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ECONOMIC FORECASTING OF DEMOGRAPHIC DIVIDEND OF INDIA

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ABSTRACT

Many social scientists and demographers have analyzed and concluded that the catalyst behind the demographic dividend in the developing countries was sudden fluctuations in the age structure in those countries. This phase opens a window of a demographic opportunity as it results is an increase in the share of young adults in the population leading to a 'youth bulge' together with rapidly declining infant mortality. In this background, this research paper attempts to study how economic growth of India gets influenced by its demographic dividend. India, has been chosen to see this relationship between two variables economic growth and demographic dividend using fixed effect model covering a period of 2000–2011. The results show that a substantial fraction of the growth acceleration that India has experienced since the 1980s—sometimes ascribed exclusively to economic reforms—is attributable to changes in the country's age structure. Moreover, the demographic dividend could add about 2 percentage points per annum to India's per capita GDP growth over the next two decades.

The impact of India's dividend will eventually uplift the growth rate of the potential labor force along with the growth of younger population. The results from regression equation exhibit that relationship between GDP growth rate and demographic dividend is positive thus, validating our hypothesis that demographic dividend has a positive impact on economic growth. However India needs to ensure timely implementation of effective policies to realize the dividend.

Keywords: Demographic Dividend; Economic Forecasting; Population Projection

INTRODUCTION

Changes in the population age structure have led to growth in the per capita income and economic growth in many developing countries around the world (Kelley & Schmidt, 2001; Mason & Lee, 2004). This has largely occurred because changes in age structure lead to a divergence between population growth and growth of the working age population. The phenomenon is beginning to work in India as well as we see an increase in the population growth within the young cohort since past ten years (2014 Census Report, Office of Registrar General of India) and in the coming years (2017 U.N. Medium of Population Projection). As this occurs, the demographic dividend may push the per capita income growth up together with a positive growth in labor productivity.

India has become, in the last two decade one of the most dynamic and fastest-growing economies in the world. In less than twenty years' time, count in between 1982 and 2000, real GDP per capita for the Indian population, adjusted for purchasing power parity (PPP) rose – a record unmatched elsewhere in the world. At the start of these historical transformations, India's leaders made raising the standard living of the Indian population its new political mandate and the basis for political legitimacy. They accordingly

formulated two basic national policies: developing the economy and controlling population growth. The Indian Government announced its population policy in 1952, an unprecedented act of governmental intervention in population. The rationale for India's population policy was a neo-Malthusian 1 perspective on the relationship between population and development—a view largely dismissed by mainstream economists.

The focus on India's Demographic Dividend is motivated by several factors, the most important being, a latecomer relative to advanced Western nations and East Asian economies; India is in the midst of a major demographic transition. That transition started about 40 years ago and will likely last another 30 years.

(1 Neo-Malthusian advocates the present and future human population planning)

Quantitatively, according to the United Nations report of 2009, India will go through a huge transition phase in the years 2010-2040 where almost one quarter of the increment could be seen in the global population amongst the age group 15–64 years. Faster economic growth and development: Indian population is polygenic and is a unique combination of mixed races and culture too. The working-age ratio in the country is set to rise from about 64 percent currently to 69 percent in 2040, reflecting the addition of just over 300 million working-age adults. This would make India—by an order of magnitude—the largest single positive contributor to the global workforce over the next three decades.

Hypothetical Forecast of Demographic Dividend

Hypothesis I: The ratio of the working age group on dependents is more relevant to analyze than those in the non-working age group.

The combination of a sharp decline in mortality rates and decline in the birth rates is what that create the demographic transition and which further creates a bulge in the population in the younger age groups. And as time passes, this result enlarges its share of working-age group which is in the range of 15-56 years in general but for India this age group lies in the range of 15–59 years and this would happen especially when the 'baby boomers' join this group. And hence, the ratio of depended people gets reduced on the working population. This expected decline in the ratio of non-working to the working population is an indisputable statistical fact. As all countries undergo demographic transition at some point or the other, they experience these changes in the age structure of their population as well. However, the positive consequences of this trend are not welcoming which means that it is not always necessary that all of the working age groups would be able to join the work force and contribute to the national output simultaneously even though the working age groups in a population in higher.

