DEMOGRAPHIC CONSTRAINT - POPULATION CHANGE AND ECONOMIC DEVELOPMENT

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Abstract
This paper studies the relationship between population change and economic growth. The most difficult problem for such an analysis is to be able to separate cause from effect. Does population growth accelerate or retard economic growth the question arises? Also we will talk about the concept of 'demographic dividend'. In recent years, the debate has under-emphasized a critical issue, the age structure of the population (that is, the way in which the population is distributed across different age groups), which can change dramatically as the population grows. Because people's economic behavior varies at different stages of life, changes in a countries age structure can have significant effects on its economic performance. Nations with a high proportion of children are likely to devote a high proportion of resources to their care, which tends to depress the pace of economic growth. By contrast, if most of a nation's population falls within the working ages, the added productivity of this group can produce a "demographic dividend" of economic growth, assuming that policies to take advantage of this are in place. In fact, the combined effect of this large working-age population and health, family, labor, financial and human capital policies can create virtuous cycles of wealth creation.

Introduction
The theory of demographic transition attempts to explain why all contemporary developed nations have more or less passed through the same three stages of population growth. The article begins with a brief discussion of the theory of demographic transition and how does population growth affect economic development. Economists and demographers continue to disagree about whether population change (a) restricts, (b) promotes, or (c) is independent of economic growth. It looks into population trends in India and fertility rates followed by population policy since 1947, human resource development policy and it also talks about the case studies within the country as well as some international comparisons. It reviews the debate over the effects of demographic change on economic growth and examines the evidence on the relevance of changes in age structure for economic growth. It also examines the relationship between population change and economic development in particular regions of the world. Finally, it discusses key policies that combined with reduced fertility and increases in the working- age population, have contributed to economic growth in the developing world.

All contemporary develop nations have more or less passed through the same three stages of population growth. Before their economic modernization, these countries, for centuries, had stable or very slow growing population as a result of the combination of high birth rate and almost equally high death rate .With economic development resulting in higher incomes, improved public health facilities, there was marked decline in mortality that gradually raised life expectancy from under 40 years to over 60 years .however, the decline in death rate was not immediately accompanied by a decline in fertility. with declining death rate but birth rate not falling correspondaly, these countries passed through two stage, marking the beginning of demographic transition i.e., transition from stable or slow growing population to rapidly increasing population .finally, stage three is reached when the forces and influences of modernization and economic development cause fertility to decline so that eventually falling birth rate converges with lower death rate leaving no population growth.

Microeconomic Theory of Fertility
Economists are using the principles of economy and optimization to explain family size decisions. They are looking more closely at the microeconomic determinants of family fertility. In deciding whether or not to have additional children, parents are assumed to weigh economic benefits against costs. The principle of benefits is the expected income from child labor against the cost: (1) the opportunity cost of mother's time, the income she could earn if she were not at home caring for her children. (2) The cost of educating children that is the trade – off between having fewer 'high quality' high cost, educated children versus more 'low quality', low cost, uneducated children with much lower earnings.
Statistical studies have shown that birth rates among the poor are likely to fall where there is:
1. An increase in the education of women and consequent change in their role and status.
2. An increase in female non-agricultural wage employment opportunities which raises the price or cost of their traditional child bearing activities
3. The development of old age and social security systems to bridge the economic dependence of parents on their offspring's.

4. A reduction in infant mortality through expanded public health programme and better nutritional status for both parent and child.

Thus, efforts to make jobs, education and health more broadly available to poverty groups will not only contribute to their income and physical well-being, but it also can contribute substantially to their motivation for smaller families.

How Does Population Growth Affect Economic Development?

