

A Demographic Bonus for India?
On the First Consequence of Population Aging

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The 'Bonuses' from Demographic Transition

1. Algebraic effect of higher growth rate of working-age population compared with that of total population: Per capita income increases even if output per worker remains unchanged. But this effect is limited to a period 15-40 years following the onset of fertility decline, and may not be realized if unemployment rates rise.
2. The rise in the saving rate as a result of lowered dependency burden in households. This is expected to increase investment rate and rise productivity of labour. But this effect too is temporary.

3. The rise in labour force participation of women as a result of they needing to spend less time in bearing and rearing of children. This effect could be delayed by as much as 30-40 years but would be more lasting than the earlier two.
4. The increase in the quality of labour force as a result of greater investment in child schooling and health – the impact of substitution of quality for quantity during demographic transition. The evidence from India suggests that uneducated couples who are sending their children to school (especially girls) are more likely to be using contraception and having smaller family sizes than who don't.

The first effect follows from the following algebraic relationship between output per capita (\bar{y}) and output per worker (y):

$$\bar{y} = \frac{Y}{N} = \frac{Y}{L} \times \frac{L}{N} = y \frac{L}{N}$$

where N is the total population and L is the total number of workers. By differentiating this expression can be converted to growth rates as

$$g_{\bar{y}} = g_y + (g_l - g_n)$$

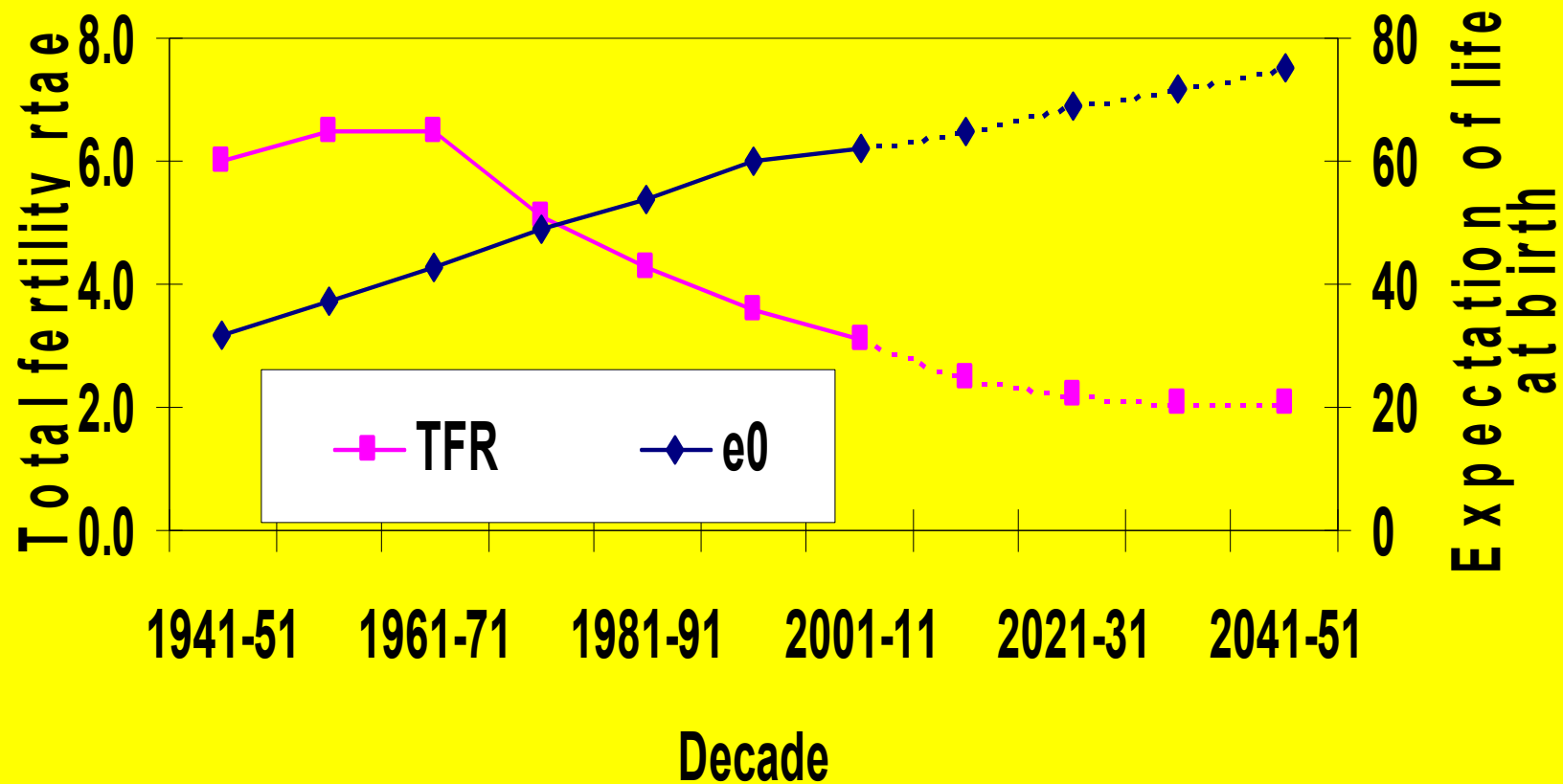
where g_l is the growth rate of total population and g_n is the growth rate of total population.