Hypothesis II: A finite part of the demographic dividend may not get materialised even though insufficient women join the workforce.

There is another source of increase in the working age group which is the female workforce which is followed by the decline in the fertility rate. But such an increase does not solely depend on just having a lower number of children. There may also be other social, cultural and economic factors which differ from one country to another. For example, there are very low female workers in Spain and Italy even though these countries have low fertilely rate. Another example is Sweden, where the higher rates of women's employment are as much as is the higher fertility rates. Another interesting fact is that in those countries whose slope of graph of female work participation rate is

in downward stage i.e. U-shaped, where tan increase in household incomes would decrease the female workers. After combining all these theories on women participation in work, it is rightly said by some demographers that if women do not join the workforce, a sizeable part of the demographic dividend may not get materialised.

Hypothesis III: The young and the old age group consume more than they produce, whereas working-age group thrives to save more.

This is the third critical assumption of the demographic dividend hypothesis which explains that the positive changes in the age structure of younger age groups and the reduction in the dependency ratio increases saving in the economy. In 1986, Modigliani's life cycle hypothesis also supported this assumption. The life cycle hypothesis states that the young and the old age group consume more than they produce, whereas working-age group thrives to save more. The increased savings in a house can provide the capital required for the financial growth. Many empirical studies on life cycle also supported this hypothesis.

However, this hypothesis may not always be accepted as the assumption that the decline in the dependency ratio results in a higher saving may not hold true in every situation. For instance, in a country where most of the working age group in the population is engaged in low-productivity agriculture and other informal activities, the higher saving may not even arise there. Also, higher savings cannot be seen amongst the middle class family as their savings may be disturbed by the high inflation rate and an increasing cost of education and health care as the privatization of these services are increasing days by day. Moreover, household savings are affected by a number of other factors like the availability of financial institutions to deploy the savings. The expected savings may not be regulated, if a large part of the population remains out of the scene financially.

Hypothesis IV: The increased savings may be automatically invested.

The increased savings may be automatically invested if and only if the household savings are used productively used and are not departed away by unproductive uses like purchase of gold and land, shares or on other unnecessary activities. Investment may also be affected negatively by other factors like the policies related to government regulations, the availability of infrastructure and the economic expectations.

Hypothesis V: Demographic transition encourages investments in human capital.

As argued by Bloom in his book on 'The Demographic Dividend: A New Perspective on the Economic Consequences of Population Change': "a longer life expectancy causes fundamental changes in the lifestyle of people. The angels related to the education, family, retirement, women's role, and work all tend to displace." As a result of these changes, parents tend to spend more on the education of their children. Thus, the working population becomes more productive as they are younger as well as more educated and healthier which would definitely promote higher wages and a better standard of living. However, none of the theoretical assumption would ever prove the impacts of such changes on the demographic transition to be true and hence a demand of an empirical investigation is required. It can now be concluded that demographic transition encourages investments in human capital.

Hypothesis VI: The supply- side factors are considered and the demand-side factors are ignored in the demographic dividend.

As observed by Shankar Acharya in his article on 'India's Growth Prospects Revisited': The demographic dividend

considers only the labor supply and the demand side is never considéred. Therein lay the fact. The extra labor supply creates the potential for employment and growth. In a well-running economy with competitive product and its factor constructs the demand of labor which would match supply and hence create more jobs and output. But such a good results can't be promised. It all depends on how well the economy is functioning; and especially how well labor markets are working.

Can India Garner the Demographic Dividend?

One may wonder this question anytime whether India can garner the demographic dividend. There isn't any guarantee that the demographic dividend may last long. A good number of developed countries like USA, Europe and Japan experienced low birth rates and low mortality rates in the 1980s and had ageing populations. Today India's most competitive advantage is its demographic dividend. The recent statistical data on India's populations shows that India consists of the population of working age group form 15-59 years which largely consists of young cohort from 15-34 years. This means that India's economy has the potential to grow more rapidly than that of many other countries, including China. India is passing through a phase of unrivalled demographic changes. These demographic changes are likely to harness the increased labor force in the country. The census projection report shows that the proportion of working age population between 15 and 59 years is likely to increase > 64% by 2021. Furthermore, this bulk of increment is likely to take place in the relatively younger age group of 20-35 years. The proportion of youth in India is projected to peak at 484.86 million in the next ten years.