Two main relationships through which population growth affect the economy are (1) the saving effect (2) investment effect. Due to burden of dependency population growth lowers the saving rate. With high fertility and declining mortality in younger and older age groups, the population acquires an increasing proportion of people in the non-working age groups relative to those of working age. In the absence of increasing output per worker, savings per head must fall. With increasing population, a share of investible resources has to be devoted to reproducing for additional unproductive facilities, duplication of social services which would be necessary if population were not growing. Robert Cassen has raised doubts on the validity of the above savings in poor countries where from small wealthy class whose fertility is low and is cost of additional children is met out of consumption rather than saving, the saving cost of additional children would be quite inconsiderable .in the macroeconomic picture ,if population growth leads to slower growth of output ,then one would expect slower growth of saving but to avoid circulatory, the negative effect of population on GNP growth must be established independent of the saving effect. Cassen observes that food is the important resource which is not incorporated in the demographic models. as long as a society can increase agricultural output by mainly labor using means, the chief resource to feed growing population is provided by the population itself, the capital required is circulating capital, wage good to support the labor force. Coale and Hoover model argued that with slower population growth more capital would have been available for raising per worker productivity because of reduced welfare expenditure, similarly Cassen argues that more capital and foreign exchange would have been available from reduction in expenditure devoted to raising agricultural output.

According to Cassen wherever population growth requires increase in production, which in turn require investment, a lesser rate of population growth would release investible funds for use elsewhere. According to Sundaram, the implications of growing demographic pressures in India for the process of development in general and the progress towards poverty eradication become clearer once we focus on the labor force consequences of population growth. The sheer magnitude of the addition to workforce brings to the fore the capital constraints in raising the productivity of the labor force. The capital requirement of equipping the labor force would be astronomically large.

The labour force expansion also puts direct pressure on the single most important natural resources in a predominantly agrarian economy namely, land.The effective supply of land can be augmented by the use of reproducible capital.

The level of fertility is an integral aspect of development, the classical model of demographic transition postulates a link between a desire for fewer children and change in macro developmental variables such as urbanization, industrialization, literacy and education, and the status and role of women (Coale, 1973; Friedman, 1982).a united nation's study (1963) had added means of communication to the list. There are lessons to be learnt from the experience of Kerala and Tamil Nadu which have already attained the replacement level of fertility by 1988.An almost universal female literacy and a low level of infant and child mortality and the high status of women are considered crucial in the decline in fertility in Kerala. The decline in fertility in Tamil Nadu has been attributed to support for both increase in the age at marriage and an imaginative programme of information, education and communication.

In a country with over 575,000 villages and 4,700 urban centers', the means of modifying traditional behavior have to be adapted to the local conditions.

The Concept of Demographic Dividend

There are three phases of the demographic transition process creating three unique age structures for any country. In the first phase, with fertility being very high and mortality declining, there will be a large number of people in the young age group, particularly below 15 years, creating a high dependency ratio. In the second phase of transition, the fertility starts declining at a fast pace leading to a reduction in the child population. However, as a consequence of higher fertility in the past, there will continue to be higher growth rate in the working age group population during this period. This period is marked by considerable reduction in the dependency ratio. In the third phase, the dependency ratio again will be higher as a result of higher old age population. The demographic bonus or gift is a term used to understand the second phase of the age structure transition. The proportion of the working age population in the total population will be one of the highest during this period with a potential growth inducing impact as well.

TABLE - A.6

PROJECTED POPULATION CHARACTERISTICS AS ON 1ST MARCH 2001 2026, INDIA

| SI.No.	Indicators	2001	2006	2011	2016	2021	2026
1.	Population (in millions)						
	Persons	1028.6	1112.2	1192.5	1269.0	1339.7	1399.8
	Males	532.2	575.5	617.3	657.2	694.1	725.2
	Females	493.5	536.7	575.2	611.8	645.7	674.7
	Sex ratio	930	932	932	931	930	930
	Population density (S .km)	313	338	363	386	408	426
2.	Population by broad age-group (in million)						
	10 years and above	593.9	602.4	772.4	858.4	935.0	1005.4
	0-14	364.6	357.0	346.9	340.3	336.9	327.0
	15-59	593.3	671.6	747.1	810.6	859.6	899.7
	60+	73.7	83.6	98.6	118.1	143.2	173.2
	Proportion (percent)						
	0-14	35.4	32.1	29.1	26.0	25.1	23.4
	15-59	57.7	60.4	62.6	63.9	64.2	64.3
	15-49 (Female population)	51.1	53.1	54.5	54.8	54.1	53.3
	60+	6.9	7.6	9.3	9.3	10.7	12.4
3.	Median age (years)	22.51	23.88	25.47	27.37	29.33	31.39
4.	**Dependency Ratio**						
	Young (0-14)	614	532	464	420	392	363
	Old (60+)	119	124	132	146	167	192
	Total (Young and old)	734	656	596	566	559	556
5.	**Projected Demographic Indicators**	2001-05	2006-10	2011-15	2016-20	2021-25	
	Population growth rate	1.6	1.4	1.3	1.1	0.9	
	Crude Birth rate(CBR)	23.2	21.3	19.6	18.0	16.0	
	Crude Death rate (CDR)	7.5	7.3	7.2	7.1	7.2	
	Infant Mortality Rate (IMR)	61.3	54.3	49.2	44.0	40.2	
	Under-5 mortality rate (q5)	82.0	72.9	65.9	59.0	54.0	
	Total Fertility Rate (TFR)	2.9	2.6	2.3	2.2	2.0	
	Life expectancy of males	63.0	65.0	67.3	68.0	69.8	
	Life expectancy of females	65.1	68.1	69.6	71.1	72.3	

