated GDP growth is witnessed with rising Gross Domestic Savings. Between 2000 and 2010, India's Real GDP recorded substantial growth, accompanied by an increase in the savings rate. This is mostly due to the fact that growth in Real GDP typically results in more disposable income for households, allowing for greater savings. Moreover, business revenues increase during booms in the economy, resulting in high retained earnings contributing to gross domestic savings. The increase in savings then stimulates investment across economic sectors and sub-sectors, thereby strengthening pushing the circular growth of GDP. Moreover, the relationship between aggregate savings and Per Capita GDP in India found to be inverse and is especially attributed to the inequitable distribution of income and wealth. India's rapid economic development coupled with increasing income inequality results in such relationship between the variables. As Per Capita GDP rises, the advantages of economic expansion frequently accrue to higher-income groups and income disparities come into picture.

The increasing economic disparity results in variations in savings behavior. Affluent households, which derive more advantages from rises in Per Capita GDP, exhibit a higher tendency for consumption. As incomes increase, individuals typically allocate more funds towards increasing their living standards which lowers their propensity to save despite increased incomes. Conversely, households in lower-income groups, experiencing minimal to no gain in their disposable income, are compelled to allocate a greater proportion of their income towards essentials, allowing limited potential for savings. Additionally, the Permanent

Income Hypothesis asserts that individuals formulate their consumption and savings choices based on anticipated future earnings rather than transient variations. In a nation such as India, where income growth is unevenly distributed across industries and regions, people generally prefer immediate consumption, especially during periods of inflationary pressures, therefore diminishing aggregate savings despite an increase in Per Capita GDP. Furthermore, rising prices and cost of living in India have surpassed growth in income-levels for boomers in working-age population, especially in growing urban clusters. As Per Capita GDP rises, people experience increasing cost of living, necessitating a greater allocation of income towards consumption instead of savings, hence exacerbating the inverse correlation between aggregate savings and Per Capita GDP. Thus, the positive link between aggregate savings and Real GDP exemplifies classical model of economic growth, resulting in increased national savings and investment whereas the negative link between aggregate savings and Per Capita GDP is attributed to income disparities, increased cost of living, and consuming behaviors that favor expenditure over savings among both affluent and impoverished households. This dichotomy illustrates the intricacy of India's economic development, wherein overall growth is not accompanied with increase in savings rate across income-groups.

In case of India, the per capita real income and accessibility to banking services are major drivers that positively influence both private and household savings in both the short and long term. Moreover, when inflation intensifies, the uncertainty over the value of their pooled savings and anticipated real rate of return dissuades consumers and other private entities from saving. Aiming to sustain a specific level of actual spending further adds to this decline in the rate of savings. A surge in the dependent population diminishes private and household savings in the short term, while it increases the same in the long term. Further, the rising real interest rate boosts the household savings in the short term and decreases the same in the long term. Moreover, private and household savings have markedly decreased since the global financial crisis indicating that policies aimed at improving per capita income, reducing inflation, and improving accessibility to banking services will significantly boost private and household savings in India (Ghosh & Nath, 2023). However, further analysis is needed to consider, comprehend and examine the boomers' perspectives on jobs and incomes, consumption and expenditure, as well as savings and investment since they are a crucial segment of the working-age population and are pivotal to country's economic development. Also, a considerable segment of the working-age population is unlikely to augment savings to the same extent as the substantial prime-age workforce. Policymakers require comprehensive data to monitor shifts in the job market, savings and investment, and consumption and expenditure for the boomers over time to assess trends and formulate successful demographic policies to harness the potential of this segment with the focus on savings augmentation. The United Nations World Youth Report 2023 emphasizes how essential it is to decrease the proportion of youth classified as NEET (not in employment, education and training) to devise a policy framework encompassing stable job setting, eliminate skills mismatch, and mitigate disparities, among other things, as fundamentals that must be addressed to deal with the increasing NEET rate and jobless growth in India. In addition, the structural transformation of Indian economy has also created hurdles for boomers to contribute to the aggregate savings over time. Also, measures to increase female labor force participation rate will help to address the gender-specific unemployment in India. A substantial portion of NEET rate is attributed to the female boomers comprising of approximately 50% of them in the age-group of 15-24 years. Finally, understanding the connection between savings

