Demographic Transition, Savings, and Economic Growth in China and India

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ABSTRACT

In a country, the changing age structure of its population has direct implications for economic growth. The consequences are particularly significant in large and populous countries, such as China and India. This paper examines the impact of changing population age structure on economic growth in China and India. We present various theoretical perspectives and supporting evidence to emphasise the significance of harnessing the demographic dividend for the sustenance of growth and development. The analysis informs that, unlike China, India's savings and growth potential, as well as the magnitude and timing of its first demographic dividend, is adversely affected by the slow pace of fertility decline. The autoregressive distributed lag (ARDL) model-based long-run coefficient suggests that the contribution of the reduced dependency burden to overall per capita GDP growth during the analysis period is about 2–2.5 per cent per annum for China and about 1–1.5 per cent per annum for India. China also has a significant association between dependency ratio and savings, whereas such an association is expected to emerge in India. However, this relationship is also indicative of expected adverse consequences when the dependency ratio begins to rise and population ageing gains momentum. Therefore, following China's experience, it is argued that higher domestic savings and investments during the demographic dividend phase are critical to counter the adverse impact of population ageing and to ensure growth sustainability.

Keywords: Economic growth, demographic transition, demographic dividend, India and China, savings and economic growth

JEL: J11, E21, O53

1 INTRODUCTION

Demographic transition is a process involving the transition[1] from a young-aged population structure (high birth and death rates) to an old-aged population structure (low birth and death rates). Such shifts in population age structure have significant developmental consequences for large and populous countries, such as China and India. As we shall elaborate later, a lower dependency ratio[2] (dependents to working age population) allows for an accelerated economic growth; and the net growth benefits derived from demographic transition (from high to low birth and death rates) is referred to as the demographic dividend (Gribble and Bemner 2012). In fact, the Chinese economy witnessed unforeseeable growth during the transition phase, though the demographic process will now contribute to the faster ageing of the Chinese population. Interestingly, India is currently in a phase where the population is relatively young; it will witness continual decline in the share of dependents (children and elderly). This also provides an opportunity to harness the demographic dividend.

It may be emphasised that the notion of demographic dividend is not necessarily based on the concept of labour abundance (which China and India have), but is related essentially to changes in population age structure and dependency profile. For example, consider two equally large and labour-abundant economies, one having lower dependency ratio and the other with higher dependency burden. With similar growth environments, it is likely that the economy with lower dependency burden will present itself with higher chances of economic growth, largely because a lower dependency burden allows for higher savings and investment in physical and human capital, and thus contributes to sustained economic growth. In fact, it is estimated that nearly one-third of the economic miracle of East Asian countries (including China) can be attributed to the demographic dividend (Bloom and Williamson 1998; Bloom and Finley 2009). Similarly, other cross-country studies have observed a positive association between age structure transition and economic growth (Bloom et al. 2003; Bloom et al. 2006; Behrman et al. 1999; Andersson 2001; Kelley and Schmidt 2005; Choudhry and Elhorst 2010; Wei and Hao 2010; Feng and Mason 2005). Also, there

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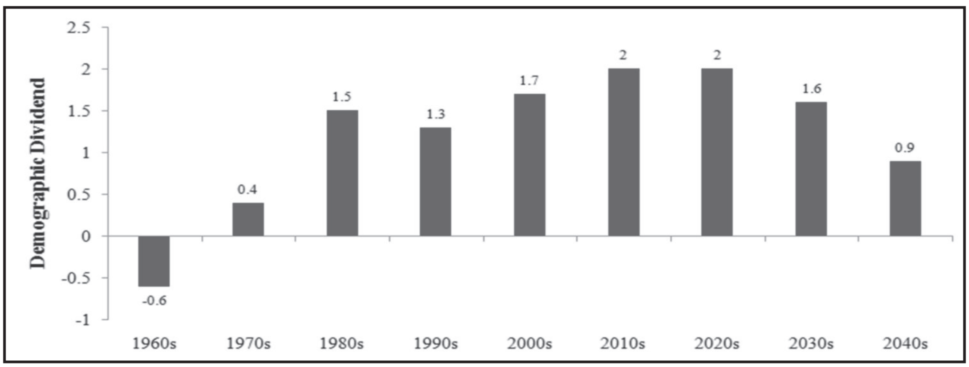
[1] Demographic transition has three distinct phases. In the first phase, the population of the 0–14 age group will be high, because of high birth rates and declining death rates, and thus yield a high youth dependency ratio. In the second phase, birth rates start declining rapidly, and lead to a reduction in the child population; but, because of higher fertility in the past, there will always be a higher growth rate in the working age population. Thus, this phase results in a reduced number of dependents, or lesser youth dependency ratio, and is known as the 'demographic dividend stage'. The third phase of age structure transition occurs with the ageing of population. The population of the elderly is likely to go up in this phase; consequently, the old-age dependency ratio will be high. The duration of the demographic dividend stage is determined by the schedule of fertility decline in the country. For instance, if the fertility decline is slow and steady, this phase may even pass unnoticed, as in the case of western countries. However, in the case of developing countries, such as India, the sharp decline in fertility implies that this stage may last around 40 years.

