

# **Demographic Transition in India**

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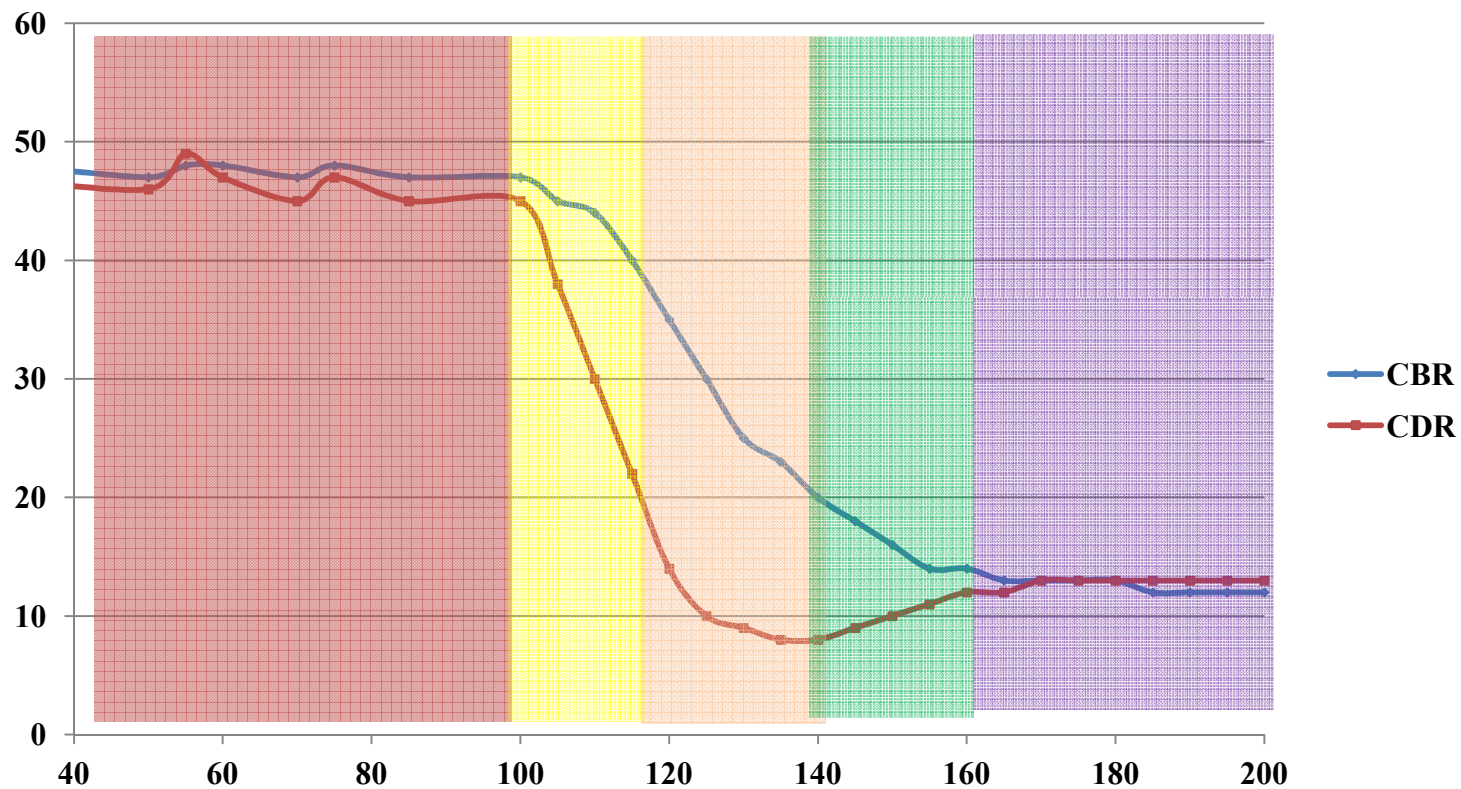
# Classical Demographic Transition

## Thompson-Notestein-Blacker

- Transition from a regime of nearly equal high birth and death rates to nearly equal low birth and death rates
- Generally, the death rate begins to decline first but the birth rate remains high resulting in population growth
- After a lag, the birth rate also begins to fall but the decline in the death rate continues and population growth continues
- Over time, decline in the death rate slows down and nearly stops and the declining birth rate nearly equals the low death rate so that gradually the growth rate approaches zero
- The population may stay at the low replacement level or the birth rate may actually fall below the death rate, leading to slow population decline (incipient decline)

# Classical Demographic Transition

## A stylistic view



The phases are :

**Pre-transitional:** High and nearly equal birth and death rates

**Transitional:** declining death rates and after a lag, birth rates

*Early transitional:* Decline in death rates but high birth rates continue

*Middle transitional:* Decline in birth rates and continuing decline in death rates

*Late transitional:* Continuing decline in birth rates and slowdown in the fall in death rates

**Post-transitional:** Low and nearly equal birth and death rates

The gap between the birth and death rates during the transition leads to  
**‘transitional growth’**

The population thus moves from an undesirable (of high mortality) regime of replacement level to a desirable (low mortality) replacement level

# What about India?

The experience of many European countries followed the classical transition

Many Asian and Latin American population have followed or are following this pattern but with differences in timing and pace

What about India?

Recent evidence shows that India too is following the pattern but with a late beginning and slower pace

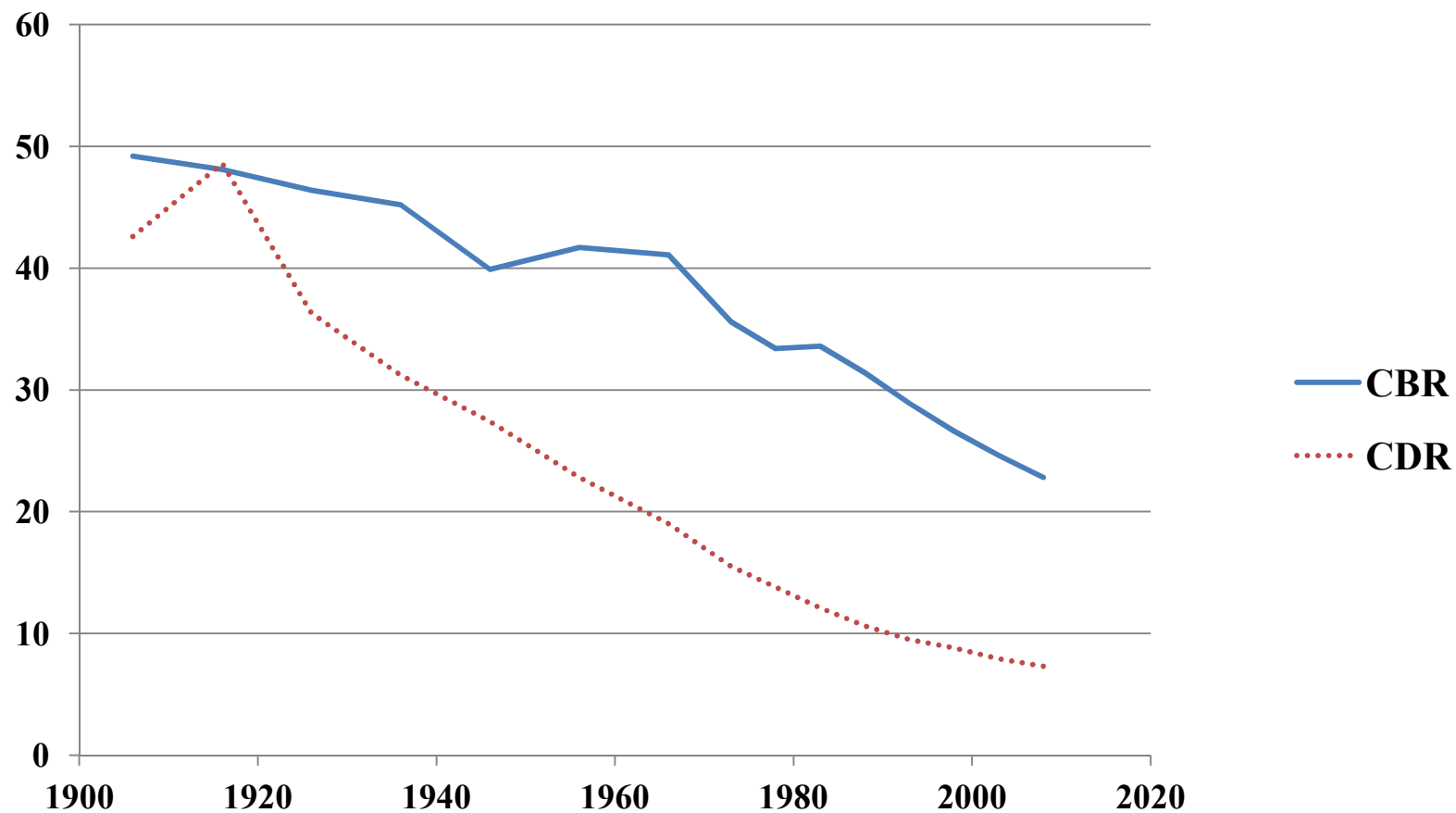
The death rate began to fall after 1920 but the birth rate remained high up to the 1960s opening up a gap and consequent population growth

The birth rate began to fall much later, after 1960s but the death rate continued to decline continuing population growth

The gap seems to have narrowed in the last decade with a small decline in the population growth rate

Clearly, India is **passing through the demographic transition** and is moving from the middle transitional stage to the late transitional stage

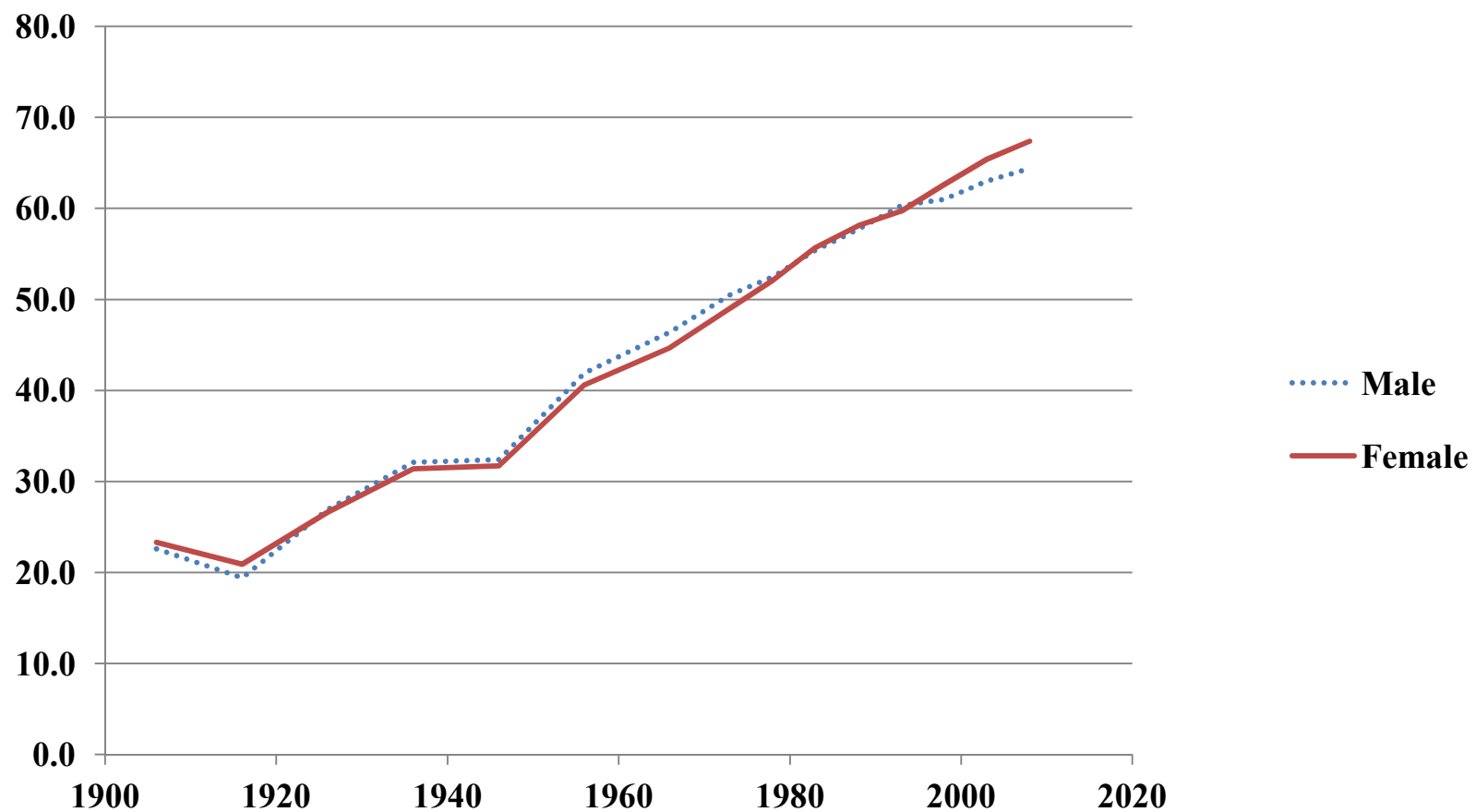
# Trends in CBR and CDR, 1901-2011



# Trends and Differentials in Mortality

- The CDR was **very high, over 40 per thousand**, during early years of the twentieth century but fell steadily to below 40 in the 1920s, below **30 in the 1940s**, and further **below 20 after 1960**. It has been less than 10 since the 1990s.
- The **life expectancy** in India has increased from a **low of 20 years** during 1911-20 to over 30 during 1931-40, crossed 40 years during 1951-60, 50 years in the mid- 1970s, and **60 in the early 1990s**.
- Broadly, there has been a rise of about 10 years in the expectancy every two decades. The latest data on ASDR show a life expectancy of just over **65 years, 64 for males and 67 for females during 2006-10**.
- Female expectancy had fallen below male expectancy during the middle of the century but the gap is in favour of females now; however, this gap is less than that seen in most countries.