Source : Census of India 2001, Population Projections for India and States - Report of the Technical Group on Population Projections, 2001-2026 : M/O Health & Family Welfare

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EXPECTATION OF LIFE AT BIRTH

Census Year		Male	Female
1		2	3
1901-10	(a)	22.6	23.3
1911-20		19.4	20.9
1921-30		26.9	26.6
1931-40		32.1	31.4
1941-50		32.4	31.7
1951-60		41.9	40.6
1961-70		46.4	44.7
1970-75	(b)	50.5	49.0
1976-80		52.5	52.1
1981-85		55.4	55.7
1986-90		57.7	58.1
1991-96	(c)	60.6	61.7
1996-01		62.3	63.3
2001-05		63.8	66.1
2006-10		65.8	60.1
2011-15	(d)	67.3	69.6
2016-20		68.8	71.1
2021-25		69.8	72.3

Source: National Commission on Population, Ministry Of Health And Family Welfare, Government Of India

Crude Birth Rate (Rural, Urban & Total) - All India
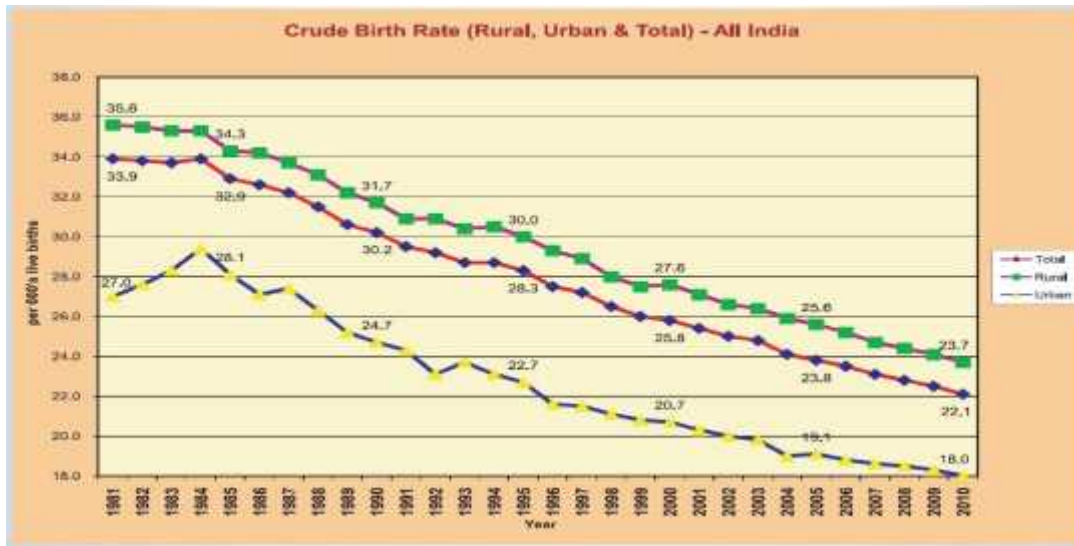
The salient features of the population projections at the national level, and some of the underlying assumptions in this regard, are as under:

- The population of India is expected to increase from 1029 million to 1400 million during the period 2001-2025 - an increase of 36 percent in twenty- five years at the rate of 1.2 percent annually. As a consequence, the density of population will increase from 313 to 426 persons per square kilometer.