[2] Total dependency ratio is defined as the ratio of the sum of the population of the young (0–14 years) and of the elderly (65 years and above) to the working-age population (15–64 years).Although in the Indian context people older than 60 years are considered elderly, to be consistent with international practice, we have classified the population aged 65 years and older as elderly. Besides, in India, many work beyond 60 years of age.

are reasons to believe that the sustained developmental process in these countries is associated with the demographic dividend; these reasons are discussed later (Mason and Lee 2006).

Following the experience in East and Southeast Asia, there was high optimism that the demographic dividend phase could take India to newer economic heights (Bloom and Williamson 1998; Bloom et al. 2006; Bloom 2011; Aiyar and Mody 2011). However, unlike these countries, India did not gain much in the early phases of demographic transition (the 1980s and 1990s). To some extent, the poor gains can be associated with concerns surrounding the growth environment (James 2008; Chandrasekhar et al. 2006; Navaneetham 2002; Mitra and Nagarajan 2005; Bloom 2011). Nevertheless, since the 1980s, India's growth story has been exceptional and very different from its past stagnancy (Rodrik and Subramanian 2005; Panagariya 2004; Basu and Maertens 2007). In fact, after the 1990s, the per capita income of India increased at a rate of over 5 per cent per annum; the equivalent rate before the 1990s was below 3 per cent. This turnaround is partly associated with—although neglected by the growth literature on India—the increasing share of the working age population since the 1980s (Bloom 2011; Aiyar and Mody 2011; James 2008). In fact, Bloom (2011) suggests that 'if India adopts policies that allow the working age population to be productively employed, India may receive a demographic dividend of roughly 1 percentage point growth in GDP per capita, compounded year by year'. Similarly, Aiyar and Mody (2011) expect a large and significant impact of both the level and ratio of working age population on economic growth in India. They expect the demographic dividend to add about 2 percentage points per annum to India's per capita GDP growth over the next two decades (Figure 1). Choudhry and Elhorst (2010) also conclude that population dynamics can explain 39 per cent of the economic growth in India and will positively impact economic growth between 2005 and 2050.

Figure 1 Demographic dividend for India (estimates and forecasts), 1960s to 2040s



Source: Aiyar and Mody (2011)

Note: Demographic dividend calculated as the increment to annual per capita income growth relative to a counterfactual in which the working age ratio stays fixed at the 1961 level. Also, note that growth in per capita net domestic product is in constant 1993–94 prices.

Demographic transition has two types of effect on economic growth: one, in terms of increasing workers-to-population ratio (or shrinking dependency burden of children and elderly);and two, an effect on labour productivity. These effects can be written in the form of a simple equation (see Bloom and Williamson 1998; Mason and Lee 2006):

$$Y/N = Y/L \times L/N$$

where, Y is the total output or gross domestic product, L is the population in the labour force and N is the total population. The term Y/L indicates the component of labour productivity, whereas L/N captures the changes in proportion of work force. With demographic transition, the L/N ratio tends to increase; and with low unemployment levels, this can have a favourable impact on the level of per capita income (Y/N). However, the component of Y/L is a crucial determinant of the magnitude of economic growth. If there are substantial productivity gains, it can have a huge positive impact on the economy. Interestingly, even if productivity growth is constant, there exists considerable scope for economic growth, because of an increasing share of the working age population (L/N). Besides, we can witness economic improvements despite a marginal dip in labour productivity to the extent that it is compensated by the increment in the proportion of workers.

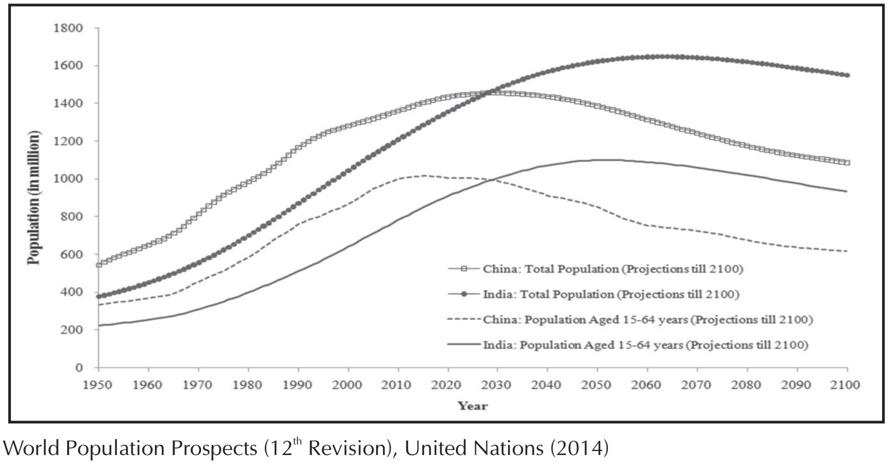
There are some important pathways through which the increased workforce can impact economic growth (James 2008; Mason and Lee 2006; Lee and Mason 2010; Bloom et al. 2006). To elaborate, the reduced dependency burden can allow for increased household savings which, in turn, could lead to productivity gains through increased capital per worker (capital deepening). Also, with declining fertility rates, households will be more likely to invest in human capital, which can favourably impact labour productivity, research, innovation, and technology. Reduced fertility rates will also favourably impact female labour force participation. Besides, increasing savings and wealth will help develop entrepreneurial and risk-taking capacities of economic agents and contribute to economic growth. Also, there are substantial gains from longevity and increased investments in health.