Such a trend would make India one of the youngest nations in the world. In 2020, the average Indian will be only 29 years old. Comparable figures for China and the US are 37, 45 for West Europe, and 48 for Japan. This 'demographic dividend' provides India with immense opportunities, but it also comes with some known challenges. It will benefit India only if our population is healthy, educated and appropriately skilled. Therefore, greater focus on human and inclusive development is necessary to best utilize the demographic dividend. Let me now introduce with the statistical data on the trends of population in different age groups in India. Table 1 below explains the major vital statistic in the demographic Transition happening in India from 1951–2011.

Table 1: Demographic Transition in India (1951-2011)

Demographic Variable	1951	1961	1971	1981	1991	2001	2011
Crude death rate (CDR)	22.8	19	15	12.5	9.2	7.4	7
Infant mortality rate (IMR)	148	146	129	110	80	66	44
Crude birth rate (CBR)	41.7	41.2	37.2	33.9	29.5	25.4	21.6
Total fertility rate (TFR)	6	5.5	5.2	4.2	3.6	3.1	2.4
Population (millions)	361	439	548	683	846	1028	1210
Compound annual growth rate of population (%)	-----	1.98	2.24	2.23	2.16	1.97	1.64
Life expectancy at birth (years)	39	44.5	49.7	55.5	60.3	63	66.1
	(1951 -1956)	(1961-1966)	(1970-1975)	(1981-1985)	(1991-1995)	(2000-2004)	(2006-2010)

Source: Compiled from Census of India reports; Extracted from Singh, A. K. (2016). India's Demographic Dividend: A Sceptical Look, p. 14.

During the first two decades of post-independence development, while infant mortality rates fell significantly, the fertility rate was more or less stagnant. This would have increased the population of young people significantly, merely because of greater child survival. In the three decades since then, though the fertility rate has been declining, the infant mortality rate has fallen quite sharply, with possibly the same effect. The life expectancy over the period has recorded marked improvement, going up from 39 years during 1951–1956 to 66.1 years during 2006–2010. Table 2 and Table 3 exhibits the actual trends in the age distribution of India's population from 1951-2015 (COI 2015-data) and Projected trends in the age distribution of India's population from 2020-2050 (UN 2013-data) respectively.

Table 2: Actual Trends in the Age distribution of India's population (1951-2015)

Year	Child Population (%) (0-14 years)	Working Population (%) (15-59)	Old Population (%) (60 - 80+)
1951	37.48	57.12	5.39
1955	38.84	48.94	5.09
1960	40.40	54.38	5.22
1965	41.50	53.22	5.28
1970	40.85	53.67	5.48
1975	40.08	54.28	5.64
1980	39.39	54.80	5.82
1985	38.67	55.30	6.03
1990	37.78	56.15	6.30
1995	36.65	56.71	6.64
2005	32.98	59.56	7.46
2010	29.05	62.05	8.0
2015	28.67	62.29	9.04

Source: Compiled from Census of India reports and the United Nations Department of Economics and Social Affairs/Population Division World Population Prospects

Table 3: Projected trends in the age distribution of India's population (2020-2050) 2020-2050

Year	Child Population (%) (0-14 years)	Working Population (%) (15-59)	Old Population (%) (60 - 80+)
2020*	26.74	63.05	10.21
2025*	24.80	63.71	11.49
2030*	22.87	64.25	12.90
2035*	21.07	64.50	14.44
2040*	19.74	64.06	16.19
2045*	18.85	63.02	18.13
2050*	18.22	61.55	20.23

Note: 2010-2050(*) are the projected values.

Source: United Nations Department of Economics and Social Affairs/Population Division World Population Prospects:

The demographic data has important implications on the labour market. According to official data on the Indian labour force, the labour group in the year 2006 was 472 million, 529 million in 2011 and is expected to be around 653 million in 2031. It is also predicted that the labour force will continue to grow and by 2025, 300 million youth would enter the labour force.