- The crude birth rate will decline from 23.2 during 2001-05 to 16.0 during 2021-26 because of falling level of total fertility. In contrast, the crude death rate is expected to fall marginally due to changing age structure of the population with the rising median age as a result of continuing decline in fertility and increase in the expectation of life at birth. It will drop from 7.5 during 2001-06 to 7.2 during 2021-26.

- The infant mortality rate of the country, which is reported to be 63 in 2002, is estimated to decline to 61 during the period 2001-05 and is expected to go down to 40 by the end of the period 2021-25.

- Between 2001 and 2025, because of the declining fertility, the proportion of population aged under 15 years is projected to decline from 35.4 to 23.4 percent; the proportion of the middle (15-59 years) and the older ages (60 years and above) are set to increase considerably. With the declining fertility, along with the increases in life expectancy, the number of older persons in the population is expected to increase by more than double from 71 million in 2001 to 173 million in 2026 - an increase in their share to the total population from 6.9 to 12.4 percent. The proportion of population in the working age-group 15-59 years is expected to rise from 57.7 percent in 2001 to 64.3 percent in 2025.

- Another important consequence of the declining fertility will be that, at the national level, the population in the school-going age of 5-14 years is expected to decline from 243 million in 2001 to 222 million in 2026. The share of the population aged 5-14 years to total population of all ages is expected to decrease by 5 percent from 24 percent in 2001 to 19 percent in 2011 and by 3 percent between 2011 to 2026 (19 to 16 percent).

- The youth population in the age- group 15-24 years is expected to increase from 195 million in 2001 to 240 million in 2011 and then continue to decrease to 224 million in 2026. Its proportion to total population is expected to fall from 19 percent in 2001 to 16 percent in 2026.

- From the above, it is evident that, 54 percent of the population in the country, are aged 24 years and below in 2001, constituting 35 percent and 19 percent in the ages 0- 14 years and 15-24 years respectively. The combined proportion of these two age- groups is expected to fall from 54 percent in 2001 to 39 percent in 2026. The average Indian will be expected to be of 31 years old in 2026 compared to 23 years old in 2001.

- Out of the total population increase of 371 million between 2001 and 2026, the share of the workers in the age-group 15-59 years in this total increase is 83 percent. This has implication in the productivity of labour in future.

- The sex ratio of the total population (females per 1000 males) is expected to decrease (i.e. become less feminine) from 933 in 2001 to 930 during 2026.

- The Total Fertility Rate (TFR) is expected to decline from 2.9 during 2001-2005 to 2.0 during 2021-25. The assumption is that the Total Fertility Rate (TFR) would decline steadily and would touch the floor value of 1.8 in some states. With this, the weighted TFR is projected to reach the replacement level of 2.1 by the period 2021.

- The urban population in the country, which is 28 percent in 2001, is expected to increase to 38 percent by 2026. The urban growth would account for over two-thirds (67 percent) of total population increase by 2026. Out of the total population increase of 371 million during 2001-2026 in the country, the share of increase in urban population is expected to be 249 million.

- The State, which is expected to have least growth in the quarter century (2001-2026) is Tamil Nadu (15 percent), followed by Kerala (17 percent). In contrast, Delhi will have the highest projected growth of 102 percent during 2001-2026. States, which will have projected growths in the range of 20-30 percent, are Himachal Pradesh, Punjab, West Bengal, Orissa, Andhra Pradesh and Karnataka. The population in the states of Haryana, Rajasthan, Uttar Pradesh and Madhya Pradesh is projected to increase by 40-50 percent during 2001-2026, which is above the national average of 36 percent. The population of Uttar Pradesh is expected to be highest among all the states of the country at almost 249 million in 2026.

- Of the projected increase in population of 371 million in India during 2001-26,187 million is likely to occur in the seven States of Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Rajasthan, Uttar Pradesh and Uttaranchal (termed as BIMARU states, since it was so before division). Thus nearly 50 percent of India's demographic growth during this period of twenty five years is projected to take place in these seven states. Twenty two percent of the total population increase in India of 371 million during 2001-26 is anticipated to occur in Uttar Pradesh alone. The population in these seven states together is expected to grow at 1.5 percent per annum during 2001-26. In contrast, the contribution of the four southern states, namely Andhra Pradesh, Karnataka, Kerala and Tamil Nadu, to the total increase in population size of the country during 2001-2026 is expected to be 47 million -thirteen percent of total demographic growth of the country. The population in these four states together is expected to grow at 0.8 percent per annum during 2001-26. Proportions of contribution of some of the other states to the total increase in population size during 2001-26 are Maharashtra (10 percent), West Bengal and Gujarat (5 percent each) and Delhi (4 percent). These four states together thus contribute 24 percent of the total increase in population size during 2001-2026. The contribution of the remaining states and union territories to the total increase in population size during 2001-2026 is 13 percent.