Against this backdrop, we aim to examine the long-term association between demographic transition, savings, and economic growth in China and India. Based on the analysis, the paper discusses whether the demographic dividend could be sustained and, if yes, under what preconditions. In concluding, we argue that population growth is a cloud on the horizon and that policies have to move faster to safeguard India's long-term welfare prospects. The remaining sections are organised as follows. Section 2 briefly describes the demographic trends in China and India. Section 3 briefly presents the key theoretical perspectives on demographic transition and economic growth, and highlights that the accumulation of higher savings is critical for the sustenance of growth. Section 4 presents some supporting evidence for our arguments. Section 5 briefly discusses the main results and outlines the importance of the demographic dividend for sustainable growth. Section 6 concludes.

2 CHANGING POPULATION AGE STRUCTURE IN CHINA AND INDIA

China and India are the two most populous countries in the world. Using data[3] from the United Nations World Population Prospects (2012 Revision), Figure 2 shows their estimated population (1950–2010) and projected population (2010–2100). China has a larger population than India now, but India is projected to have the largest population in the world by the end of the 2040s. China's population is expected to peak in the 2030s at 1.45 billion, and India's population at 1.64 billion in the 2060s. Figure 2 makes clear that the working age population (15–64 years) was greater in China than in India even before the 1950s, and its rate of growth higher in China since the 1970s. Nevertheless, the working age population of both countries is expected to converge in the 2030s, at around 800 million; thereafter, that population will be higher in India. Since the 1970s, the working age population started to increase in India; it marks the initiation of the demographic dividend phase. This phase is expected to last until the 2040s, which implies that India is currently in the middle of its demographic dividend phase. This demographic advantage will gradually disappear after 2040; thereafter, India could face severe challenges of population ageing. Specifically, the population aged 60 and above is projected to increase from 8 per cent in 2010 to about 18 per cent in 2050 and, further, to 30 per cent by 2100. India already has an elderly population of 100 million; therefore, there is growing concern over its struggle with population ageing (Giridhar et al. 2014; Rajan 2008; Alam 2006).

Figure 2 Total and working age (15-64 years) population, India and China, estimates and projections, 1950–2100

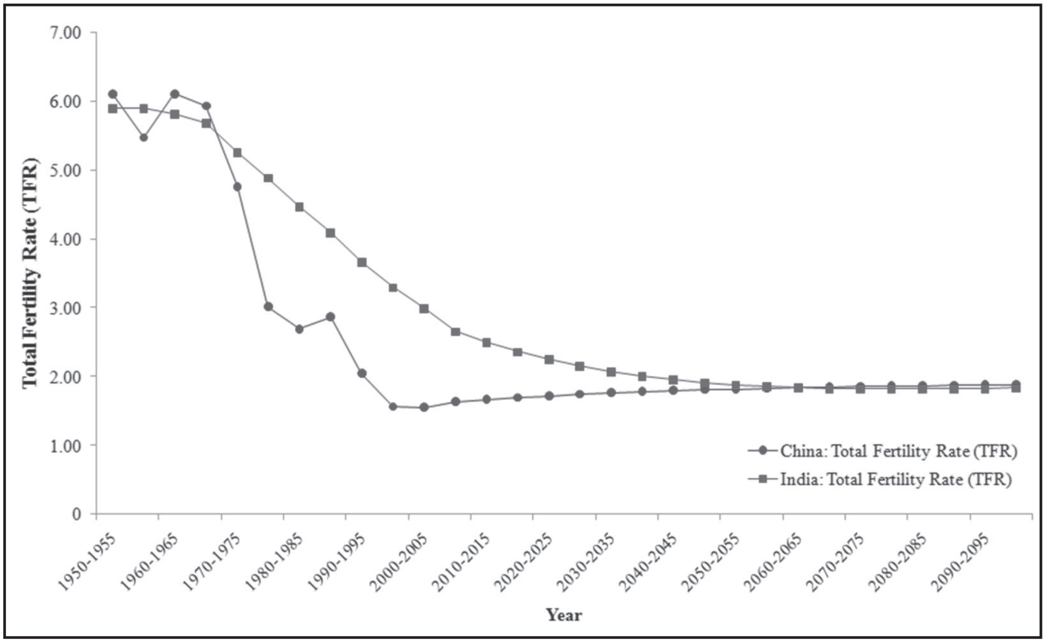


Source: World Population Prospects (12th Revision), United Nations (2014)

[3] The data pertaining to population trends and projections for India and China are drawn from the World Population Prospects (2012 Revision), performed by the Population Division of the United Nations (2014).These projections are based on the cohort–component projection model. The details of projection assumptions are available from the United Nations (2014).