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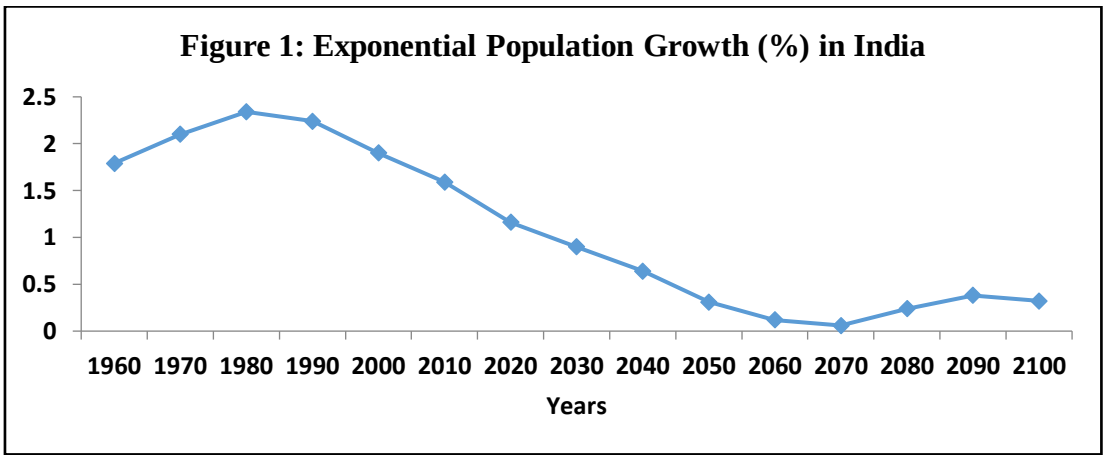
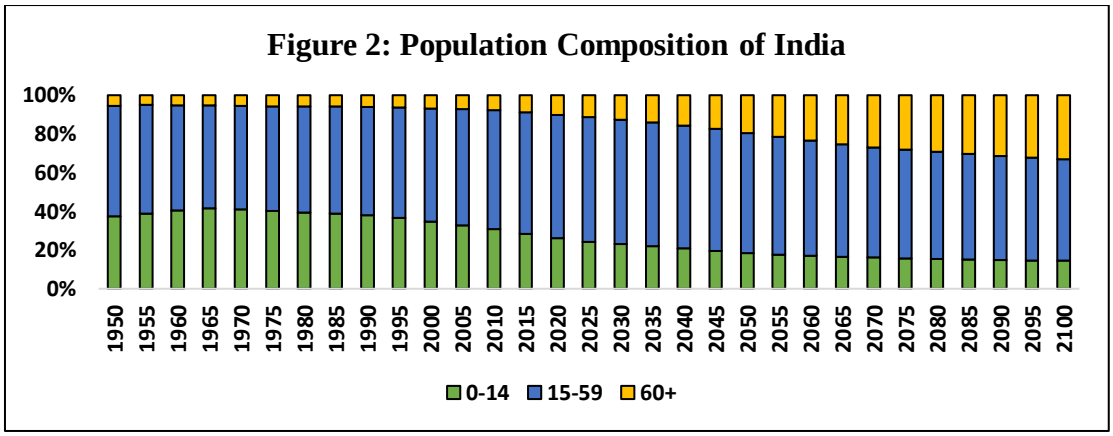
and earnings, the financial inclusion of boomers is crucial to realizing the demographic dividend. Providing job prospects for boomers tackles one aspect of the concerns, but scheming for increasing their savings is also crucial as savings will establish a financially sound and secure environment for people and the entire country in the long run.



Source: Based on UN World Population Prospects



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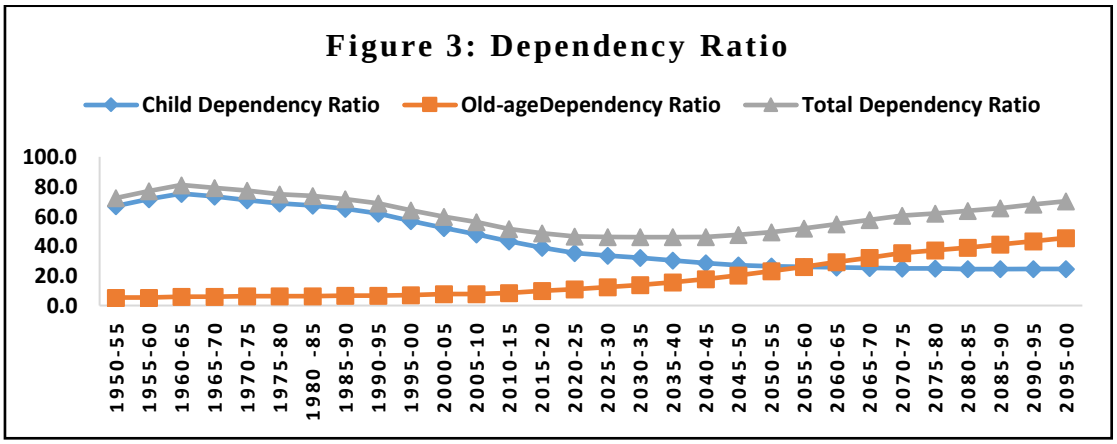

