Can India Attain the East Asian Growth with South Asian Saving Rate?

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Abstract
The paper finds that while India’s GDP growth rate is slowly converging to the East Asian level, its savings and investment rates are not. This raises the question whether India’s growth aspiration is consistent with its savings and investment behavior. The paper examines India’s saving and investment rates—their trends, composition and determinants—to understand how they are likely to evolve in the future. It finds that India’s domestic saving and investment rates are likely to register moderate increase in the medium term, but are unlikely to reach the East Asian level. At the same time, India’s pattern of growth is found to be less intensive in the use of physical capital than has been the case in the East Asian countries. The paper concludes that India could grow at 8 percent, if it can ensure prudent fiscal outcomes (which is found to have a positive effect on aggregate saving) and undertake domestic reforms to attract external capital to fill its emerging saving-investment gap.

JEL Classification:

1 I would like to thank Poonam Gupta, Serigo Schmukler, Ajay Shah and participants in the World Bank workshop (held in Beijing in March 2006) for many useful suggestions.
1. INTRODUCTION

1. The optimism about Indian economy has been on an ascent in recent years. Much of this optimism stems from the fact that, while growth has continued to elude many developing countries, India—a relatively poor country with a billion plus population—has emerged as one of the fastest growing countries in the world. Its economy has grown at an annual average rate of 3.5, 5.5, 6.0 and 8.1 percent respectively between 1960-79, 1980-91, 1992-2002 and 2002-05 periods. The prognosis about the future of the Indian economy appears to be equally promising: there have been several studies in recent years that suggest that India could emerge as the fastest growing country in the world in the medium to long-term and, in the process, become the third largest country in the world by 2050. While these studies project different long-term growth rates for India (mostly varying between 6 to 8 percent per annum), they all seem to agree that India has entered a phase of rapid growth that can be sustained into the foreseeable future.

2. Going by the cross-country empirical regularities between growth and investment, one would argue that, given the strong, positive and robust relationship between the two variables (e.g., Levine and Renelt [1992]; and Mankiw, Romer and Weil [1992]), achieving rapid and sustained growth would not be possible without a similar acceleration in India’s investment-GDP ratio. Therefore, the country’s aspirations to grow at 8-10 percent rate would have to be supported by a combination of the following two factors: (i) its domestic saving rate (measured as Gross Domestic Saving to GDP ratio) would have to increase from its current level of 27-29 percent to 32-34 percent; or (ii) breaking from its past trend, India would run large current account deficits—from the average of 0.75 percent of GDP during the last 30 years to as much as 3-4 percent of GDP over the next few decades—and thereby uses the external resources to finance most of its growth acceleration. The Indian planners took cognizance of these constraints as the following excerpt from India’s Tenth Five Year Plan (2002-05) document indicates:

"With the average incremental capital output ratio (ICOR) in the Eighth and Ninth Plan period amounting to around 4.0, the investment increase needed to achieve a 1.5 percentage point increase in growth is 6 percentage points. While some part of this could come from an increase in foreign direct investments, it is unrealistic to expect this source to contribute more than 1 to 1.5 percentage points. This means that if the entire acceleration in growth has to come from additional investment with an ICOR of 4.0, it would be necessary to increase the investment ratio by 4.5 and 5 percentage points of GDP, which would have to be mobilized through additional domestic savings. An increase of this order in the average rate of domestic savings over the next five years may not be feasible. A substantial part of the additional growth must, therefore, come from increased efficiency and tapping hidden potentialities in the economy."

(http://planningcommission.nic.in/plans/planrel/fiveyr/welcome.html)

2 For example, Goldman Sachs [2003, 2006] projects that India could grow at an annual rate of 6 percent between 2000 and 2050. The study by PwC [2006] projects a growth rate of 7.6 percent in dollar terms and 5.2 percent in PPP terms between 2005 and 2045. Rodrik and Subramanian [2005] argue that India could grow at 7 percent over the next 20 years. Kelkar [2004, 2005] suggests that India has the potential to grow at 8 percent per year for the next 20 years. A report by US’s National Intelligence Council [2004] assumes that India will be the fastest growing economy in the world during the next 4-5 decades. Even by the least optimistic of these projections, Indian economy will be emerge as the third largest economy in the world by 2050, not just in terms of PPP (purchasing power parity), but also in current US dollar.