Figure 3 compares the trends in total fertility rate[4] (TFR) in China and India. During the 1950s, the TFR was slightly higher in China (6.1) than in India (5.9); but, since the 1970s, the TFR declined faster in China. This steep decline in fertility rates, which provided China the early advantage of a higher share of the working age population, is attributed primarily to its adopting the one-child policy (Aird 1978; Bongaarts and Greenhalgh 1985; Whyte and Gu 1987; Lavely and Freedman 1990). In contrast, India's fertility decline has been relatively slow, though it provides a longer phase of the demographic dividend (Bloom 2011; Chaurasia 2007; Dyson 2008; Bhat nd).

Figure 3 Total fertility rates for India and China, estimates and projections 1950–2100

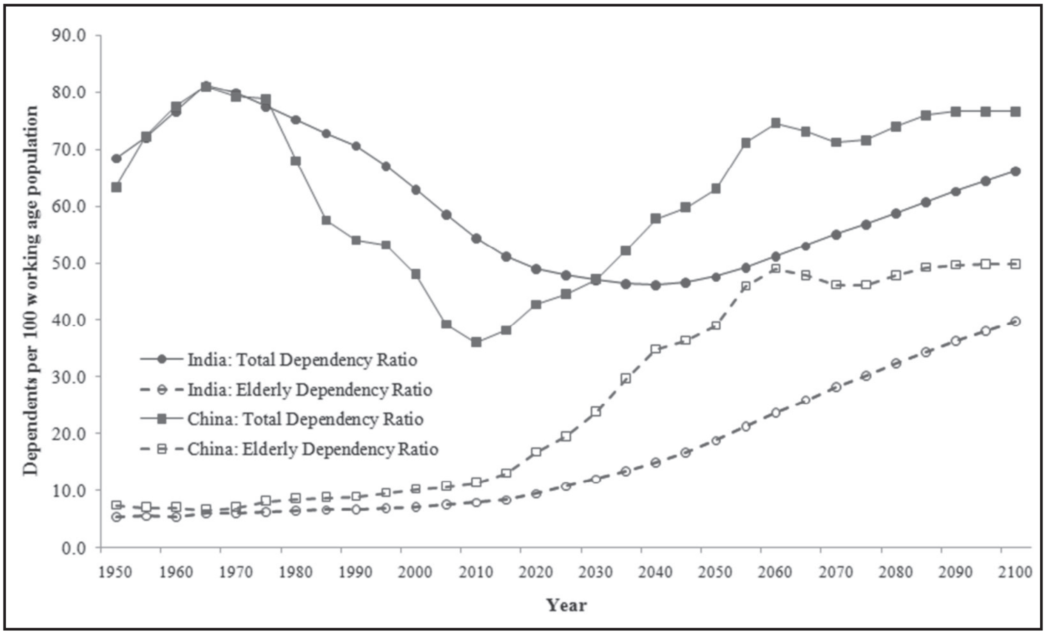


Source: World Population Prospects (12th Revision), United Nations (2014)

The dependency ratio is an important indicator that describes the expected socioeconomic burden and responsibilities on the working age population in a country. Figure 4 shows the number of elderly dependents and total (elderly + children) dependents per 100 working age population.

[4] The total fertility rate (TFR) of a population is the average number of children that would be born to a woman over her lifetime if the woman survives until the end of her reproductive life and experiences the exact current age-specific fertility rates of the population through her reproductive lifetime.

Figure 4 Elderly and total (elderly + children) dependency ratios for India and China, estimates and projections, 1950–2100



Source: World Population Prospects (12th Revision), United Nations (2014)

3 DEMOGRAPHIC TRANSITION, SAVINGS, AND GROWTH: SOME THEORY

It is widely acknowledged that a demographic transition can contribute significantly to economic growth (Leff 1969; Modigliani 1970; Bloom et al. 2003; Mason 1988; Higgins and Williamson 1997; Deaton and Paxson 1997; Lee et al. 2000; Modigliani and Cao 2004). An elementary view is that an increased proportion of the working age population will not only produce more output but also increase savings and investment in the economy. Further, economic gains are expected with a decline in fertility and an increase in female labour force participation (Lee et al. 2012; Barro and Lee 1994). Similarly, a low dependency burden is expected to boost investment in human capital (health and education) and augment labour productivity via technical progress (Becker 1962; Benhabib and Spiegel 1994). Besides, a significant growth run can also generate resources for increased public investment in infrastructure and other productive sectors (World Bank 1984). Broadly, these explanations imply that the increased labour force will have to be used more productively, and that the productivity gains in the form of increased savings should be reinvested to increase the capital–labour ratio and sustain economic growth (Solow 1956; Mason and Lee 2006).