# Trends in life expectancy, 1901-2010

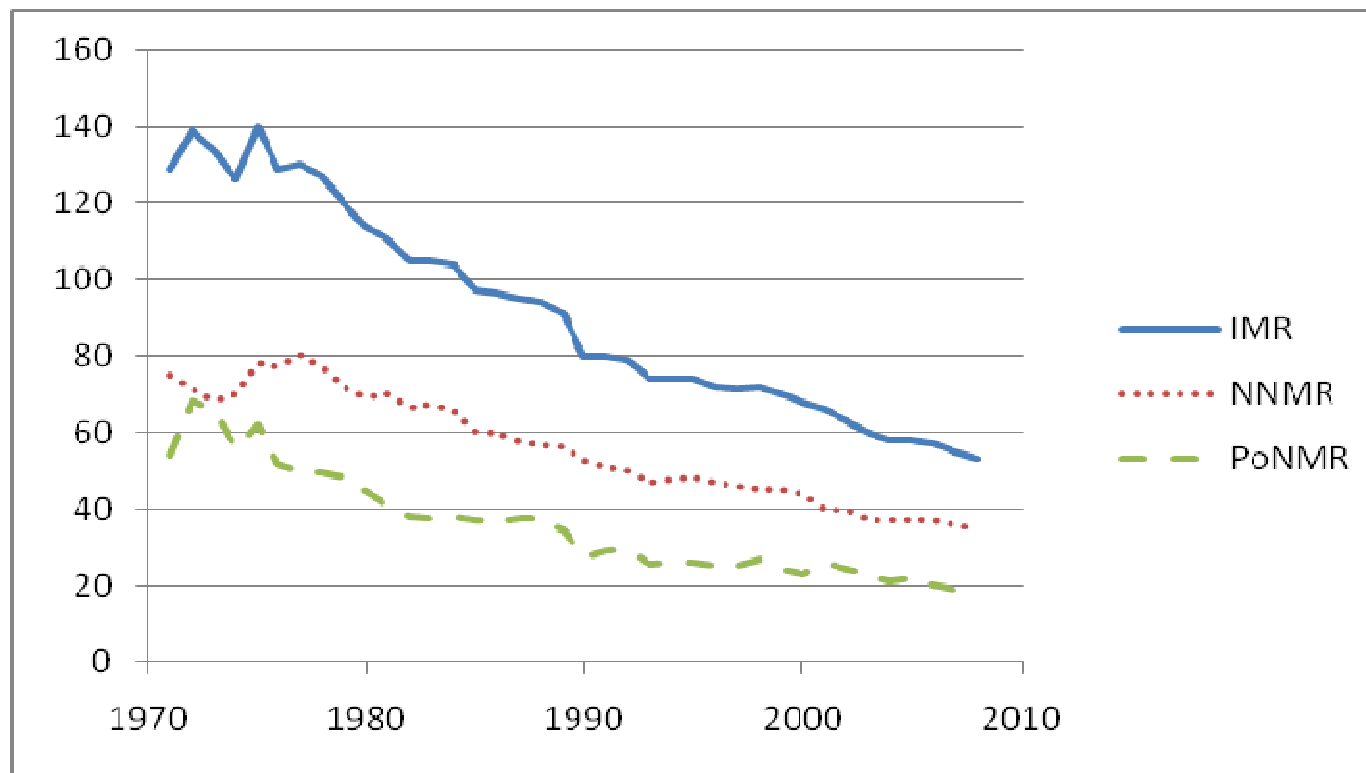




# Early childhood mortality

- The Infant Mortality Rate (IMR) was well **over 100** per thousand **through the 1970s** but the latest figure, for **2011**, is **44**.
- Similarly, the Under-five Mortality Rate (U5MR) has declined from **over 200 per thousand** (one fifth of newborn not surviving to the sixth year) to **55 in 2011**.
- Though early childhood mortality has fallen, the level is still quite high, well above that in the developed world, but higher than that in many developing countries.
- Moreover, **after 1991, fall in the IMR has not been as steep** as during the 1970s and 80s.
- The **fall in post-neonatal mortality** has been greater than in neo-natal mortality.
- While hardly any sex differential is seen in the IMR, the **U5MR has consistently been higher for girls than for boys**. Female neglect seems to operate especially at young ages.

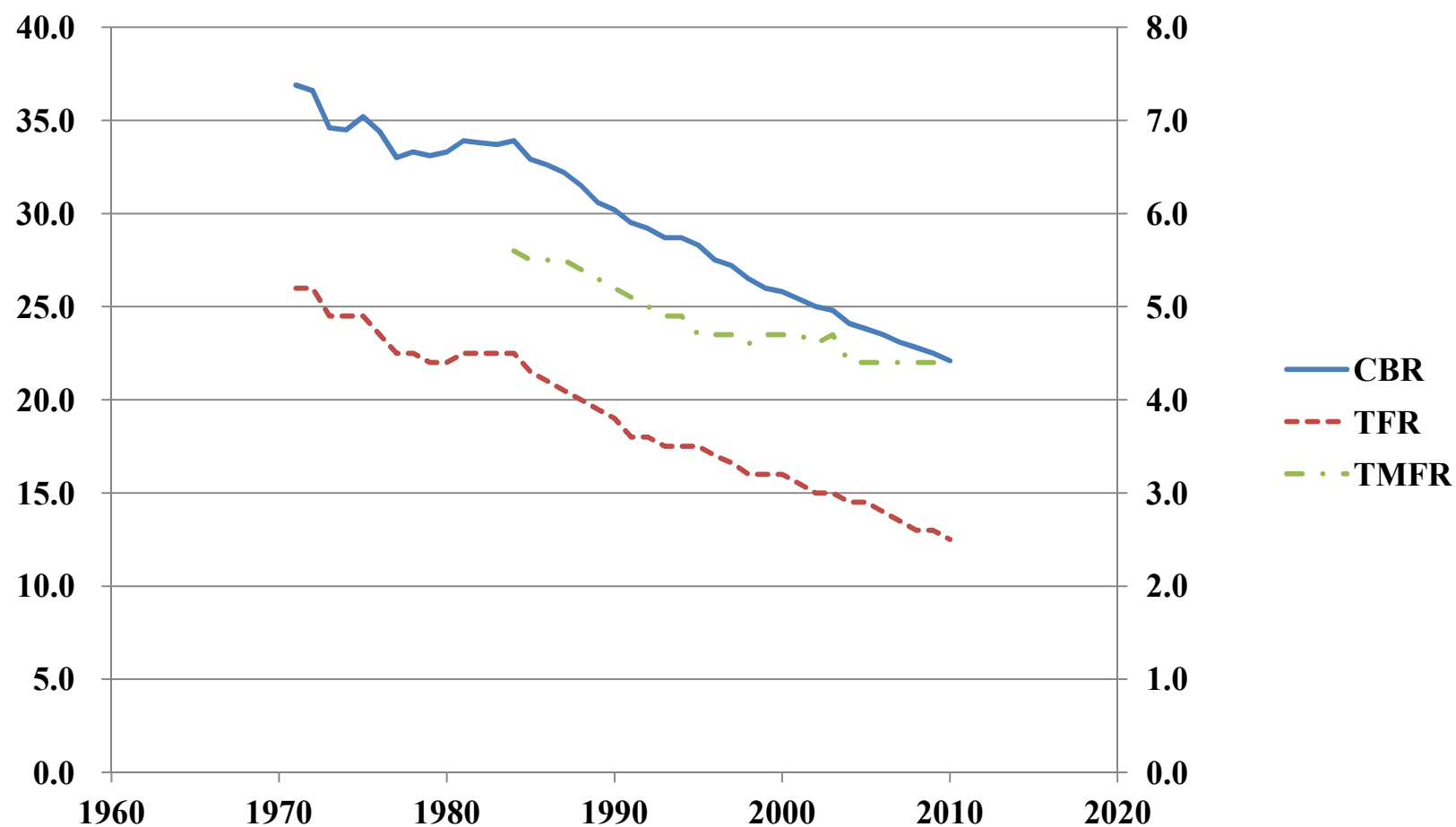
# Trends in infant mortality, 1971-2010



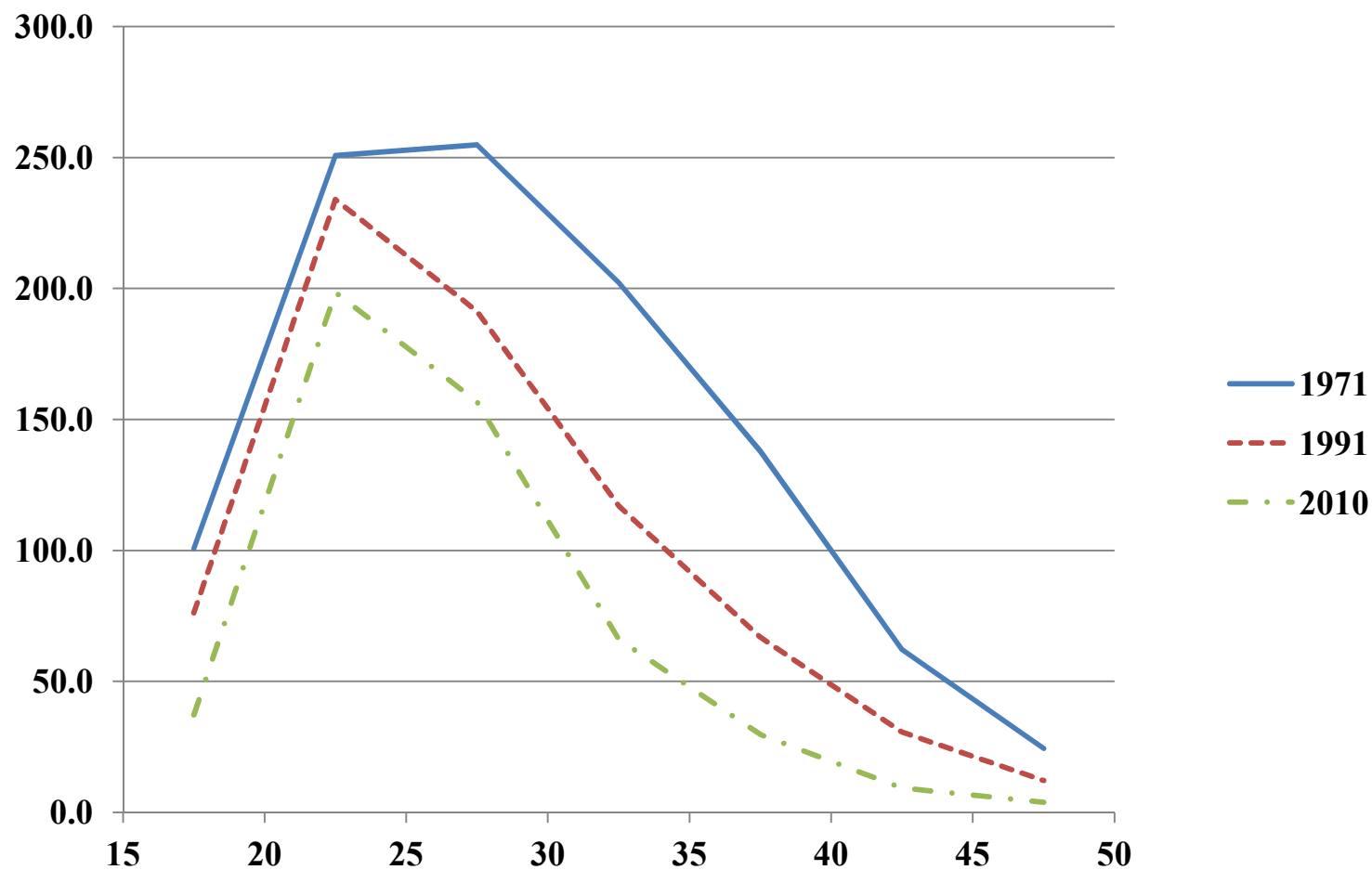
# Trends in Fertility

- Fertility was high in India in the past, with the Crude Birth Rate (CBR) in the **upper 40s** (per thousand population) during the early part of the twentieth century.
- Some **decline** was noticed in the **1940s** followed by a plateau through the 60s with the birth rate hovering **around the 40 point mark**.
- **A steady fall is seen since the 1970s, with the CBR reaching 22.1 and the TFR 2.4 by 2011.**
- There was some stall, through the late 1970s to mid-1980s, but since then the decline has been fairly smooth.
- The age pattern of fertility has undergone a change; ASFRs in the ages over 30 have fallen much more than in other age groups, though a decline is seen at all the ages. **Fertility is now much more concentrated in the prime ages, 20-29 years, than in the past.**

# Trends in CBR, TFR, TMFR, 1970-2011



# Trends in Age Specific Fertility Rates



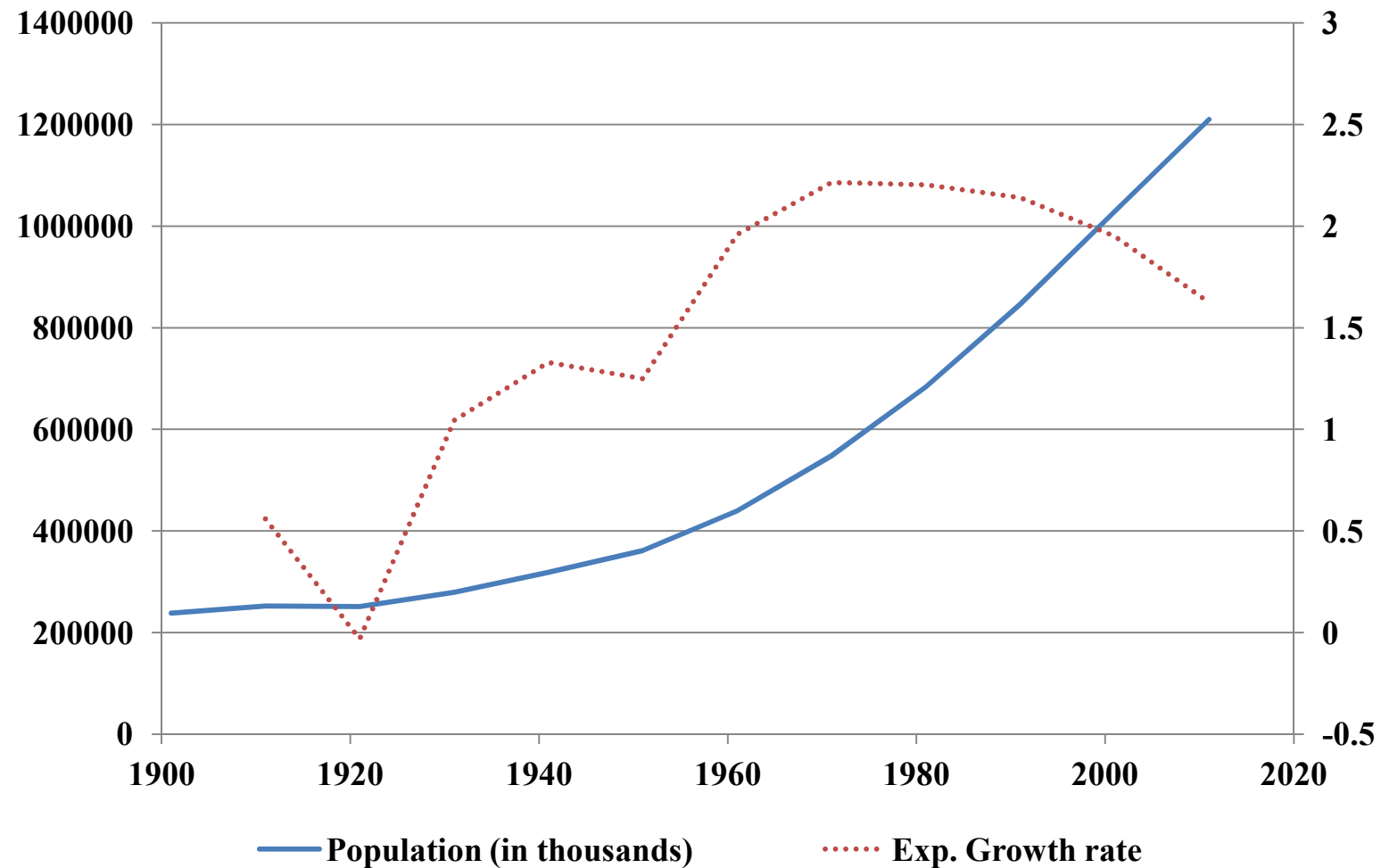
# Fertility Differentials

- Fertility is lower in **urban** areas than rural, among the **more educated** than the less educated, among the rich and middle classes than the poor. Differentials by caste exist but are not very wide.
- **Sikhs and Christians** have lower fertility than Hindus whereas fertility among Muslims is higher than among Hindus.
- Controlled for other factors, the differentials by education persist, as do some by religion, but the rural-urban, income/wealth and caste differences diminish considerably.
- The trends reveal, first, that **fertility decline has occurred in all sections of society**, the poor and the rich, the illiterate and the educated, residents of villages and towns or cities, and in various caste and religion groups. India's fertility decline has been quite pervasive.
- Second, the gaps seem to be narrowing. In other words, fertility transition has been occurring in all sections, but some are ahead of others and have lower fertility than average while some are lagging behind.