Effect of dependency burden on saving ratio

$$\frac{\Delta S}{Y} = \Delta s = -\Delta d \frac{(1 - s)}{(1 + d)}$$

In deriving the above expression for the change in the saving ratio, it was assumed that per capita consumption does not change when the dependency ratio falls.

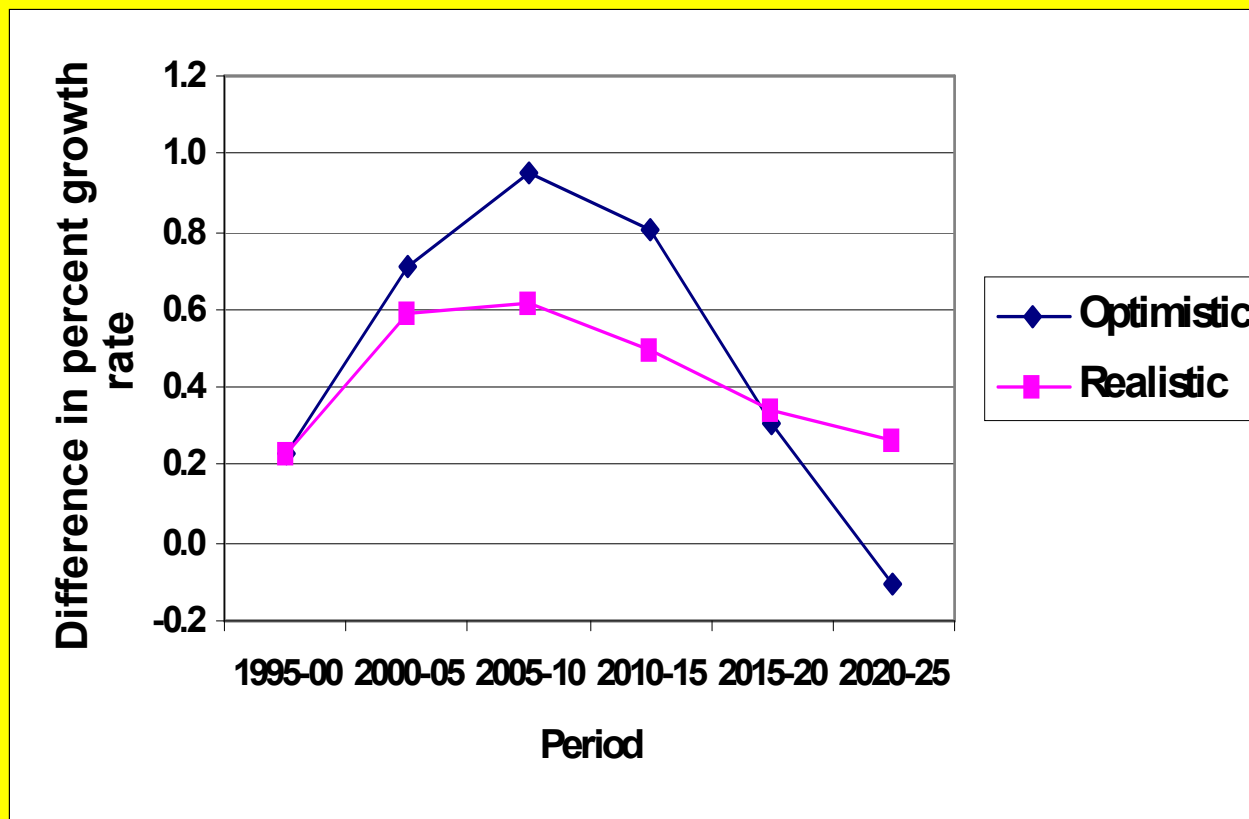
Estimated and projected trends in TFR and e0 India, 1941-2051