Nevertheless, the linkages (causality) between economic growth, population age structure, and savings rate have always been puzzling[5]. Neoclassical theories suggest causality runs from savings to growth, but empirical evidence is the opposite (Carroll and Weil 1994; Loayza et al. 2000; Sahoo et al. 2001). Theoretically, demographic changes are an implicit component of three important approaches to explain this reverse causality:

1. permanent income hypothesis (Friedman 1957);
2. life cycle hypothesis (Modigliani and Brumberg 1954; Modigliani 1970; Modigliani 1986; Modigliani and Cao 2004); and
3. habit formation theory (Carroll et al. 2000).

The permanent income hypothesis states that the major determinant of consumption is change in permanent income (expected income in future years) rather than change in temporary or current income. This implies that a higher rate of (unanticipated) economic growth can lead to higher savings (Friedman 1957). The life cycle hypothesis argues, on similar lines, that savings varies over an individual's life cycle (Modigliani 1986). Typically, children and the elderly are more likely to have high consumption, and the working age population to have higher net savings. This implies that individuals plan both their consumption and savings behaviour over the long term and aim to smoothen out their consumption over their entire lifetimes. Again, the model shows that an economy is likely to experience higher savings with growth in population and labour productivity. In fact, the fundamental and novel implication of the life cycle hypothesis is that the national saving rate depends on the long-term rate of income growth and is unrelated to per capita income (Modigliani and Cao 2004). Thus, economic growth in a phase of demographic dividend should lead to higher savings and investment.

In their model of habit formation, Carroll et al. (2000) argue that a given level of income is more rewarding if it is arrived at through rapid economic growth. The model relies on the notion that through the process of habit formation, one's own past consumption might influence the utility yielded by current consumption (Fuhrer 2000; Caroll et al. 2000). Therefore, individuals will not be required to support the consumption of several family members in the later phases of the demographic dividend when the dependency burden is the lowest. Besides, due to habit formation, individuals may not require to consume more to maximise their utility. This habit formation exhibits a growth-to-savings causality and explains, also, why we can expect a positive short-run response of saving to a favourable shock to the dependency burden[6] (Caroll et al. 2000; Bonham and Wiemer 2012).

[5] The puzzle pertains to declining private savings in Japan and accelerated savings accumulation in China. The literature extensively discusses the Japanese puzzle (see Hayashi 1997) and the Chinese puzzle (see Modigliani and Cao 2004).

[6] There are also opponents of the view that a negative relationship exists between population growth and savings rate. For instance, Deaton and Paxson (1997) argue that the effect of population growth on saving is small. Interestingly, Ratiram (1982) estimates a saving function using data for 121 countries for 1970–77 and find no relationship between dependency rate and aggregate saving. However, it can be argued that the conclusions may be also affected by the data range, which arguably covers a small period.

4 DEMOGRAPHIC TRANSITION, SAVINGS, AND GROWTH: THE EVIDENCE

We now present some stylised evidence to assert that the developmental experience of India and China are consistent with the theoretical predictions. For this purpose, data on population trends[7] are drawn from the UN World Population Prospects (2012 Revision, United Nations 2014). It is important to select the key demographic variables carefully to capture the overall population composition and its influence on economic growth and savings (Leff 1969). Hence, the combined dependency ratio (young + old dependents) is used to represent the changing population age structure. Data on GDP per capita (constant 2005 USD) and gross domestic savings (as a percentage of GDP) are sourced from the online database, World Development Indicators (World Bank 2015).

From Table 1, it is immediately discernible that the period of demographic transition corresponds well with the income and savings profile of both the Chinese and Indian economies (Ma and Yi 2012). To elaborate, during the 1960s, both India and China had similar population age structure, though India had better economic indicators (average GDP per capita (in USD) China 108.4; India 245.0). However, since the 1970s, China experienced faster fertility decline, which subsequently decelerated average annual population growth (from 2 per cent in the 1960s to 0.6 per cent in the 2000s), and contributed to faster reduction in the average dependency ratio (from 79.8 per 100 working persons in the 1960s to 40.9 in the 2000s). Such a significant advantage in the dependency ratio is associated with an increase in the average gross domestic savings-to-GDP ratio in China—from 30.5 per cent in the 1970s to 45.9 per cent in the 2000s (Yang et al. 2011). Besides, household saving is estimated to have accounted for only 6–7 per cent of the GDP in the 1970s but over 22 per cent in the 2000s (Qian 1988; Kraay 2000). In India, the rate of population growth has also been decelerating, but the decline in fertility has not been as dramatic. For instance, China's dependency ratio was 36 per 100 working age persons in 2010; India is projected to have the lowest dependency ratio of 46 per 100 working age persons in 2040. Clearly, the nature and pace of demographic transition in China has allowed exclusive growth opportunities. Nevertheless, India will benefit from a broader window of opportunity (demographic dividend phase ≈ 1970–2040) than compared to China (demographic dividend phase ≈ 1970–2015).