# Population size and growth

- As a result of the ongoing transition, India's population has increased from **238 million in 1901 to 1210 million in 2011**, i.e., **more than quadrupled**.
- The pace was **slow up to 1921**, with some decline during the decade of 1911-21 but picked up after 1921 and accelerated after 1951, with decadal increase rising to 20 percent and the period of **1961-91** experienced growth **at a rate exceeding two percent per annum**.
- Some slowing down of the pace was noticed after the 2001 census with the decadal growth still over 20 percent but the annual rate falling marginally below the two percent mark.
- **The latest census has shown a clear fall, to a decadal growth of 17.6 percent and annual rate of 1.62 percent**. In fact, not just the growth rate but the absolute increase has also shown a decline, from 182 million during 1991-2001 to 181 million during 2001-11.
- **Clearly, India's trajectory of growth has turned downward though the population trajectory continues to be upward.**

# Trends in population size and growth rate, India, 1901-2011



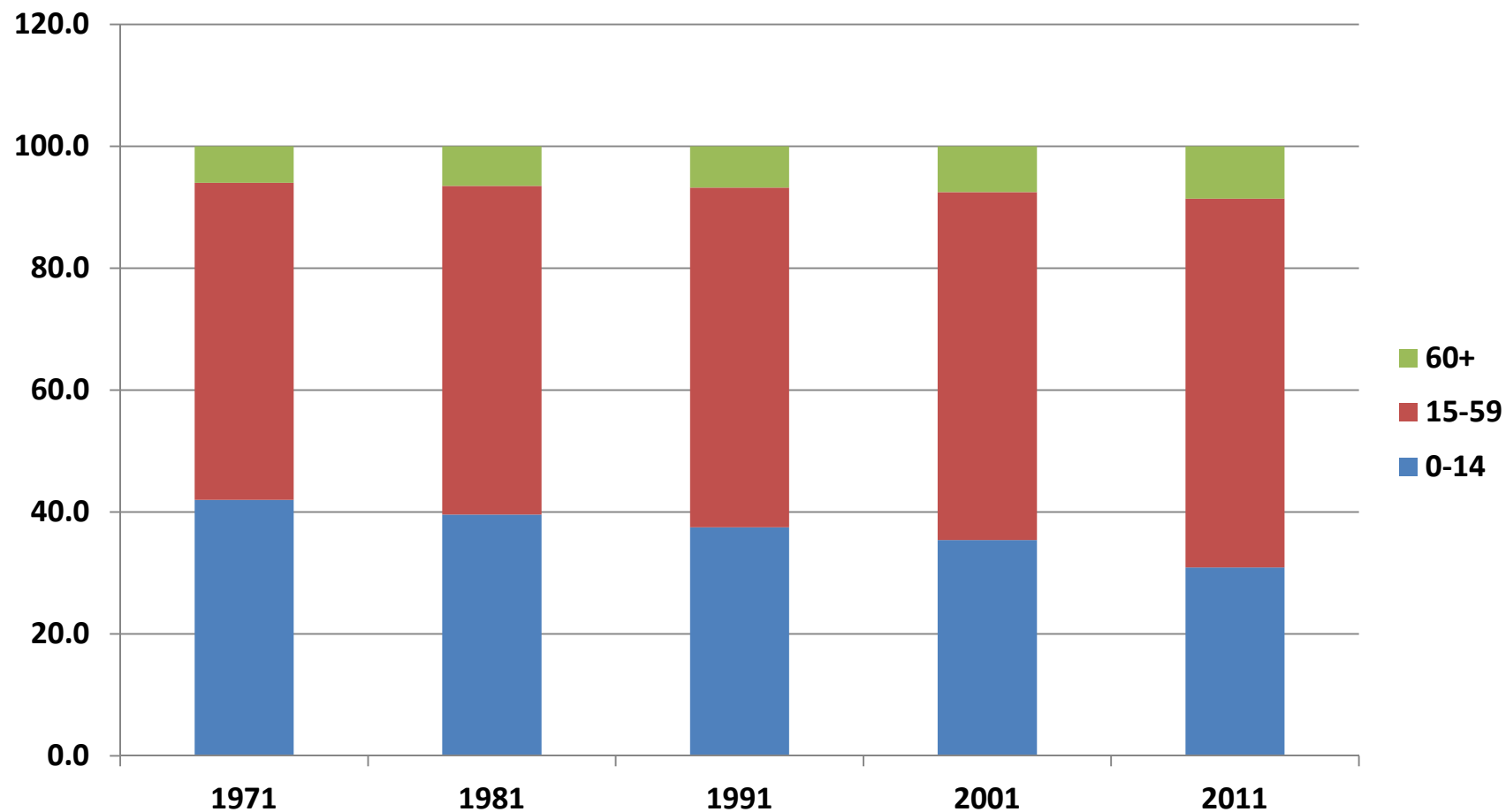


# Changes in Age Structure during the transition

- The population pyramid was wide at the bottom narrowing steeply over age some time ago but by 2001 there occurred **clear shrinking at low ages with the bulge moving upwards** suggesting recent fall in fertility.
- The most conspicuous changes are seen in the shares of the youngest age groups, **0-4 and 5-9.**
- In broad terms, the age distribution has **shifted towards middle ages**, with fall in the share of the child population and a corresponding rise in the share of adults.
- The broad age group **15-59** generally labelled as **working ages** has **gained by over eight points** in its share during 1971 to 2001, from 52.0 percent to 60.5 percent (*for the 15-64 age group, the increase is from 54.6 percent to 63.6 percent*).
- The old ages (60 and above) have also gained but only marginally, from 6.0 to 8.6 percent (*for the 65+ ages, from 3.3 percent to 5.5 percent*). **Ageing has begun to occur in India, but at the moment, only just so.**

- A positive consequence of the change in the age distribution is that the **dependency ratio has fallen, from 92 percent to 65 percent (84 percent to 57 percent if 15-64 age group is treated as “working ages”)**
- Most of this is accounted for by the **drop in the young age dependency ratio** and very little by the old age. Clearly, the requirement of supporting children has come down as couples now have fewer children than in the past.
- The share of the population in **ages 0-6** (that is, below seven years) shows a **steady fall in the recent years**, of about two percentage points per decade.
- The results of the 2011 census revealed that the share of this age group fell from **16 percent in 2001 to only 13 percent in 2011**, a consequence of recent fertility decline.

# Trends in broad age distribution, 1971-2011



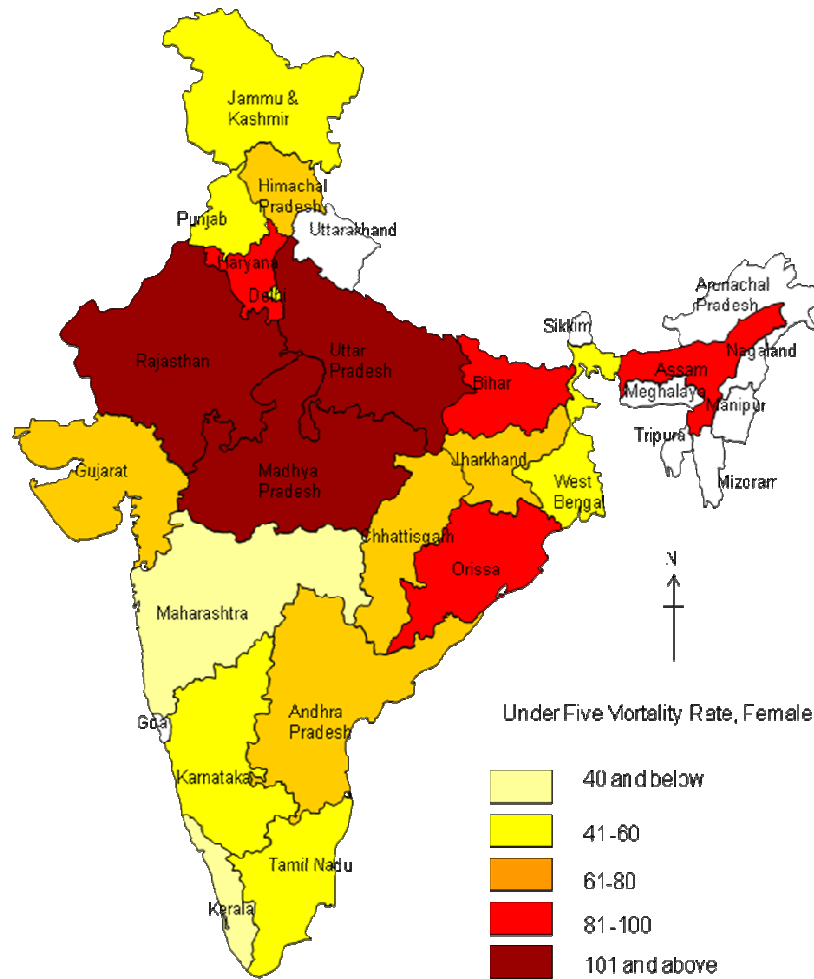
# **Regional Variations in the Transition**

**The transition has not been uniform across the country.**

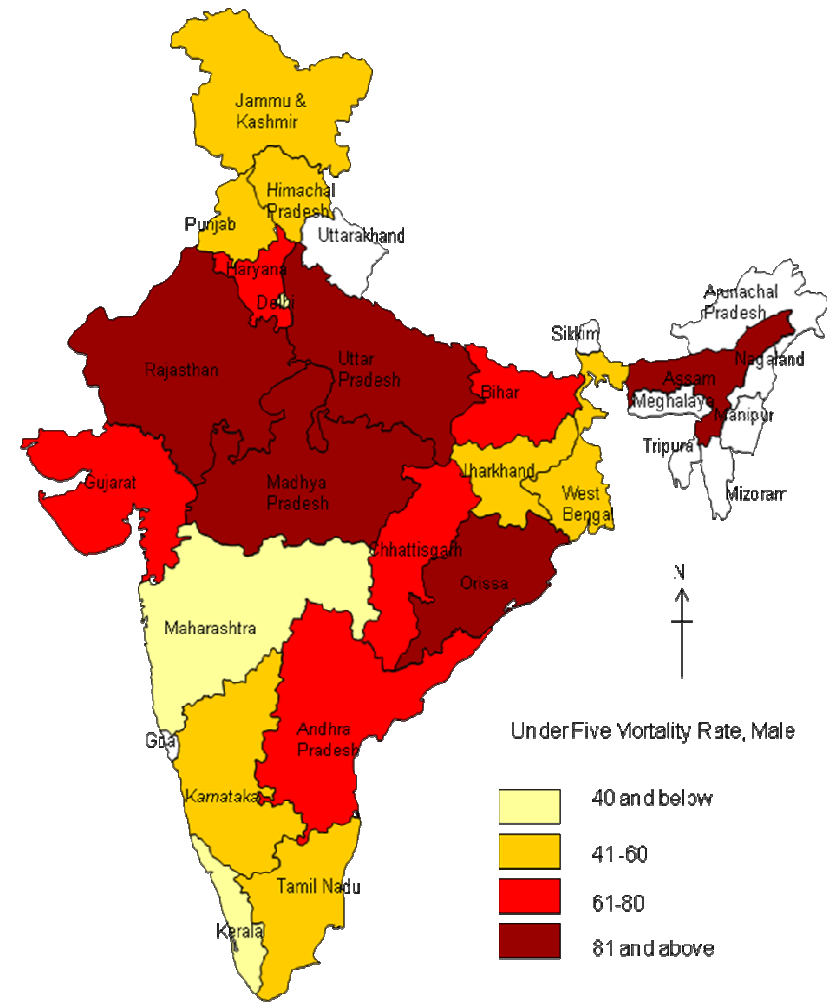
**Both fertility and mortality differ considerably across states  
(and also within states)**