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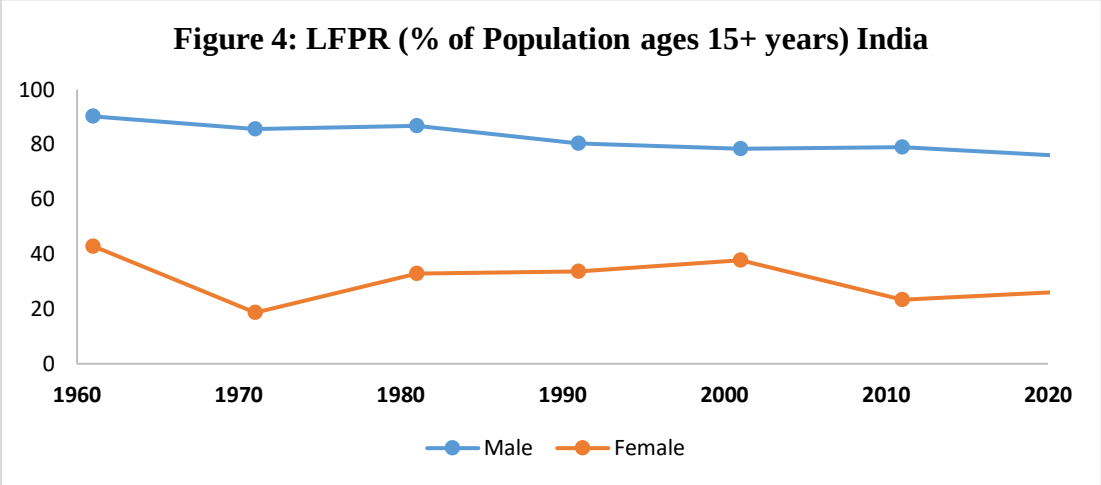

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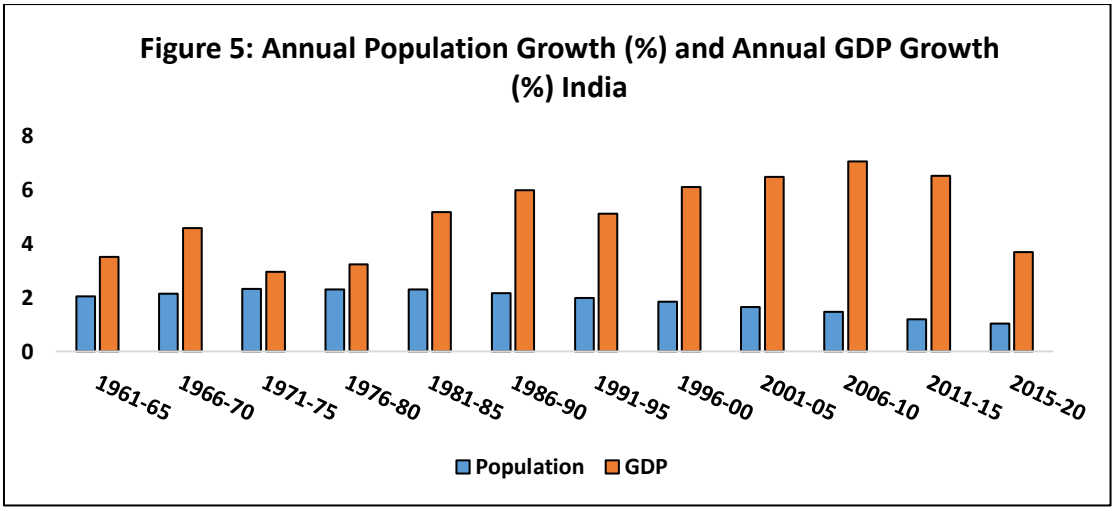

Source: ***www.worldbank.org***

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