[7] The projections are based on the cohort-component projection model (see, for details, UN 2014; Preston et al. 2001).

Table 1 Comparison of key economic and demographic indicators of China and India, 1960–2009

Years	Avg. GDP per Capita (constant 2005 USD)		GDP Per Capita Avg. Annual Growth		Avg. Gross domestic Savings (% GDP)		Avg. Annual Population growth		Avg. agd dep-ndency ratio (% working age) population)	
	China	India	China	India	China	India	China	India	China	India
1960–69	108.4	245.0	1.2	1.8	-	13.7	2.0	2.1	79.8	79.9
1970–79	168.7	277.4	5.3	0.6	30.5	17.5	2.0	2.3	77.3	77.8
1980–89	327.6	334.2	8.2	3.4	35.4	20.2	1.4	2.2	59.5	73.1
1990–99	742.5	465.2	8.8	3.8	41.2	23.0	1.1	1.9	52.7	67.3
2000–09	1751.8	735.1	9.6	5.3	45.9	28.8	0.6	1.5	40.9	59.0

Source: World Development Indicators, World Bank (http://data.worldbank.org/, accessed 27May 2015)

Note: Data for Gross domestic savings for China for the years 1970-79 is obtained from Basu (2009).

We further confirm the association between population age structure, gross domestic savings, and economic growth in China and India using time series econometrics. For this analysis, we have 44 annual observations (1970–2013) for the three key variables: dependency ratio, GDP per capita (constant 2005 USD), and gross domestic savings (as percentage of GDP). These variables are log-transformed to facilitate interpretation as elasticities. Table 2 presents the results based on Augmented Dickey-Fuller (ADF) unit root tests for these variables. In the case of China, it is noted that none of the variables are stationary in levels but are difference stationary, I(1) process. In the case of India, only the log of dependency ratio is level stationary, I(0) process. However, the other two variables are difference stationary I(1) process.

Table 2 Augmented Dickey-Fuller test for unit root, China and India, 1970-2013

Variable	China			India		
	Test statistic	p-value	C, T, L	Test statistic	p-value	C, T, L
Log of GDP per capita	-2.14	0.521	C, T, 6	-1.29	0.889	C, T, 1
1st difference of log of GDP per capita	-3.31*	0.064	C, T, 2	-7.64***	0.000	C, T, 0
Log of savings-to-GDP ratio	-3.00	0.132	C, T, 1	-2.28	0.447	C, T, 2
1st difference of log of savings-to-GDP ratio	-7.17***	0.000	C, T, 0	-6.86***	0.000	C, T, 1
Log of dependency ratio	-2.34	0.412	C, T, 6	-3.65**	0.026	C, T, 4
1st difference of log of dependency ratio	-3.43**	0.048	C, T, 5	-	-	-

Notes:***, **, * imply significance at the 1%, 5%, 10% level, respectively.

C, T, L denotes the constant term, trend variable and the lag length considered for the test equation, respectively.

The lag length for the ADF was selected using Schwarz-Bayesian Criterion (SBC).

For analytical purposes, we apply the autoregressive distributed lag (ARDL) model that offers considerable advantage in that variables could be assumed to be endogenous, with different order of integration I(0) and I(1), and varying lag orders (Pesaran and Shin 1999; Pesaran et al. 2001). Besides, the long-run and short-run coefficients are estimated simultaneously, thus removing problems associated with omitted variables and autocorrelation. The model also provides a parameter to capture the speed of adjustment. For this analysis, the variable lag length is selected using the Schwarz-Bayesian criterion (SBC). Bounds testing approach is applied to investigate the presence of the long-run relationship among the three variables (Pesaran et al. 2001). However, as we are using a small sample, therefore the F-statistic is compared with the critical values suggested by Narayan (2004, 2005) for an analysis based on 30 to 80 observations. The 95 per cent lower and upper bound critical values for a restricted intercept and no trend model with 2 regressors and 40 observations is 3.435 and 4.260, respectively.

We find that the computed F-statistic for India (F = 12.48) and China (F = 6.89) is greater than critical values, suggesting that we can reject the null of no levels relationship. In other words, per capita GDP, savings-to-GDP ratio, and dependency ratio are co-integrated in both India and China[8]. The model for both India and China fulfils basic diagnostic tests: Lagrange multiplier test of residual serial correlation, Ramsey's specification test, and heteroscedasticity test. The long-run and short-run coefficients are reported in Table 3. In the case of China, in the long run, per capita GDP is influenced by both savings-to-GDP ratio (significant positive impact) and dependency ratio (significant negative impact). However, in the case of India, only the dependency ratio shows a significantly negative long-run association with per capita GDP. The coefficient suggests that in India, a 1-per-cent-reduction in dependency ratio is associated with a 3.7-per-cent-increase in per capita GDP.