**As a result the pace of transition has also varied**

# Inter-state variations in U5MR, 2011

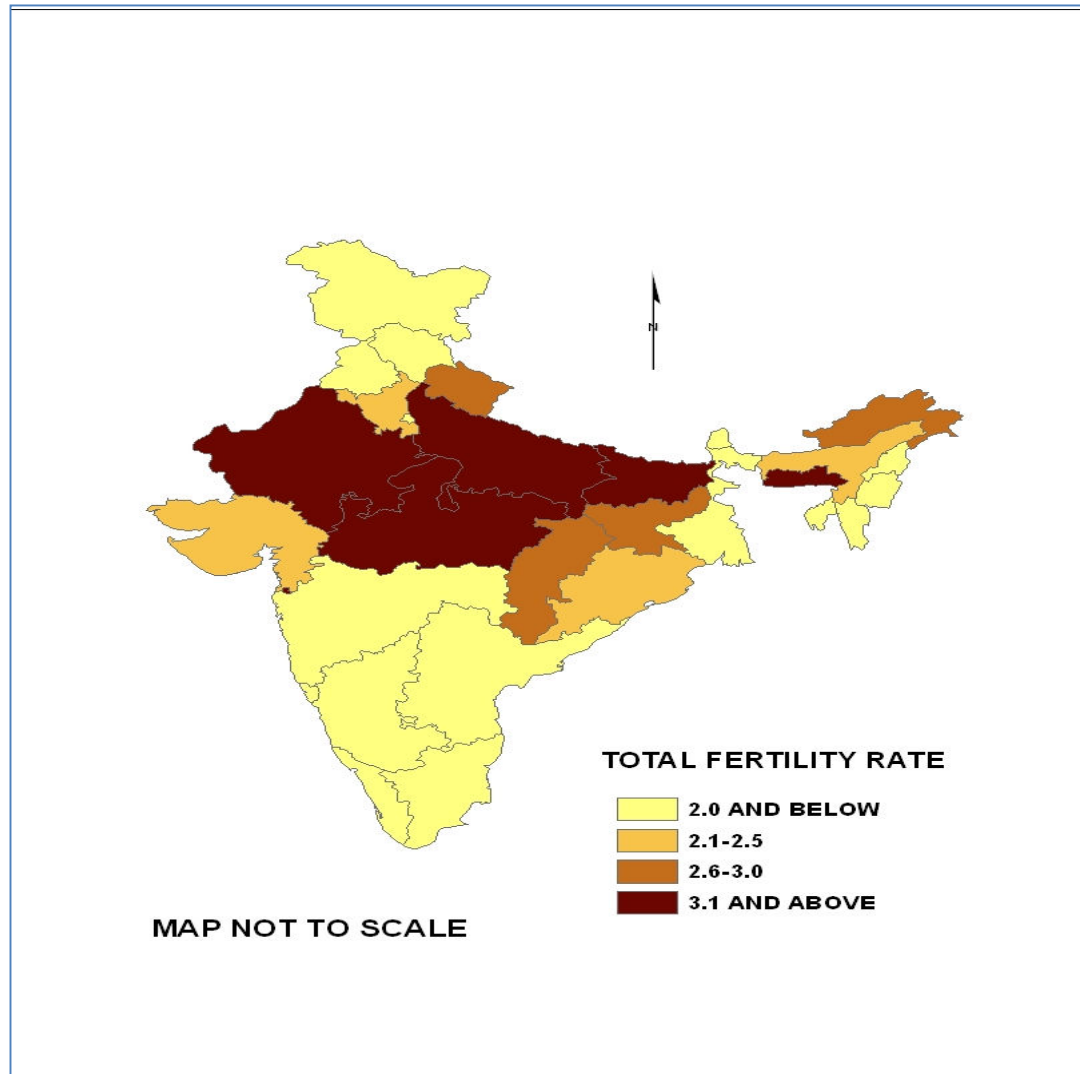


Map not to scale



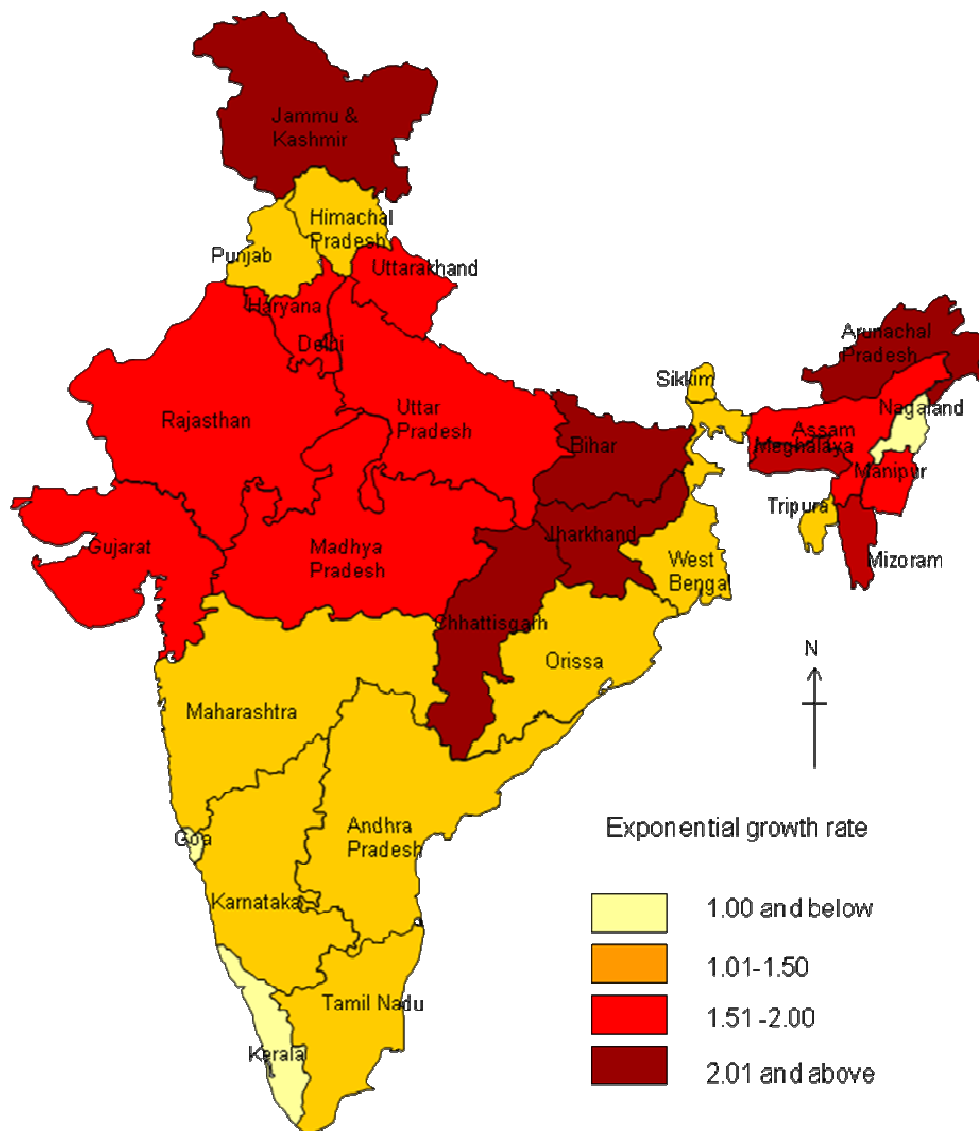
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# Total Fertility Rate in India, 2011



# Variations in growth rate of population

- There are large variations in the timing and pace of change and consequently differences in population growth
- Uttar Pradesh is the largest state in population size, with the 2011 population just under **200 million**, followed by Maharashtra and Bihar each exceeding 100 million. The UT of Lakshadweep is the smallest, with population below 100 thousand (**64,429**).
- Growth has occurred in all parts of the country but not uniformly. **Delhi and Chandigarh** have, as expected **larger rates of increase** than others.
- On the other hand, **Goa, Himachal Pradesh, Punjab and Tamil Nadu** have grown at **relatively lower pace**.



Map not to scale



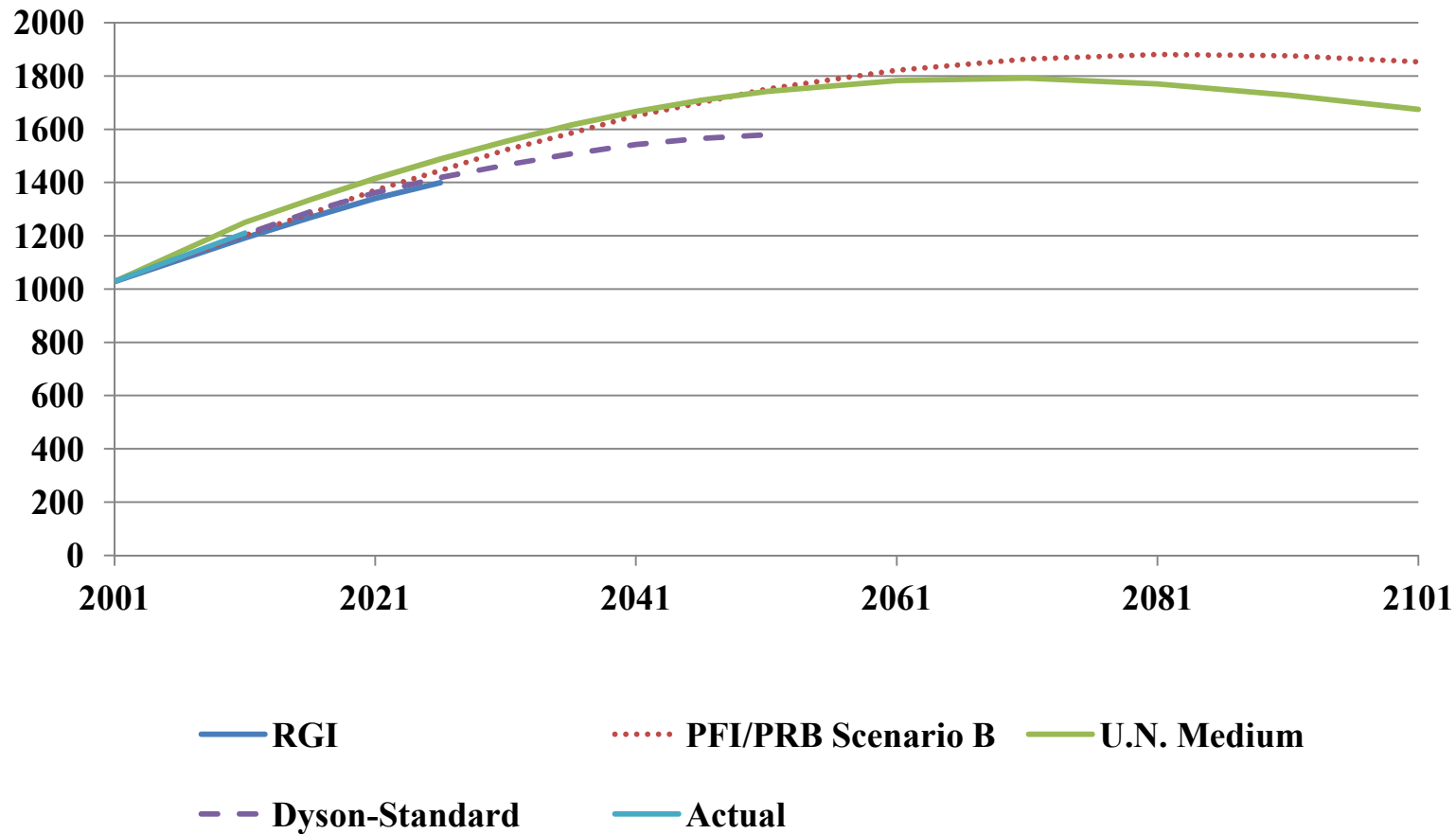
- The timing of the growth has also varied. Kerala was leading both in experiencing rapid growth and in slowing down the pace.
- The decade of 2001-11 exhibits vast differences in the rate of growth; among large states, it has varied between a mere 0.47 percent in Kerala to 2.24 percent in Bihar.
- A consequence of the inter-state variation in growth rates is that shares of states in India's population have changed since 1901. Uttar Pradesh and Tamil Nadu have lost 2-3 percentage points and Assam, Gujarat and Maharashtra have gained more than one point. Notice, however, that while Kerala gained during the first half of the century, Uttar Pradesh lost during the first half and Tamil Nadu during the second.

# **Population Prospects through the century**

- **Fertility is expected to fall further and India's population expected to reach replacement level low fertility and mortality in the foreseeable future.**
- **There is no consensus on when this will happen but most projections expect it to occur well before the middle of the century**
- **There will be growth due to population momentum even after the population reaches replacement level**
- **Various projections place India's population between 1.5-1.7 billion in 2051 and beginning to decline before the end of the century**

# Population Prospects

Various projections place India's population between 1.5 and 1.8 billion by 2051.

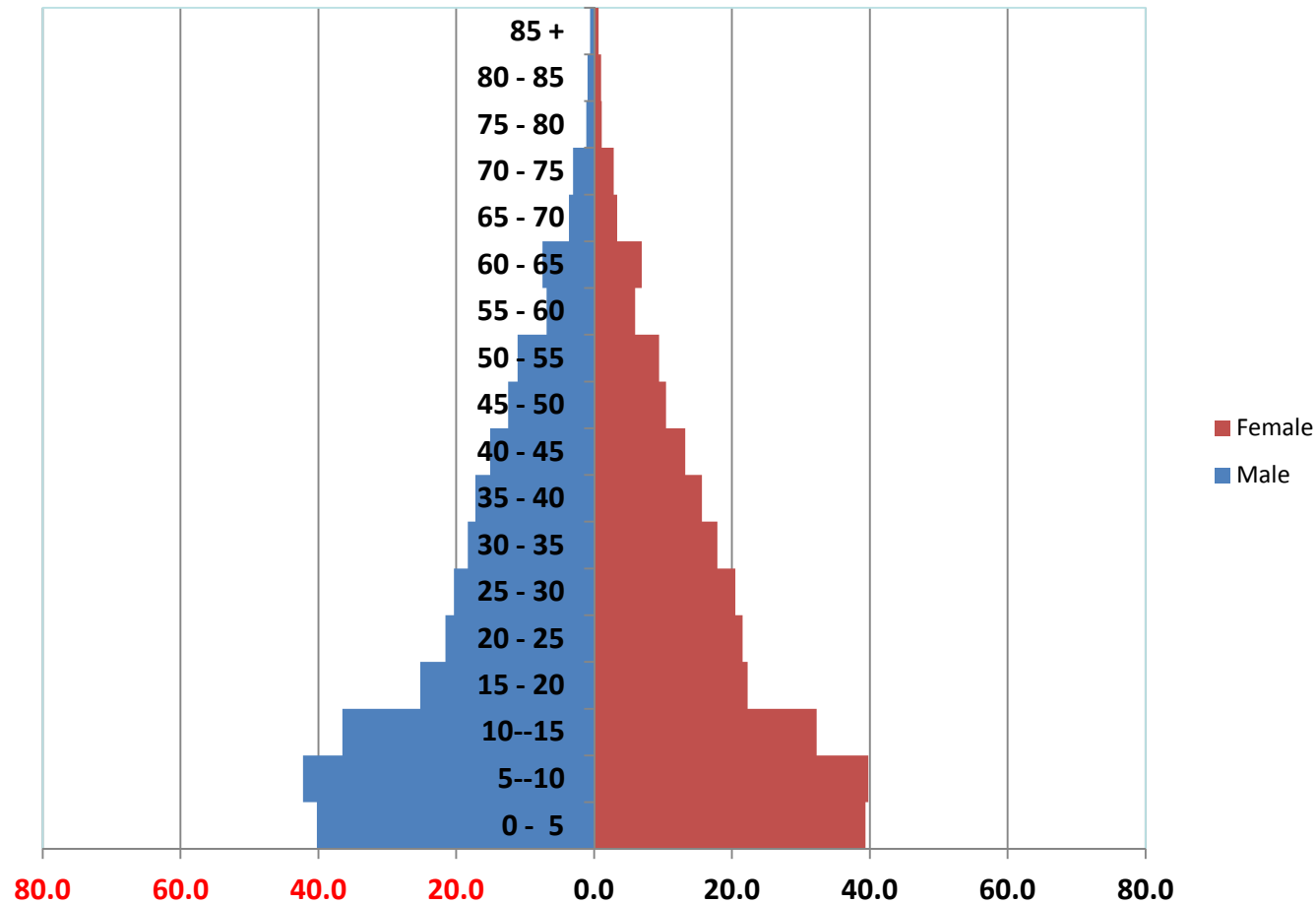


# Change in age structure and ageing

- A consequence of the demographic transition is that the age structure would undergo a major shift, from young to old ages.
- By the middle of the century, the share of the young ages, 0-14 years would fall to nearly half of the level of 2001 and that of the old age group 60 years (or 65 years) and above would more than double.
- Clearly, India's population would be ageing.
- The share of the working ages would rise for some time reaching a peak of 65 percent for the 15-59 year age group (and nearly 70 percent for the 15-64 year group) before beginning to decline.