- Continuing decline in fertility and increase in the expectation of life at birth is expected to make a difference to the proportion of older population (60 years and above) between states. The State of Kerala, where lower fertility and mortality rates have been achieved earlier than the other states, the proportion of older persons aged 60 years and above is expected to increase from 11 percent in 2001 to 18 percent in 2026. Thus, almost every sixth individual in Kerala is expected to be a senior citizen by 2026. In contrast, Uttar Pradesh is expected to have an increase of the proportion of old age population from 6 percent in 2001 to 10 percent in 2026, implying that the population of Uttar Pradesh will be expected to be relatively younger compared to that of Kerala. The median age of population in Kerala is expected to go up from 28 years in 2001 to 38 years in 2026. In contrast, the median age in Uttar Pradesh is expected to go up from 19 years to 27 years.

- Because of declining fertility level in all the states, the crude birth rates (CBR) will also be declining. By 2021-25, except Uttar Pradesh, no state is expected to have a crude birth rate of 20 and above. The highest CBR of 20.5 per thousand is expected to be in Uttar Pradesh followed by Madhya Pradesh (18.0) during 2021-25. Assam, Chhattisgarh, Bihar, Jharkhand, Rajasthan and Uttaranchal are expected to have CBRs in the range of 16.5-17.6, close to the projected national level of 16.0. In most of the other states, the CBRs will be in the range 12-15. Kerala will be expected to have the least CBR of 12.3 followed by Tamil Nadu (12.5) during 2021-25.

- In contrast to the CBRs, the situation is expected to be different in case of crude death rates (CDR). Because of increase in the expected proportion of ageing, in some of the states namely, Himachal Pradesh, Punjab, Delhi, West Bengal, Maharashtra, Andhra Pradesh, Karnataka, Kerala, Tamil Nadu and North Eastern Region, the crude death rates are likely to increase during 2021-25.

- The infant mortality rate (IMR) is expected to decline in all the states during 2001-25. The IMR, which was highest in Orissa in 2002 at 87, is expected to come down to 52 in 2021-25, followed by Madhya Pradesh (51). Other states, where IMRs are expected to be in the range of 40-50 during 2021-25 are Jammu & Kashmir, Haryana, Rajasthan, Uttar Pradesh, Assam and Andhra Pradesh. The lowest IMR is expected to be in Kerala, from 12 in 2001-05 to 8 during 2021-25. It will be followed by Delhi with IMR declining from 25 in 2001-05 to 18 during 2021-25.

- In so far as the projected sex ratio is concerned, it is observed that in some of the northern states, the population is expected to be more masculine, that is, the ratio will decrease in 2026. Lowest sex ratio of 789 is expected to be in Delhi in 2026, followed by 839 and 840 in Haryana and Punjab respectively. In the southern and eastern states except Kerala, the situation would be reverse. In Kerala, where there are excess females than males in Census 2001, the trend would remain the same in 2026. Tamil Nadu is the other state, where the number of females is expected to be equal to the number of males in 2026.

- State-wise proportion of population expected to live in urban areas by 2026. It is observed that by 2026, 99 percent of Delhi's population would be living in urban areas, which is highest among the states, included for projecting the population by component method. In contrast, 12 percent of the population of Bihar would be expected to live in urban areas by the same year (2025), which is lowest among all the states.