Table 3 ARDL (1, 0, 0) long-run and short-run coefficients, China and India, 1970-2013

Variables	China		India	
	Coefficient	Std. error	Coefficient	Std. error
Long-run coefficients (dependent variable: log of GDP per capita)				
Log of savings-to-GDP ratio	3.010**	1.255	0.129	0.135
Log of dependency ratio	-2.747***	0.751	-3.714***	0.226
Constant	7.447	7.205	21.42***	1.314
Short-run coefficients (dependent variable: 1st difference of log of GDP per capita)				
1st difference of log of savings-to-GDP ratio	0.187**	0.062	0.044	0.044
1st difference of log of dependency ratio	-0.171**	0.079	-1.268***	0.345
Speed of adjustment	-0.062***	0.021	-0.341***	0.095

Notes:***, **, * imply significance at the 1%, 5%, 10% level, respectively.
The lag length was selected using SBC.

[8] Studies have concluded that in China, a steady, long-run relationship exists between population age structure, savings rate, and economic growth. For instance, Ya (2012) finds that both the youth dependency ratio and old dependency ratio have a negative and significant impact on the household saving rate, while the GDP growth rate has a positive effect on it. In the case of India, Samantaraya and Patra (2014) notice that GDP and dependency ratio favourably impact household savings.

As such, on average, India needed about 1.5–2 years to achieve a 1-per-cent-decline in its dependency ratio (Table 2). Therefore, it can be inferred from the long-run coefficient that during the analysis period, the reduced dependency burden contributed 1.5–2 per cent per annum to overall per capita GDP growth. Similarly, China required about 1–1.5 years to achieve a 1-per-cent-decline in dependency ratio; this implies that the reduced dependency burden contributed 2–2.5 per cent per annum to per capita GDP growth. These back-of-the-envelope estimates are slightly higher than other estimates (for example, Bloom et al. 2006; Bloom 2011; Bloom and Finlay 2009; Aiyar and Mody 2011; Ladusingh and Narayana 2011), mainly because our analysis covers the 2000s, the most recent high-growth phase. Besides, the inclusion of other macroeconomic variables may likely capture some of the effects and provide more accurate estimates of the magnitude of the demographic dividend. However, such analysis is beyond the scope of this paper; we identify it as an area for further research. Finally, we note that the speed of adjustment for the two countries is different; and, after a short-run shock, India returns to the long-run equilibrium much faster than China.

5 DISCUSSION

Regarding population and economic growth, three views are apparent:

1. the pessimistic view (Malthusian legacy), that population growth negatively affects economic growth;
2. the optimistic view, that population growth is beneficial for economic growth; and
3. the neutralistic view, that population is unrelated to economic performance (Bloom et al. 2003).

In many countries, there is increasing evidence to suggest that demographic transition has mostly supported economic growth. Two of the most populous countries in the world (China and India) are also its two fastest growing economies; this compels us to discard the pessimistic view[9]. Also, it may be reiterated that the demographic dividend is not necessarily based on labour abundance, but that it quintessentially captures the impact of young population age structure on economic growth via pathways such as increased savings and investment and reduced dependency burden.

[9] There appears to be significant empirical evidence that economic growth is positively related to population growth, if opportunities are created for the growing numbers. Choudhry and Elhorst (2010) include the demographic variables in the Solow–Swann growth model to show the effect of population dynamics on economic growth. Specifically, they use data for the 1961–2003 period to show that economic growth is positively associated with the growth differential between the working age population and the total population and negatively with child and old age dependency ratio. Similarly, Kelley and Schmidt (2005) highlight that the combined impacts of demographic transition have led to 20 per cent of per capita output growth impact, with larger shares in Asia and Europe. In fact, the optimists have been proved right by the growth experience of other Southeast Asian countries, such as Thailand and Vietnam (Wongboonsin et al. 2005; Minh 2009).

This contribution of the changing population age structure is now increasingly referred to as the first demographic dividend. To elaborate, there is increasing recognition that despite the reduced growth of the labour force (due to population ageing), it is feasible to sustain economic improvement—by boosting productivity growth (Lee and Mason 2010). Such plausibility emanates from the standard Solow–Swann growth model, which suggests capital deepening can be expected at a later stage of demographic transition, when the share of the dependent population is on the rise. This is associated with the life cycle hypothesis, and contends that an increased capital–labour ratio can offset the growing burden of old age dependency, if old age is not too generously supported through public or familial transfer programmes (Mason and Lee 2006). Such a phase, in which the accumulated savings (translating into higher physical and human capital per worker) sustains the growth momentum, is referred to as the second demographic dividend. Lee and Mason (2010) also demonstrate that because of low fertility, public and private human capital investment will increase, and offset the seemingly unfavourable impact of population ageing, to deliver a second dividend. Clearly, the first and second demographic dividends are inextricably linked, such that the former adds to the current prospects whereas the latter shapes the sustainability prospects.