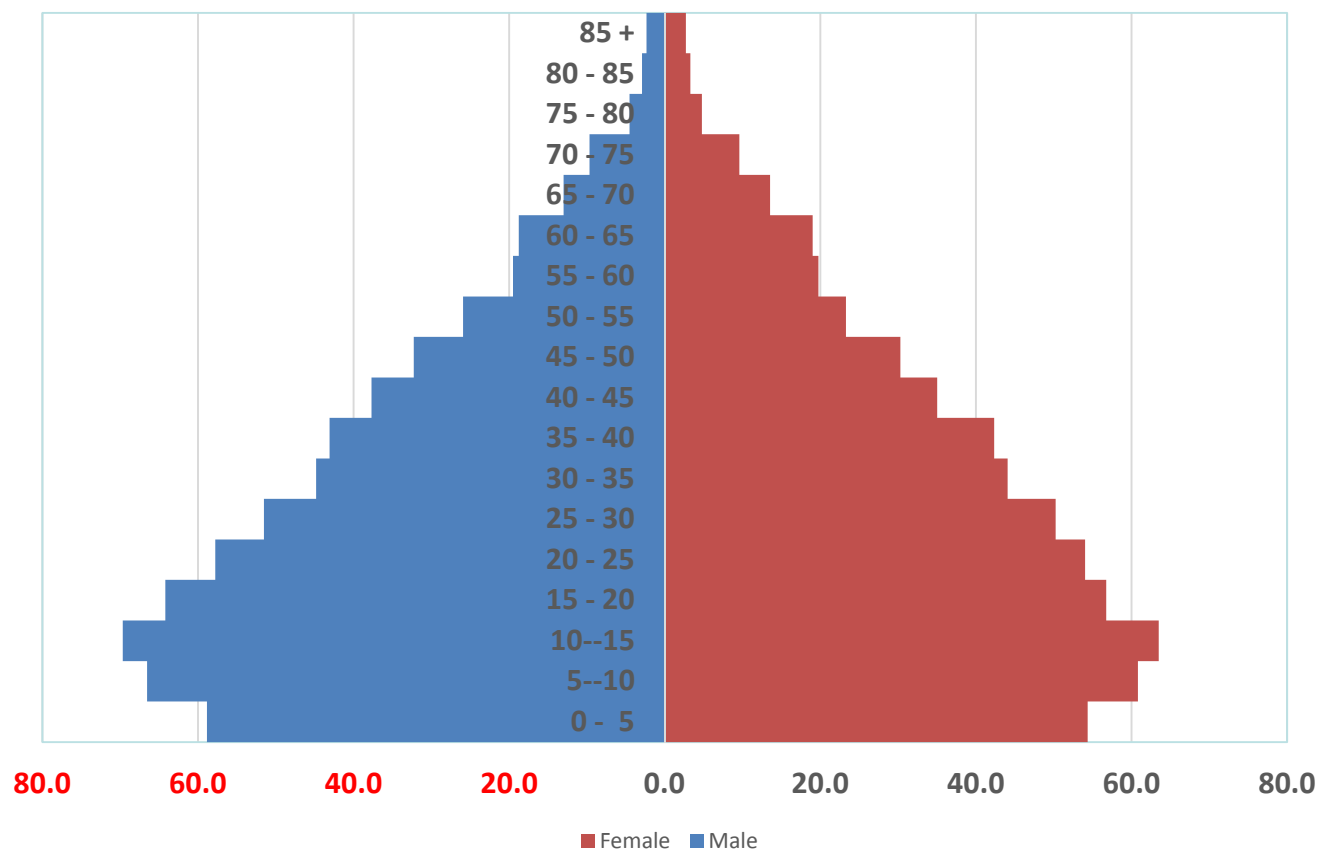
# Population Pyramid, India, 1971

## No demographic dividend



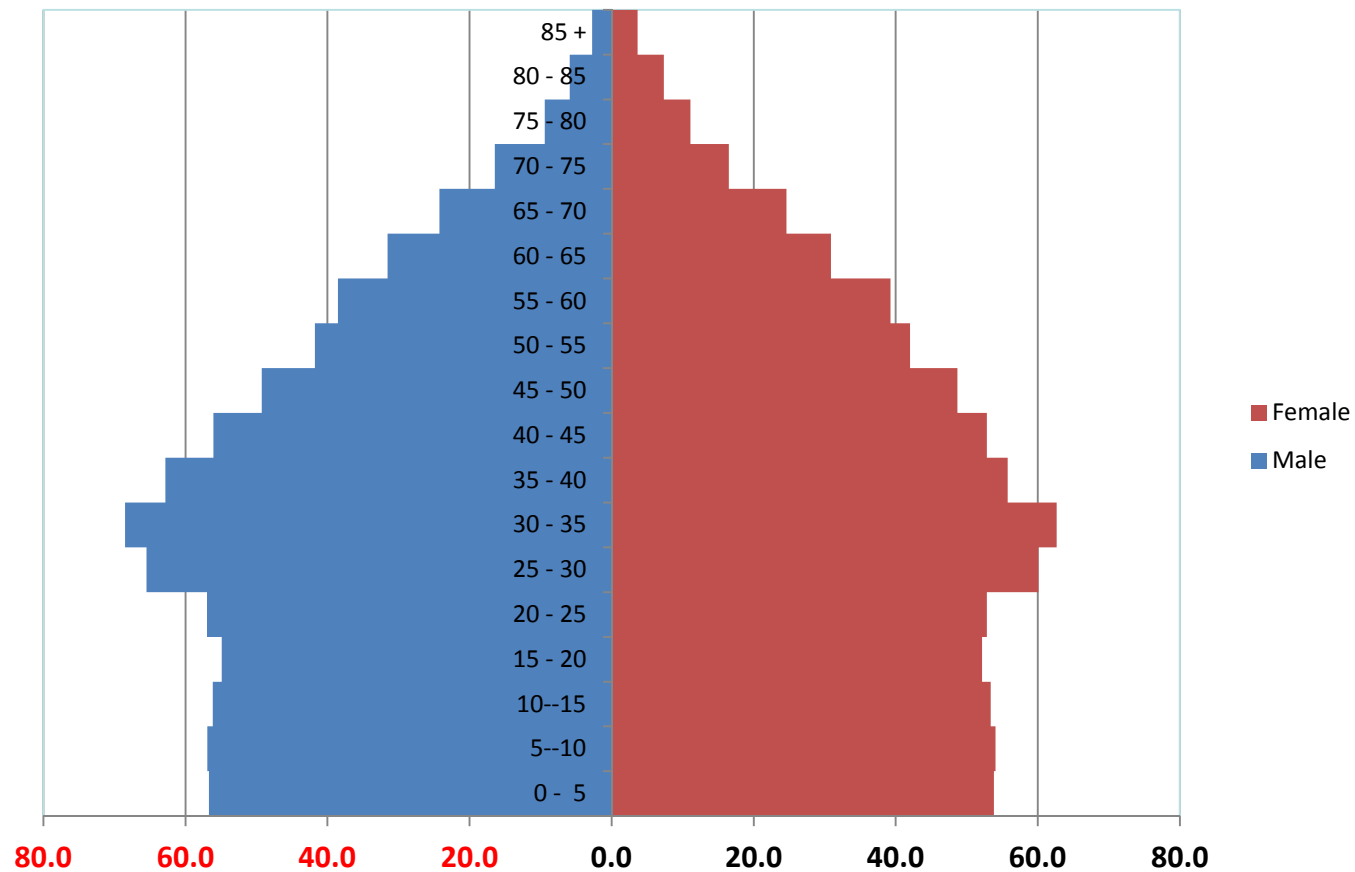
# Population Pyramid, India, 2011

## Demographic dividend emerging



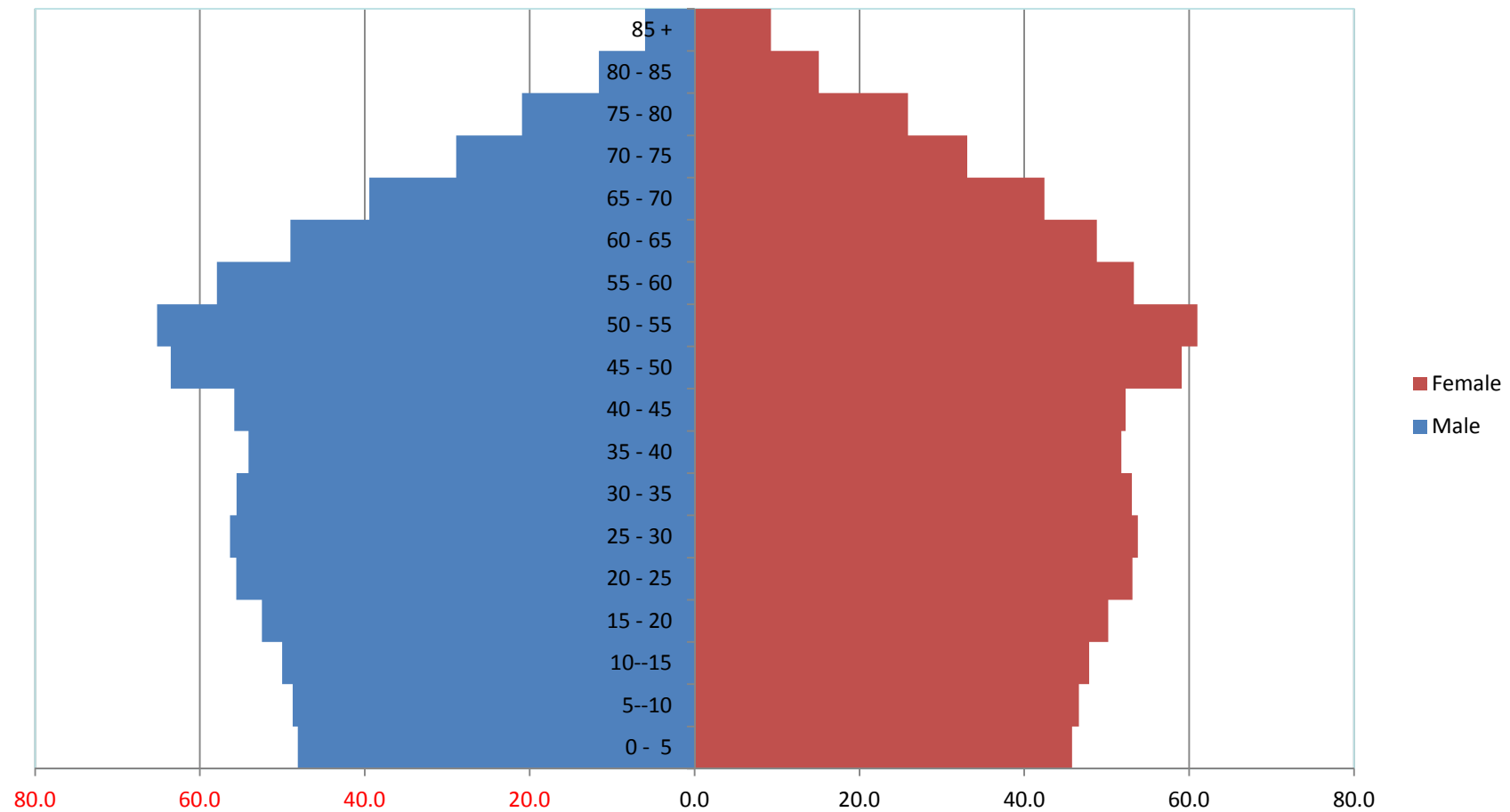
# Population Pyramid, India, Proj. 2031

## High Demographic Dividend



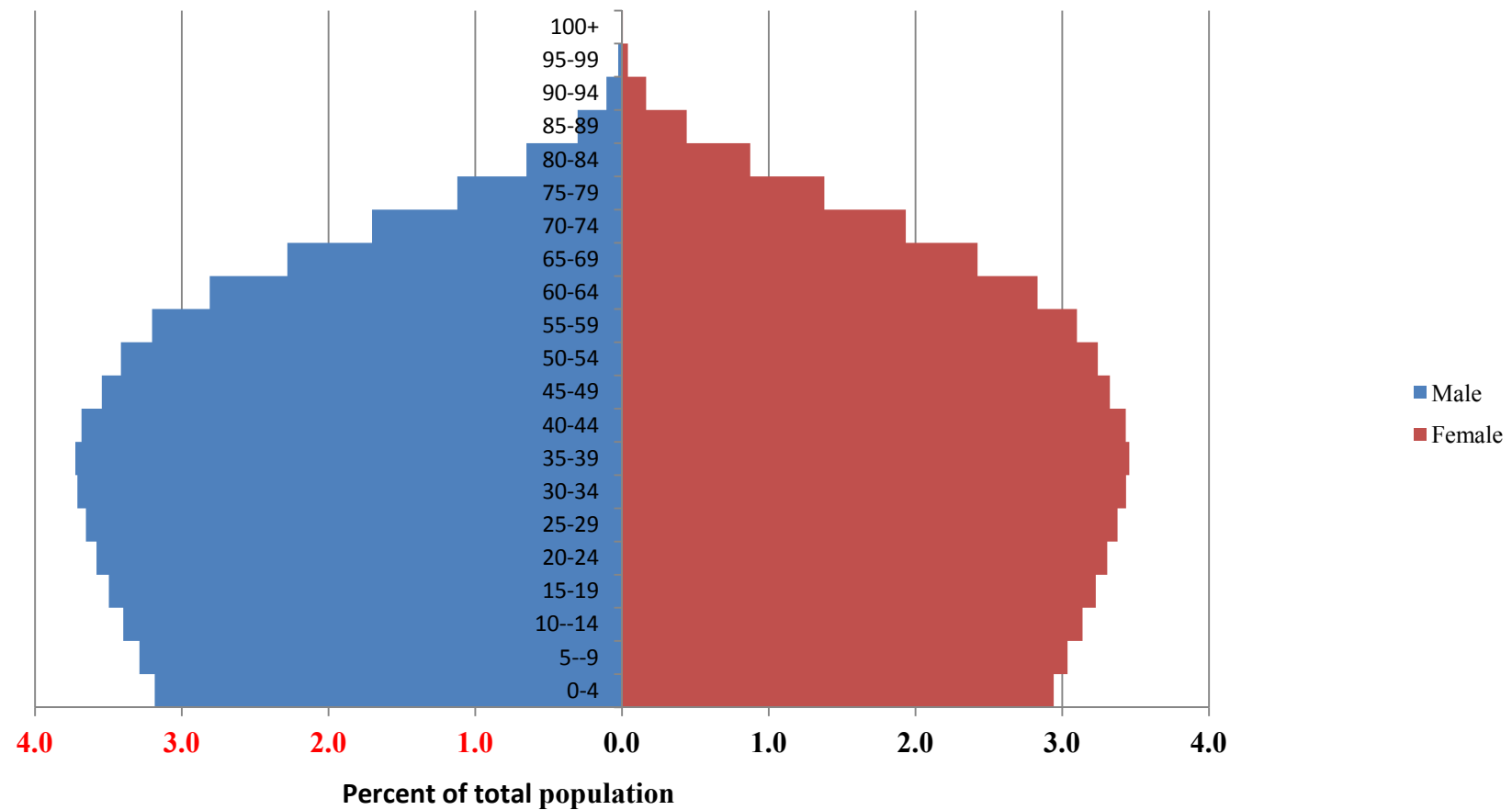
# Population Pyramid, India, Proj. 2051

## Demographic dividend phasing out





# Population Pyramid for India, based on U.N. medium projection



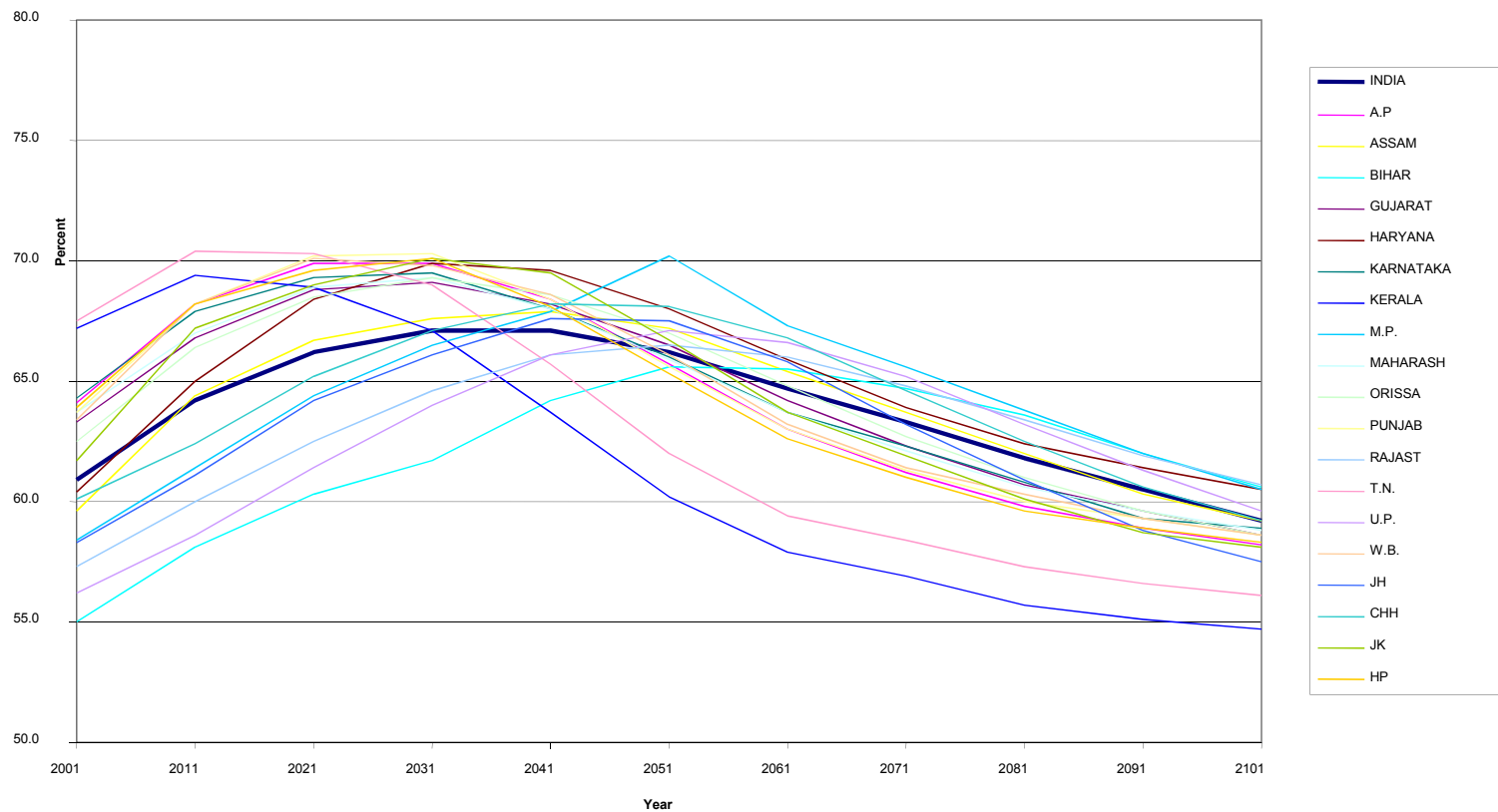
# Demographic Dividend

- This bulge in working ages yields the **demographic dividend**, a situation in which the working age population is well over 60 percent and the **dependency ratio is low**.
- This would be available for some time, the period of **window of demographic opportunity**, through the first half of the century and for some time after that.
- A consequence of India's **staggered fertility transition** is that the **window of demographic opportunity** would be open in different regions during different time periods
- Therefore, India will not draw a high dividend at any time but will draw a moderate dividend over along time

# Dividend in India and States

## PFI/PRB Projections

Fig.3: Percent Population in Ages 15-64  
India and Large States, 2001-2101, PFI/PRB Projections