Estimated and Projected trends of TFR, e0 and population growth rates

Decade	TFR	e0	Growth rate		Growth rate difference
			All ages	15-64	
1941-51	6.0	32	1.27	1.44	0.16
1951-61	6.5	37	1.96	1.45	-0.51
1961-71	6.5	43	2.20	1.98	-0.22
1971-81	5.1	49	2.20	2.45	0.25
1981-91	4.3	54	2.14	2.44	0.30
1991-01	3.6	60	1.93	2.28	0.35
2001-11	3.1	62	1.52	2.12	0.60
2011-21	2.5	65	1.25	1.67	0.42
2021-31	2.2	69	0.99	1.24	0.24
2031-41	2.1	72	0.82	0.83	0.01
2041-51	2.1	75	0.64	0.53	-0.11

Figure 2: The difference between the growth rate of working-age population (15-64) and growth rate of total population under optimistic and realistic scenarios, India 1995-2025



Deferred Bonus of Demographic Transition

- During demographic transition the reproductive span shrinks which provides a window of opportunity for women to enter the labour force.**
- But initially, continued rapid growth rate of male labour force deters the entry of women.**
- But when the growth rate of male labour force subsides as a result of fertility decline, they get the opportunity to enter the work force.**

- **As a result of this lag, we assume that for India, the female labour force would begin to rise only after 2021.**
- **The actual pace of the increase is also difficult to predict, but in our projections it is assumed that it would rise from 40% in 2021 (current rate) to 60 percent during 2041-51.**

Immediate and deferred demographic bonus from changes in labour supply, India, 2001-2051

Decade	Growth rate		Bonus	Female LFPR (LF)	Bonus from	Growth rate of labour force	Total bonus
	All ages	15-64	from age structural change		change in female LFPR *		
2001-11	1.52	2.12	0.60	0.400	0.00	2.12	0.60
2011-21	1.25	1.67	0.42	0.400	0.00	1.67	0.42
2021-31	0.99	1.24	0.24	0.472	1.66	2.90	1.91
2031-41	0.82	0.83	0.01	0.540	1.34	2.18	1.35
2041-51	0.64	0.53	-0.11	0.600	1.05	1.58	0.94
Average	1.04	1.28	0.23	0.48	0.81	2.09	1.04

* Derived as the growth rate of $(1+LF/LM)$, with LM as .85.