Concerns about Population Growth
Although we need not worry about Malthusian fears that population growth in India is outstripping or will soon outstrip the growth of food supply, one cannot deny the fact that population growth is a topic of concern. The incidence of nutritional deprivation in India is among the highest in the world .general undernourishment what is sometimes called protein energy malnutrition is nearly twice as high in India as in sub Saharan Africa on the average ,the proportion of undernourished children in Africa is 20-40 percent ,whereas the percentage of undernourished Indian children is very high 40-60 percent. The proportion of severely undernourished children in India is above 20 percent in the larger north Indian states. The pressure on environmental resources is no less serious than perspective of food consumption and production. We are suffering from a major problem of overcrowding of habitat and increase in manmade pollution to the cutting of forest and vegetations .rapid population growth leads to excessive pressure3 not only on the environment but also on the social infrastructure, including sewage systems, hospital facilities, railway networks, power grids, garbage processing plants and many other component of the stock of public amenities.

Human Resource Development
Human resource development plays a crucial role in the development of an economy .If there is masses in general which are illiterate or their education level is low, they are unskilled and untrained, and their general health is poor. It means a large scale investment is required in human resource development.

Items	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09
	Actual	**Actual**	**Actual**	**Actual**	**RE**	**BE**
Total Expenditure	7,96,384	8,69,757	9,59,855	11,09,174	13,55,831	14,85,536
Expenditure on Social Services	1,53,454	1,72,812	2,02,672	2,39,340	3,03,490	3,57,381
of which:						
i) Education	75,607	84,111	96,365	1,14,744	1,35,679	1,60,642
ii) Health	34,066	37,535	45,428	52,126	66,423	75,055
iii) Others	43,781	51,166	60,879	72,470	1,01,388	1,21,684
As Percentage of GDP						
Total Expenditure	28.91	27.62	26.76	26.86	28.70	27.91
Expenditure on Social Services	5.57	5.49	5.65	5.80	6.43	6.72
of which:						
i) Education	2.74	2.67	2.69	2.78	2.87	3.02
ii) Health	1.24	1.19	1.27	1.26	1.41	1.41
iii) Others	1.59	1.62	1.70	1.76	2.15	2.29
As Percentage of Total Expenditure						
Expenditure on Social Services	19.3	19.9	21.1	21.6	22.4	24.1
of which:						
i) Education	9.5	9.7	10.0	10.3	10.0	10.8
ii) Health	4.3	4.3	4.7	4.7	4.9	5.1
iii) Others	5.5	5.9	6.3	6.5	7.5	8.2
As Percentage of Social Services Expenditure						
i) Education	49.3	48.7	47.5	47.9	44.7	44.9
ii) Health	22.2	21.7	22.4	21.8	21.9	21.0
iii) Others	28.5	29.6	30.0	30.3	33.4	34.0

Source: Budget Documents of the Union and State Governments, RBI.

Human Development: International Comparison

The 2014 Human Development Report (HDR) presents the Human Development Index (HDI) values and ranks for 187 countries in terms of three basic parameters: to live a long and healthy life, to be educated and knowledgeable, and to enjoy a decent standard of living. India's HDI value for 2013 is 0.586 , positioning the country at 135 out of 187 countries and territories—the lowest among the BRICS countries, with Russia at 57, Brazil at 79, China at 91, and South Africa at118, and slightly ahead of Bangladesh and Pakistan. Significantly, while China improved its ranking by ten places between 2008 and 2013, India's position improved by just one rank (Table 9.4). Thus a lot remains to be done to bridge the gap.

Conclusion

From all the data interpreted we can conclude that in the coming years India's population will continue to rise but at a slow rate, population will continue to urbanize, and it will start to age. By 2026 the total fertility rate for the country as a whole will be approximately two births per women. There will be more female labour force participation , that will help not only the households to generate income but also build a family pattern in which they marry young, have two births in quick succession and get sterilized. The average life expectancy of both the sexes will continue to rise .Moreover there is scope of future mortality gains .India's future demographic evolution will also have significant implications for the economy, education and the environment. Future population growth will have a major impact not only on food production but also on demand for water which is a resource that will have to be used much more efficiently. The next few decades will surely see the creation of many more districts, and an increasing number of states. According to Robert Cassen poor states are mostly growing slowly economically and fast demographically and better off states are mostly growing fast economically and slowly demographically. In both cases, faster demographic change would bring about faster economic change and vice versa. It is also high time that we bring in effective measures to improve the efficiency, especially in the delivery mechanism, of all social sector programmes in the fields of education, health and employment. More reforms are need in the sector of education and healthcare. But the main problem is to implement these schemes which are poorly implemented to bring out the reforms needed.

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