From the analysis, it emerges that in China and India, the pace of fertility decline was instrumental in determining the impact of demographic transition on economic growth. However, population growth can still prove to be a major challenge in sustaining economic development in India, unlike in Southeast Asian countries. Due to its population momentum, and despite achieving replacement level fertility in about the 2020s, India's population is projected to grow another 50 years or so (Bhat nd). In fact, the process of fertility transition is ongoing in several major states of the country (such as Uttar Pradesh and Bihar), and restricts the scope for maximising gains from the current demographic phase. Also, the potential for harnessing the first demographic dividend depends largely on the existing policy environment. For instance, since independence, the Indian economy has been grappling with several institutional and structural constraints that prevented accelerated improvement in productivity and output (Basu and Maertens 2007). In China, in contrast, the social and institutional arrangements during the Maoist regime enabled its phenomenal growth run (Basu 2009).

The growth performance during the phase of the first demographic dividend also provides signals (and prerequisites) to insulate the economy (and the second dividend) from the plausible impact of imminent population ageing. For instance, the East Asian economies are better placed to harness a second dividend, as they have accumulated higher levels of savings, while institutional disadvantages may constrain the savings and growth potential of the Indian economy (Basu 2009). The situation can still be salvaged if the current phase of output growth leads to an increased level of savings and investment in the economy. As noted earlier, savings in India have increased at a slow pace; and these gradual increments are easily correlated with its economic growth and fertility decline. What works in India's favour is that it is currently in the middle of its first demographic dividend phase, which is expected to last until the 2040s. This also allows considerable scope to undertake medium- to long-term changes to improve the social and institutional environment. However, an integrated set of policies is required to ensure that India maximises the first dividend and stays on course for the second. The sustainability prospects of the economy hinges upon its preparedness to realise a second demographic dividend by prioritising the following areas.

First, policy focus on fertility decline in large states (such as Uttar Pradesh, Bihar, Madhya Pradesh, and Rajasthan) is critical to ensure an age structure profile that contributes to a low dependency burden. Until recently, fertility decline (family planning) was a major item on the policy agenda in India; but we observe some dilution in the focus now.

Second, the relationship between savings and growth is positive, but weak; it needs stimulus. In fact, savings responds to economic growth, thus reiterating the importance of higher growth in a period of falling dependency ratio. Such a phenomenon, which helped significantly in attaining a very high savings rate, is observed in China and other Asian economies (Bonham and Wiemer 2012).

Third, policy reforms should continue in India to sustain its growth momentum. This is important, because the investment climate is increasingly determined by the global outlook; financial investors are keen to invest in robust business environments. In fact, India is a huge market for several products, and there is potential for partnership in production and distribution of goods and services in sectors where local demand is much higher, such as automobiles and electronics. However, India is yet to progress with cost-efficient alternatives (including skilled labour) to promote in-house manufacturing and exports. The literature on productivity growth in India is also critical of institutional constraints that disallow output and employment growth (Virmani and Hashim 2009). Also, there is concern that only a small part of the gain in labour productivity is translated into wage increase, further constraining savings potential (Goldar and Banga 2005). Remedies can go a long way in restoring balance and growth sustainability.

Fourth, the most important task is all-around employment generation, to absorb the increasing work force. This involves exploring opportunities for the deployment of the increasing labour force in the non-agricultural sector (Chandrasekhar et al. 2006), all the more important because of the increasingly evident adverse impact of climate change on the agricultural sector (Jha and Tripathi 2011).

Fifth, the increasing education and labour force participation of females can also boost economic development in India (Drèze and Murthi 2001). For this, India needs a proactive approach for increasing both public and private investment in human capital, which also ensures equitable access and quality.

Sixth, investment in health may go a long way in safeguarding India's prospects of growth sustainability (Bloom et al. 2006). In particular, living longer and healthier is important not only to improve productivity but also to facilitate the potential for higher savings and investment. Besides, a healthy population can have a pro-growth savings and consumption profile.

6 CONCLUSION

In concluding, it is worthwhile to present a counterfactual. Assume that with increasing flexibility to foreign investment, it is not necessary for the economy to rely on large domestic investment. (In fact, given its huge consumer base, India is among the priority destinations for foreign investment, which diminishes the importance of achieving higher domestic savings for sustaining economic growth.) Such a situation would imply that capital deepening and productivity growth in India will invariably be influenced by the volatility surrounding the global economy and international capital investment. The experience of the most recent financial crisis suggests that the repercussions of such fluctuations are felt largely in the social sector. Such a development intensifies the inequalities in income and consumption, and renders a large section of the population, including the elderly, vulnerable to poverty and illness. In fact, such circumstances warrant greater public investment in social security, which only adds to the uncertainty around the growth environment. Therefore, the concern over harnessing the first demographic dividend is relevant not only to sustain growth; it aims at minimising the economic burden on governments and households when population ageing assumes substantial proportions.

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