# Implications of Regional Variations in the Transition

- The variations in the level of fertility, mortality and changes in these have implications for regional population growth and for demographic dividend
- Further growth would vary by states. States that have already achieved replacement level fertility would now experience only some growth due to momentum. **Kerala and Tamil Nadu would not grow much.**
- On the other hand, populations of **Bihar, Uttar Pradesh, and Rajasthan are likely to double** during the first half of the century. These states and many other states, **Jharkhand, Madhya Pradesh, Chhattisgarh** and some small states would grow because fertility is yet to reach replacement level and later due to momentum.

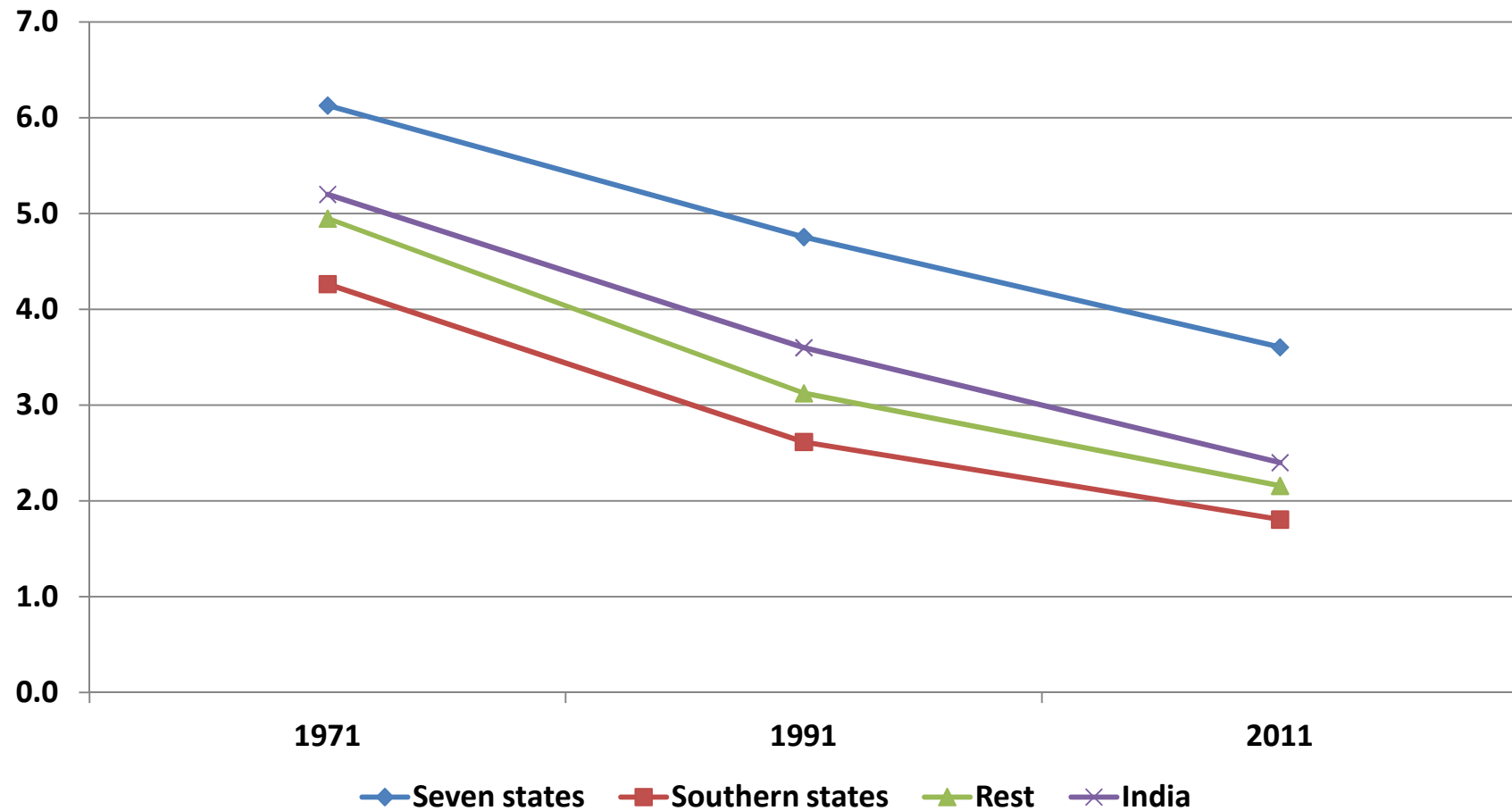
A comparative picture of three regions,

1. Four southern states
2. Seven north-central states (U.P., Bihar, M.P., Rajasthan, Jharkhand, Chhattisgarh, Uttarakhand)
3. Remaining states/union territories, is presented here

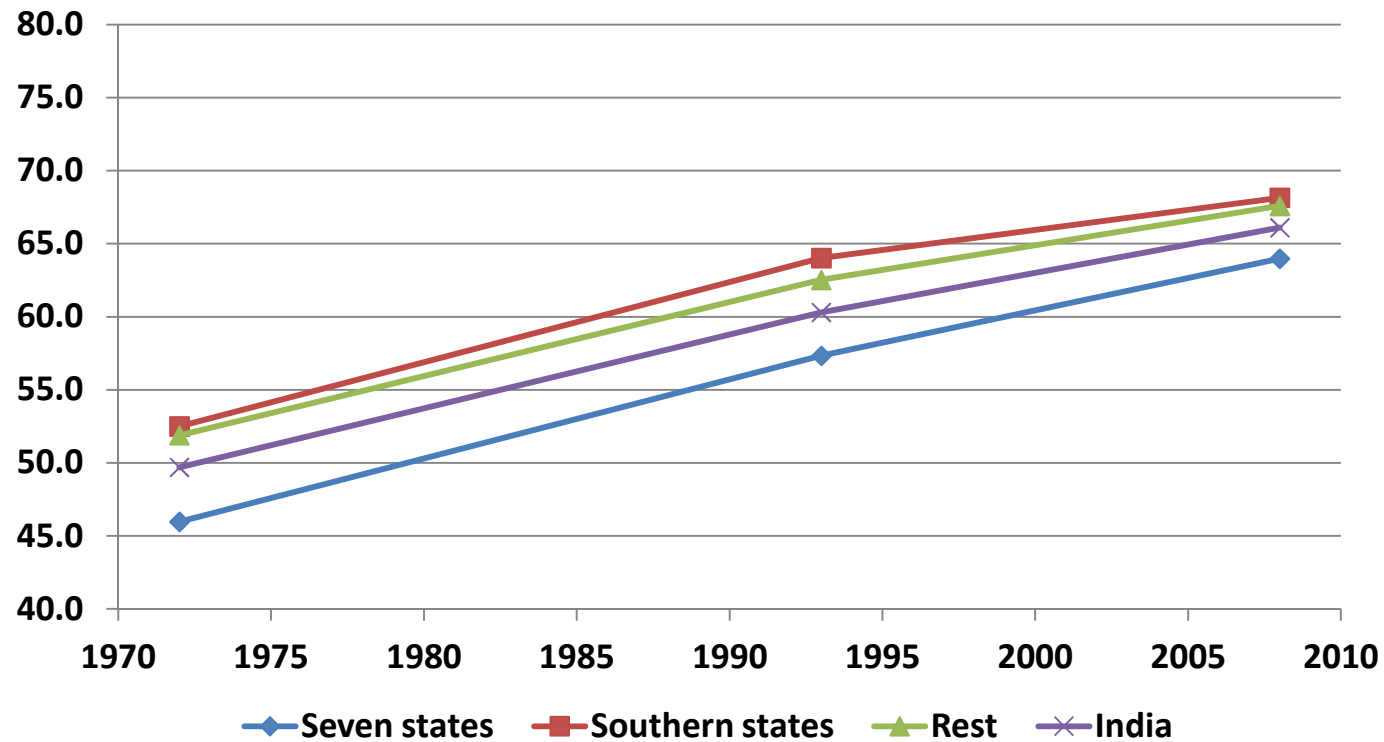
## Some demographic Indicators, India, and Three Regions, 1971, 1991, and 2011

Region	Total Fertility Rate			Life Expectancy		
	1971	1991	2011	1972	1993	2008
Seven states	6.1	4.8	3.3	46.0	57.3	64.0
Southern states	4.3	2.6	1.8	52.5	64.0	68.2
Rest	4.9	3.1	2.0	51.9	62.5	67.6
India	5.2	3.6	2.4	49.7	60.3	66.1