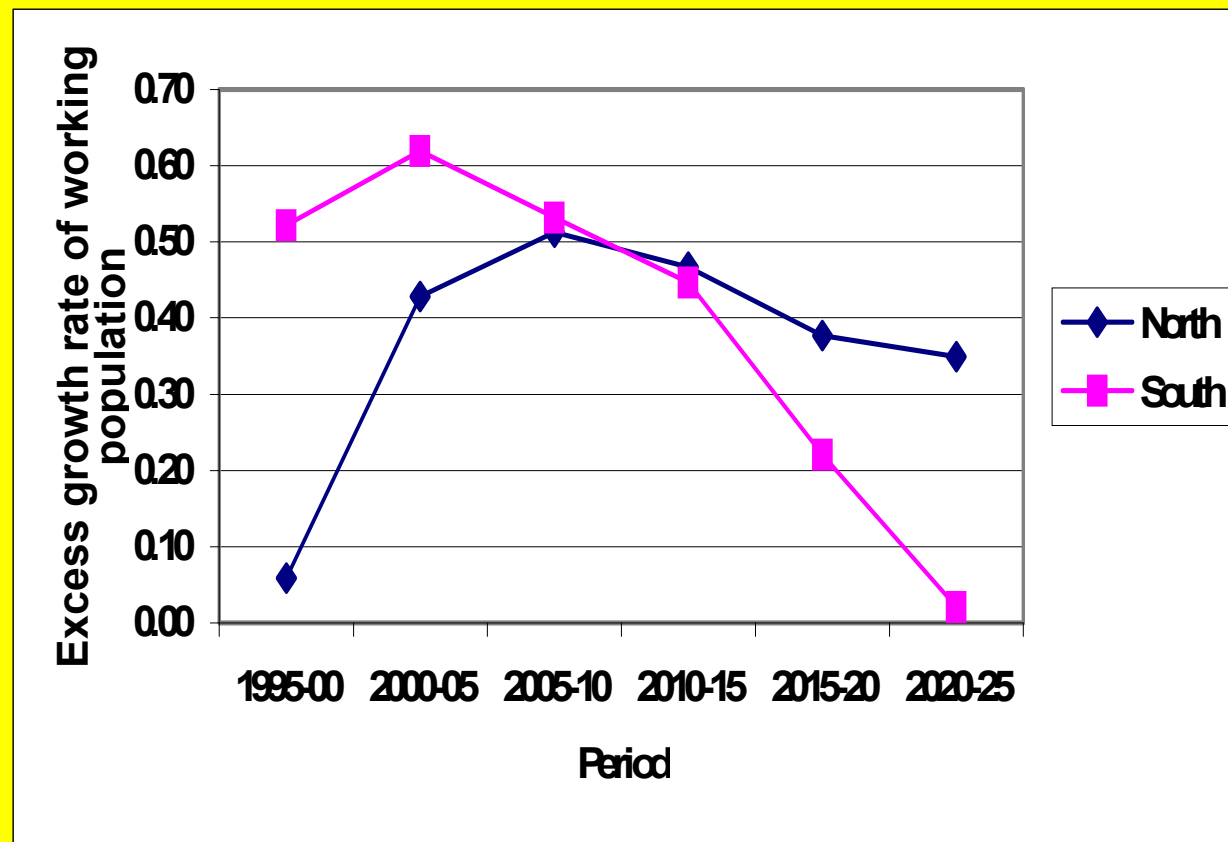
Projected trends in dependency ratio, saving ratio and growth of output, India 2001-2051

Year	Dependency ratio (d)	Change in saving ratio	Saving ratio (s)	Percent growth in output**
2001	0.671		0.23	5.75
2006	0.623	0.02	0.25	6.31
2011	0.573	0.02	0.28	6.88
2016	0.535	0.02	0.29	7.33
2021	0.509	0.01	0.31	7.63
2026	0.489	0.01	0.31	7.86
2031	0.472	0.01	0.32	8.04
2036	0.468	0.00	0.32	8.10
2041	0.471	0.00	0.32	8.06
2046	0.478	0.00	0.32	7.98
2051	0.488	0.00	0.31	7.87

Projected trends in the difference in the growth rate
of population at ages 15-64 and total population,
Major states, 1991 to 2031

State	Decade			
	1991-01	2001-11	2011-21	2021-31
South				
Kerala	0.50	0.15	-0.20	-0.49
Tamil Nadu	0.77	0.32	-0.14	-0.21
Andhra Pradesh	1.02	0.91	0.11	-0.03
Karnataka	0.67	0.84	0.05	-0.22
West				
Maharashtra	0.69	1.01	0.08	-0.13
Gujarat	0.54	0.80	0.06	-0.26
East				
Orissa	0.40	0.76	0.14	-0.21
West Bengal	0.71	0.88	-0.05	-0.16
Assam	0.70	0.76	0.41	-0.22
North				
Himachal Pradesh	0.58	0.78	0.05	-0.13
Punjab	0.63	0.87	-0.13	-0.21
Haryana	0.47	1.06	0.42	-0.22
Rajasthan	0.38	0.71	0.68	0.14
Madhya Pradesh	0.31	0.79	0.62	0.01
Uttar Pradesh	0.09	0.58	0.58	0.56
Bihar	0.19	0.64	0.64	0.22
All- India	0.35	0.56	0.43	0.07

Figure 3. The difference between the growth rate of working-age population (15-64) and growth rate of total population, north and south India 1995-2025



Conclusions

- **The national income is expected to rise by one percentage point per annum due to the increase in labour supply, as a result of demographic transition, holding output per worker constant.**
- **It is expected to rise further by two percentage points due to the increase in saving ratio.**

Some Caveats

- But as much as 80 percent of the bonus is due to the expected rise the work participation of women, the timing of which cannot be exactly predicted.
- Due to the diversity of India, the overall bonus is expected to spread thinly over a long period of time.
- Bonus would not be realized without massive effort to create new jobs, especially those that could put illiterate and semi-skilled labour force to work.