The recent statistics reveals the total population of India to be 1.3 billion in numbers and India accounts for nearly 1/6th of global population. Even though the growth rate of India's population declined consistently, India's population increased at its highest peak globally during 2001-2011 approximately by 180 million in absolute terms. According to the UNDP population projections in India, the proportion of working age group will continue to increase in the coming decades, reaching the peak of 64.5 per cent in 2035 (Table 3). And more interestingly this huge increment happening in the year 2035 would also see many developed countries like Japan and Western European experiencing a decline in the proportion of their working age group in the total population. India will be contributing 25 per cent of the world's new workers in the next decade. Now, these statistics for sure shows a bright future of India as we are going to have boom in the working age group of the total population.

Empirical Estimation of Demographic Dividend

The empirical Estimation of Demographic Dividend focus the impact of the share of working age ratio on economic growth and using this estimation, the economic growth of India can be analysed using the set of data of Indian states with different economic indicators for the specified time periods. In doing so we will be using the following equation (1.1) and from this equation we are going to estimate various specifications:

$$g\_y_{i,t} = \rho Iny_{i,t} + \beta_1 Inw_{i,t} + \beta_2 g\_w_{i,t} + \gamma' X_{i,t} + f_i + n_t + \xi_{i,t}$$

Where;

$g\_y_{i,t}$ is the dependant variable defined as the annual average growth rate of per capita income in state *i* over the decade beginning in year *t.*

The main regressors in this equation are:

$In\, y_{i,t}$ is the log of initial per capita income;

$In\, w_{i,t}$ is the log of the initial working age ratio; and

$g\_w_{i,t}$ is the average annual growth rate of the working age ratio over the decade;

Also, in the above Equation,

$X_{i,t}$ is a vector of explanatory variables that might impact steady state labor productivity;

f_i is a time-invariant fixed effect, capturing state- specific effects; and

n_t is a time dummy, capturing effects unique to the decade beginning in year *t*

Equation (1.1) forms the basis of mathematical results in conducting the empirical estimation to estimate the demographic dividend. Many international and national demographers have conducted such empirical estimation using highly computerized software's.

Forecasting the Demographic Dividend using Employability prospects of India

In this section, data analysis has been done for the leaders and the laggard states of India to judge the prospects of economic development in India. This is done by analyzing the past performance of those Indian states which are expected to experience the largest WAR and a rapid growth in their WAR in the near future. The data used in doing so will then judge whether the states will be able to harness the impending demographic dividend. The baseline for this analysis will be the latest National Human Development Report (2001) by the Planning Commission, Government of India which will further analyze the conditions of the policies and institutions in these particular States on the basis of the employment and unemployment data as depicted in Tables 4 and 5. The reason for choosing the employment data is only because it fits well within those critical policies which can capitalize the demographic dividend.

Table 4: Age-specific Employment Status in the Selected States

		2000				2011			
		age group (in years)							
		15-19	20-24	25-29	all (0+)	15-19	20-24	25-29	all (0+)
*Employment Rate or WPR**	Leaders								
	Gujarat	206	454	543	333	213	512	666	384
	Karnataka	239	417	541	359	138	378	626	376
	Kerala	122	333	549	337	90	376	555	363
	Tamil Nadu	286	452	584	382	130	409	561	392
	Simple Average				*352.7*				*378.7*
	Laggards								
	Bihar	147	241	377	258	98	310	442	253
	Madhya Pradesh	193	406	523	311	118	324	543	325
	Rajasthan	198	396	536	301	184	375	548	326
	Uttar Pradesh	238	426	483	288	240	393	507	317
	Simple Average				*289.5*				*305.25*

Source: NSS 55th and 68th Round Report: Employment Situation in India

*Note: The number of persons/person-days employed per thousand persons/ person-days is known as worker-population ratio (WPR).

As we can see from Table 4, for the period between 2000 and 2011, the Leaders states shows an overall of approx 7% increment in its employment rate while the laggards states shows a mere increment of 5%. This implies that the rate of growth of employment is not much lower in the laggards states as compared to the leader states in the present era which is shows the laggard states is in development stage and one may expect an equality in both types of states in terms of job market in the coming decades.