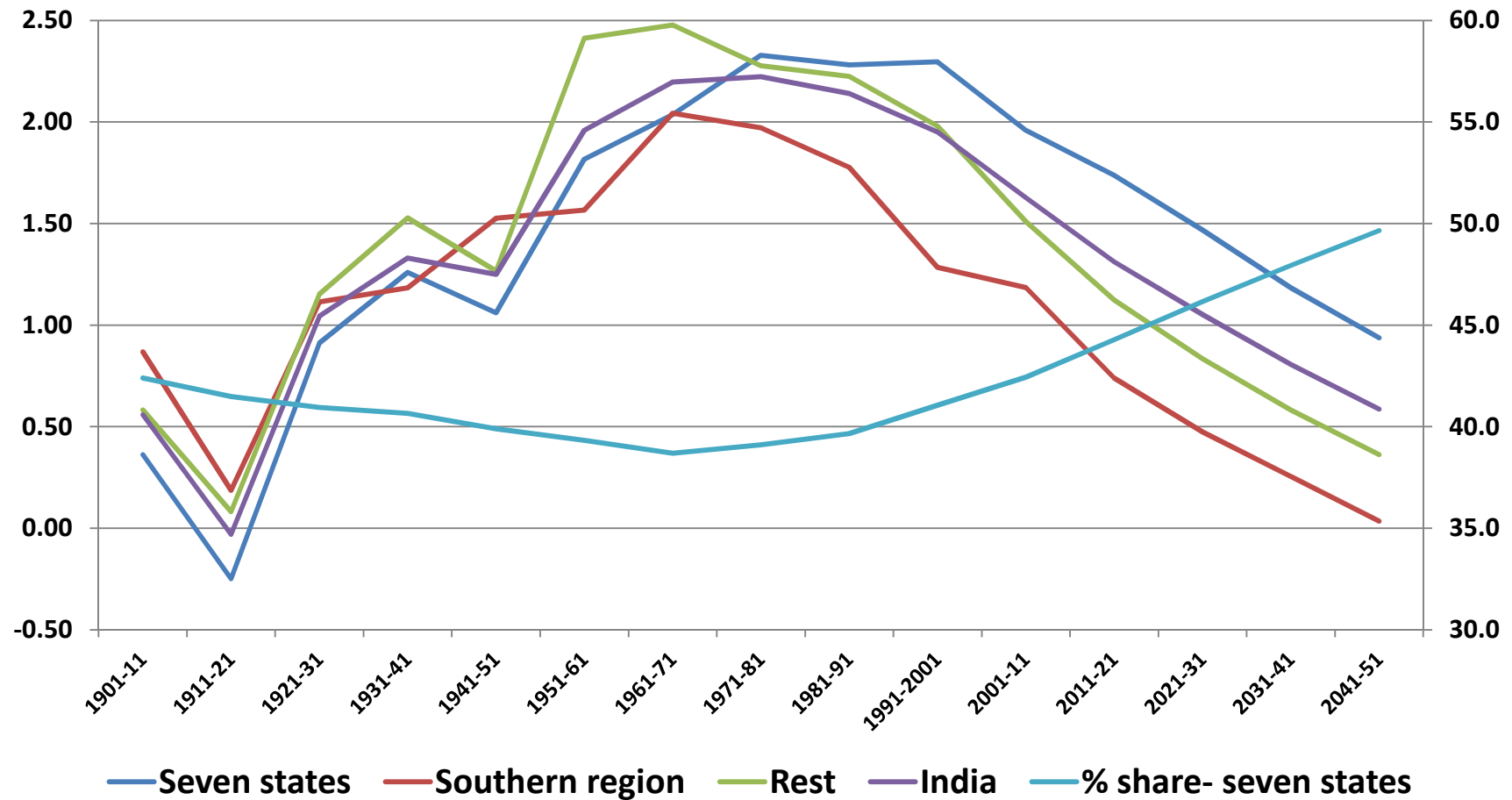
# Trends in Total Fertility Rate, India, and Three Regions, 1971-2011



# Trends in Life Expectancy, India, and Three Regions, 1971-2011

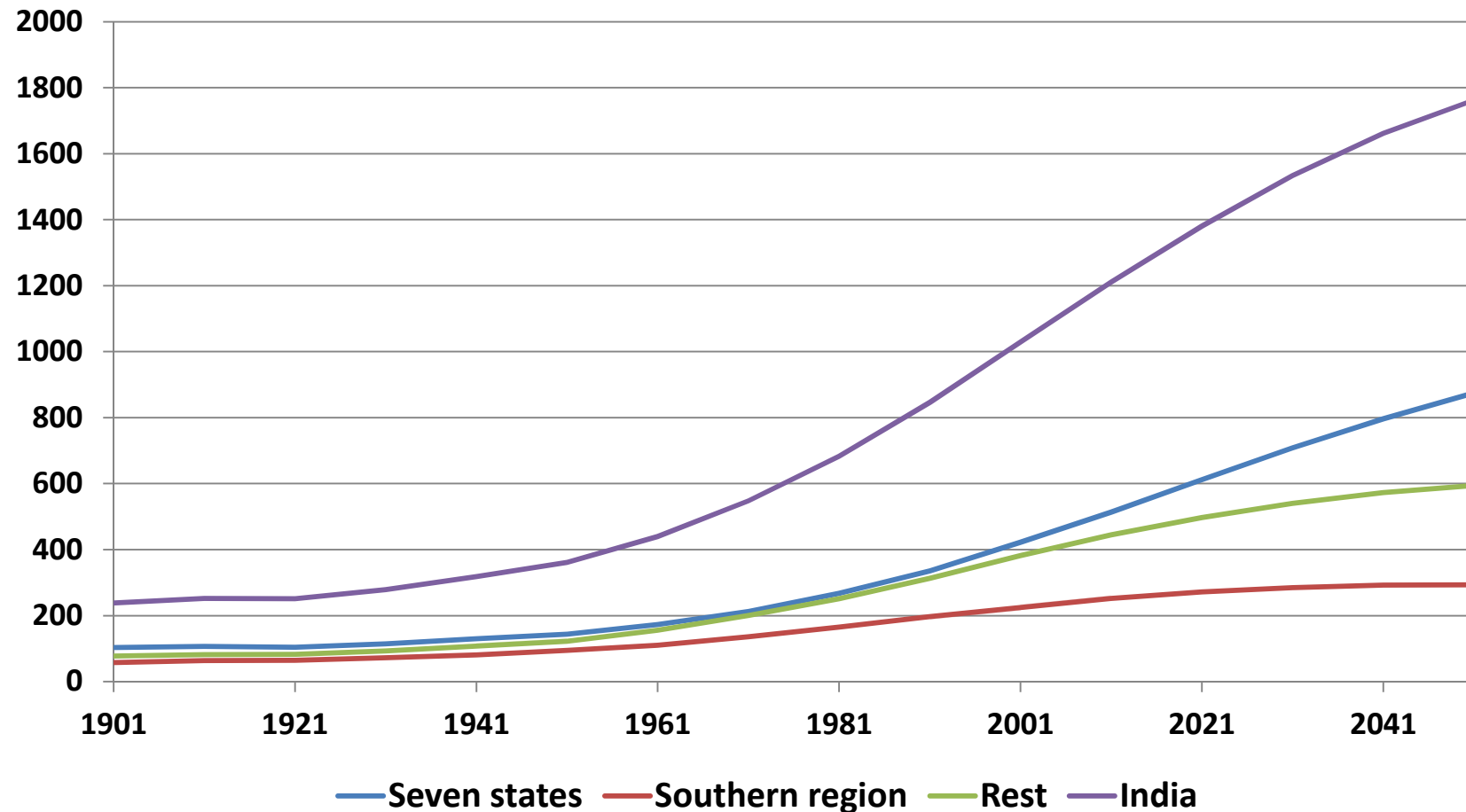


# Population growth rates (% annual), India and three regions, 1901-2011, and projected to 2051

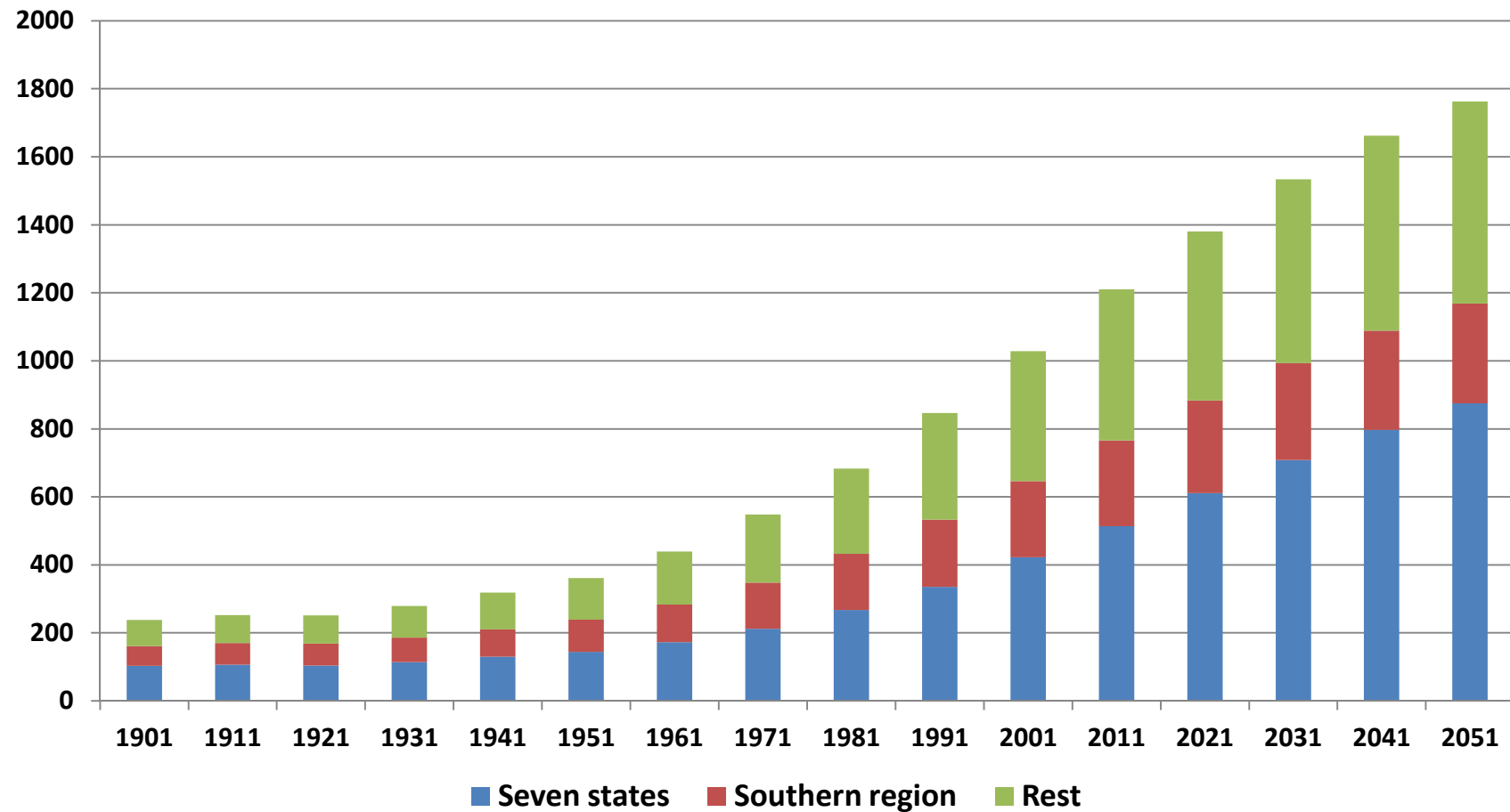




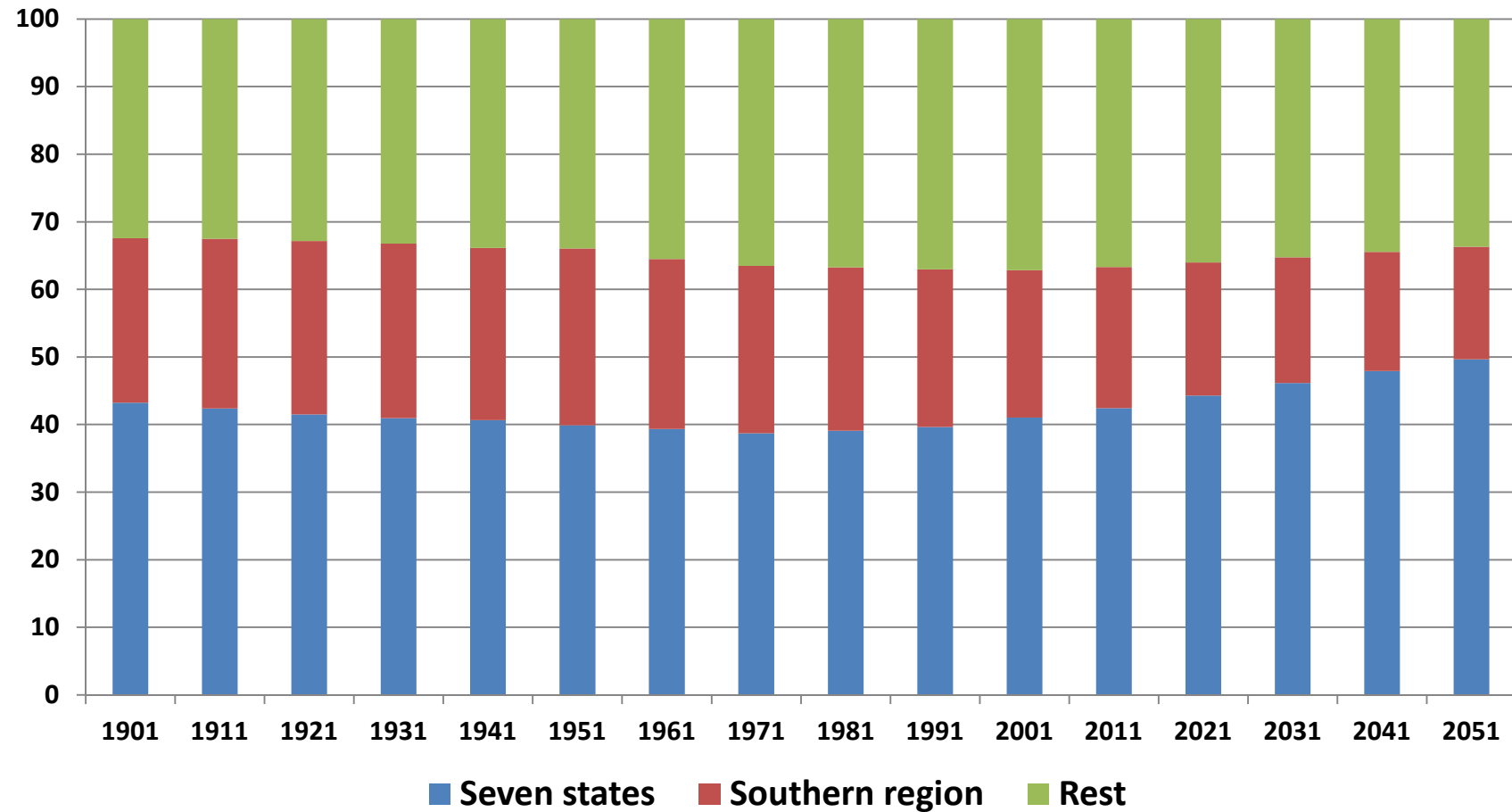
# Population (in millions) in India and three regions, 1901-2011 and projected to 2051