Next, we analyze the table 5, to understand the unemployment pattern within these states.

Table 5: Age-specific Unemployment Status in the Selected States

States	2000				2011			
	age group (in years)							
	15-19	20-24	25-29	(15-29)	15-19	20-24	25-29	(15-29)
Leaders								
Gujarat	68	72	23	53	34	29	15	24
Karnataka	48	126	37	73	139	157	41	96
Kerala	453	353	164	288	407	256	131	210
Tamil Nadu	166	141	47	108	95	157	50	95
Simple Average				130.5				106.25

Unemployment Rate or UR**

Laggards								
Bihar	205	283	192	227	280	191	127	178

Madhya Pradesh	90	121	71	94	136	125	42	83
Rajasthan	143	64	39	74	0	109	27	53
Uttar Pradesh	109	97	101	102	138	117	91	113
Simple Average				124.25				106.75

Source: NSS 55th and 68th Round Report: Employment Situation in India

**Note: Unemployment rate (UR) is defined as the number of persons/person-days unemployed per 1000 persons/person-days in the labour force.

Despite the growth of employment, unemployment rates have also been increasing, and are now the highest ever recorded. The 1990's era saw a slight more of the unemployment rate in the leader states as compared to the laggards states but slowly and gradually got stood in the same position as are the laggards states and we can see both has a quite similar rate for the recent year which is apron 106 per 1000 persons. However, few states like Bihar and UP whose unemployment rates were also high compared to the other states still experiencing the same condition until now. This aggregate increase in unemployment rate also indicates a declining rate of labour force participation among the youth, that is the age group 15-29 years.

It is certainly possible that this decline in labour force participation among the youth is the result from their delayed entry into the workforce, partly because they are extending their years of education or because as some are actively engaged in work, others who are unemployed are still looking for work. If this is a true description of labour markets in India at present, it has significant implications. One concern relates to the possibility of missing the window of opportunity provided by a large young population, because the economic growth process simply does not generate enough jobs to employ them productively. Another important concern follows from this, in terms of the negative social impact of growing numbers of young unemployed. If the economy does not generate adequate employment of a sufficiently attractive nature, the demographics could deliver not a dividend but anarchy.

The principal problem is that participation in gainful economic activity is typically less for the labour force in the laggard states than in the leader states. So, strict actions and timely executions of policies needs to be implemented by the state government before the Demographic Dividend turns into a curse rather than a gift for India.

CONCLUSION

The age Structure is vital statistics which plays a very important role in the expansion of the economic growth of a country as economic growth is directly proportional to the increase in the ratio of the working age population. But such a growth is possible if and only if a country has an actively running good policies and institutions. India is experiencing an unexpected increase in the working age ratio and this pushes India to experience a

more fast growth. The result and analysis done in this research paper shows that the age structure is not homogenous in any of these states. If the BIMARU2 states succeed in reforming their economy in a fruitful and healthy way, then there is no doubt for India in capitalising its favourable age structure.

India is in the midst of a grabbing a shining window of opportunity called the demographic dividend. India ha experienced a significant downfall in its mortality rates and simultaneously a more or less stagnancy in its fertility rate during the first two decades of post-independence development, which therefore resulted in a rapid growth in the population of the young cohort, which was also complimented with greater child survival rates. India's potential to exploit the dividend thus depends on the result of the more open, export-oriented strategy adopted by the Indian government.

Today India dose have strategies in order to exploit the demographic window of opportunity however, the single need is its implementation. In addition, there exists some challenges in the education and health sector as well as India still lacks to improve the quality of its education and health system.

2 Abbreviated terms of the leader and the laggard states

All these challenges that the current phase of the demographic transition has brought needs and extra effort to overcome over it and India need to focus on those automatic "gains" which can be delivered by the demographic dividend. More specifically, the current liberal and open-door policies in India and the excessive fiscal prudence need a replacement by some appropriate policies. As we have already seen that during the liberalization years in India, the markets didn't have any proper policies enplane which could ensure that these problems are resolved. And if this continues to be the case till today, then this can result in wasting of the opportunities that the demographic transition phase of India is temporarily offering today.

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