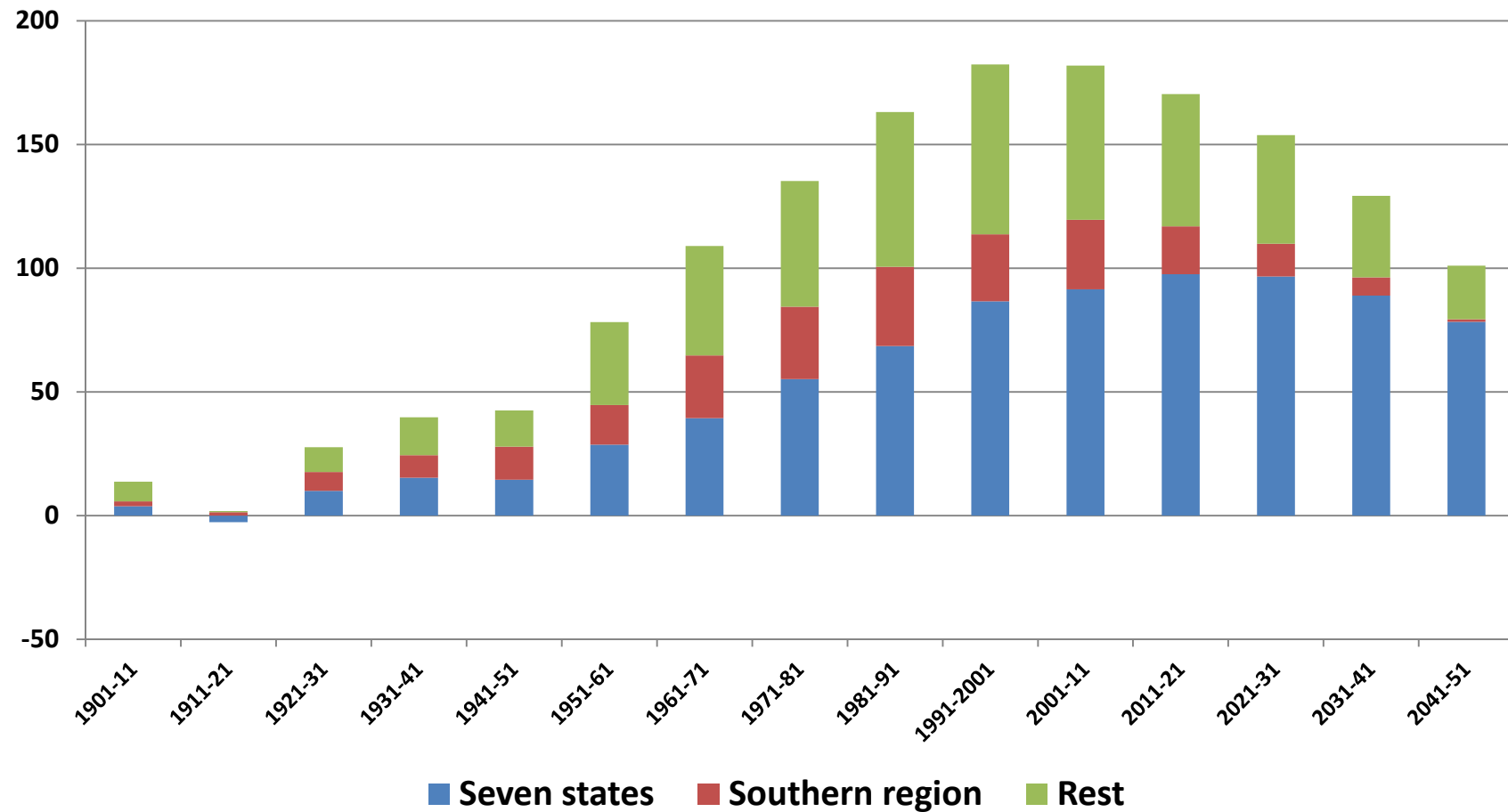
# Population (in millions) in India and three regions, 1901-2011, and projected to 2051



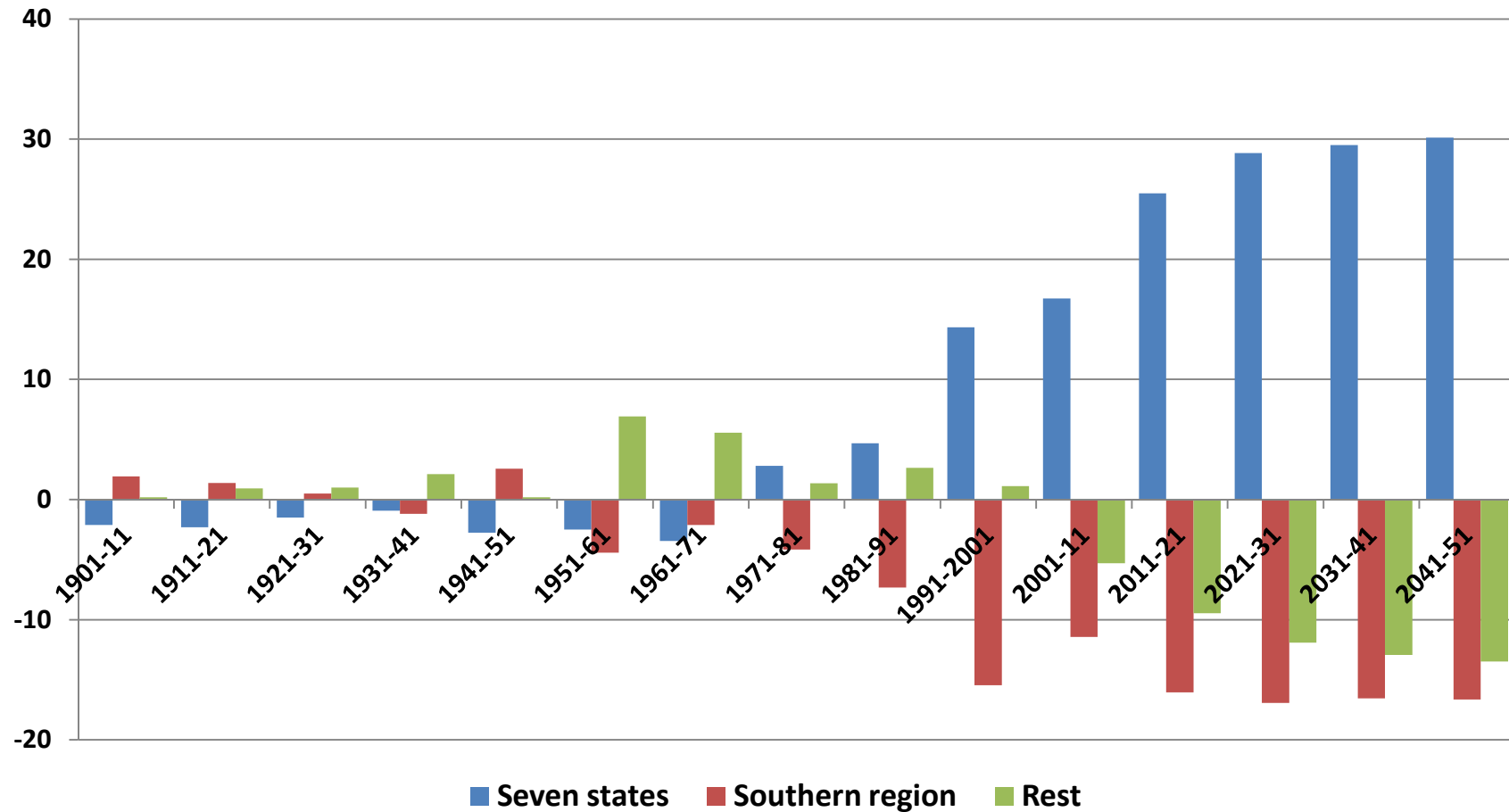
# Population shares (in %) of three regions, 1901-2011, and projected to 2051



# Intercensal growth in population (in millions), three regions, 1901 to 2011, and projected to 2051



# Surplus/deficit population increase (in millions), three regions, 1901-2011, and projected to 2051



# Conclusions

## Population growth

- India is in the process of **demographic transition** and has now entered the **phase of falling fertility** thereby reducing natural growth and is predicted to **reach low fertility-mortality replacement level** in the foreseeable future.
- Though **uncontrolled population growth is no longer an issue**, population will be **much higher than the present level**; India will overtake China and will become the most populated country before 2030.
- Besides, while at the national level further growth would not be very large, some regions lagging in demographic transition, especially the **north-central states, would double their populations** during the next fifty years.
- This would also create huge regional growth imbalances with possible socio-political consequences

## Fertility and mortality

- The **fall in fertility** has been a welcome change, with implications not just in terms of **lowering population growth** but also for the **development of women and children**.
- Some regions and sections are ahead of others and but the rest are catching up with the leaders.
- Though **mortality has fallen** in India, the level continues to be higher than that in many developing countries. **Infant mortality is** much lower than in the past, but is **not low by today's standards**.
- Of particular concern is **neo-natal mortality** that has not shown much fall in the recent past.
- Beside, after 1991, the **pace of decline in IMR has slowed down**.
- In **some sections of society and in some regions of the country**, mortality is quite **high**.

## Demographic dividend and ageing

- The **window of demographic opportunity** has already opened and will remain so for some more decades. The extent to which India can capitalize on this depends on how well the workers can be employed. This brings in issues of **quality of labour force** and **capacity of the economy to harvest the potential dividend into actual benefit**.
- Over time, the large bulge of population will move from working ages to old ages **raising old age dependency**. This would matter at the macro-level, but also at the micro or household level.
- Traditionally, supporting elderly parents has been the responsibility of working adults but **low fertility means small families** who would find it **difficult to support elderly parents**. This would then call for developing mechanism to provide old age support. At the national level, this matter does not seem urgent now but some states, the leaders in fertility transition, would face this issue soon.

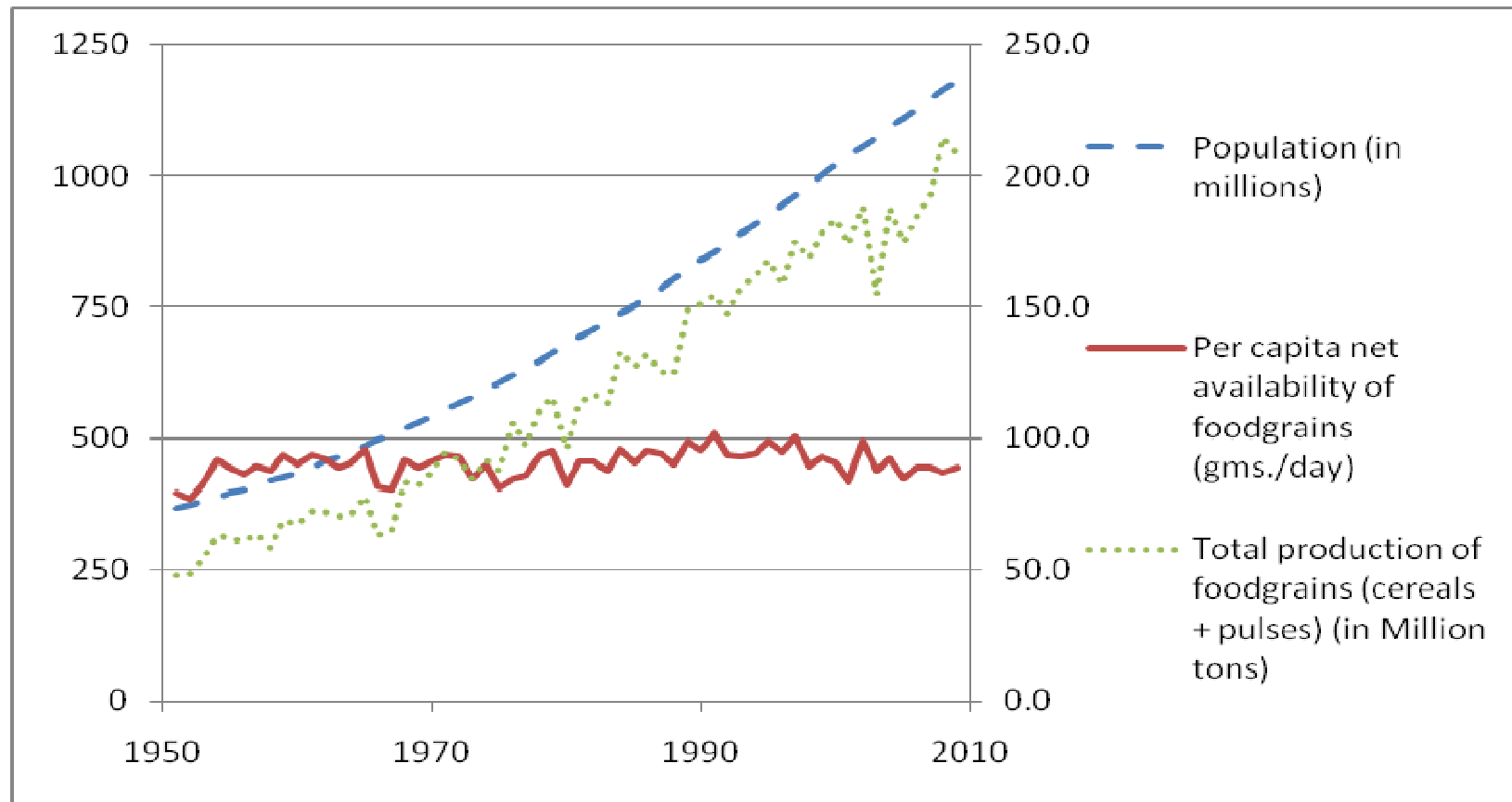


**THANK YOU.**

# Population-food-income

- In one direction, population size, growth, and structure impact socioeconomic development and in the opposite direction, socioeconomic factors influence the processes of fertility, mortality, migration and urbanization.
- Recent discussion on **demographic** dividend has underscored the **importance of age structure**.

# Trends in Population, production of foodgrains, and per capita availability



The trends since 1950 show a larger rise in NNP than in population size; thus, though India's population has more than doubled since 1951, the NNP (in constant prices) has increased even more than that with the result that real per capita income has also risen over the period.