3 The critics, however, point out that these studies have overlooked the deep-rooted supply side constraints facing the Indian economy. For example, while these studies assume that, being a young society, India will reap rich ‘population dividend,’ they ignore the fact that six out of ten Indians are now being born in the poorest six states in the country that have extremely low levels of education and health attainments (see Acharya [2005]). These forecasts, however, are now expected to get official sanction, with the Government of India targeting an average annual GDP growth rate of around 8-9 percent during the Eleventh Five Year Plan period (2007-12).
3. India’s recent growth experience, however, does not seem to support such strict empirical regularities between growth and investment. Indian economy is expected to record nearly 8 percent GDP growth rate for four consecutive years (2003-04 to 2006-07) with both saving and investment rates averaging below 30 percent of GDP. This is in sharp contrast to the experience of the East Asian countries, which reported saving and investment rates in the range of 35-40 percent during their phase of rapid growth. This brings us to the main issue to be addressed in the paper: Can India sustain the East Asian growth (around 8 percent) with South Asian saving rate (25-30 percent of GDP) and modest external flow? Alternatively speaking, is India’s growth aspiration consistent with its savings and investment behavior?

4. Using data from 1950-2005, we undertake a detailed examination of India’s savings and investment functions—their trends, composition and determinants—to understand how they are likely to evolve in the future. Based on the estimates of our regression model, we then forecast India’s future savings and investment rates. We also examine the capital intensities of various sectors in the Indian economy to understand the investment demand underlying India’s current and future pattern of growth. We bring together our various findings to answer the question, whether India can grow as rapidly as emerging Asia with its moderate rate of saving and investment rates.

5. Based on the above analysis, the paper makes three important findings: (a) While India’s GDP growth rate is slowly converging to the East Asian level, its savings and investment rates are not. This indicates that India may not replicate some of the commonly known stylized facts concerning growth, saving and investment rates observed in the East Asian countries during their growth transition; (b) India’s domestic saving rate is likely to register moderate increase in the medium term and is unlikely to reach the level seen in East Asia. While demographic composition will positively affect India’s savings, increased financial depth and the continuing liberalization of the economy are likely to reduce it. The fact that India’s household saving rate is already one of the highest in the world and has been range bound between 21-23 percent during the last six years, suggests a plateauing of household savings in India. India’s ability to raise saving will thus crucially depend on the evolution of its corporate saving (which is one of the lowest in the world) and the saving by the public sector, with the latter found to have a significant impact on the aggregate saving: 1 percent increase in public saving is found to be associated with a 0.7 percentage points increase in aggregate saving; (c) Indian growth generating process and its pattern of growth are found to be less intensive in the use of physical capital (and more intensive in the use of human capital) than has been the case with the East Asian countries. In addition, there is evidence that capital utilization rates are higher in India than in most of the East Asian countries.

6. From these findings, can we say anything about how India is likely to finance its future growth? The answer largely depends on whether India can preserve its current’s pattern of growth, which has been driven largely by its rapidly growing services sector. Since India’s services sector, especially the sub-

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4 While East Asia and Pacific region comprises of nearly 21 countries, in this paper we loosely refer to the five of its largest and fast growing countries—China, Malaysia, Indonesia, South Korea, and Thailand—as East Asia or emerging Asia. These 5 countries make up 87 percent of the region’s population and 91 percent of its GDP (check).

5 For more in-depth discussion on the economic performance of countries in the South Asian region, see Ahmed (2006) and Devarajan and Nabi (2006).

6 There is little agreement among economists and policymakers about the course of India’s future growth process. Some have argued that India should stand on both legs—manufacturing and services—if it wants to solve its employment problem along with faster growth (a number of economists including Acharya, Joshi and Panagariya have written extensively on this topic in their newspaper columns). Others have argued that India’s growth pattern has always been in favor of skilled intensive services (including manufacturing services) and the country is
sectors that are growing really fast (e.g., business and financial services, retail and construction), exhibit lower capital intensity than the manufacturing sector, by preserving the current pattern of growth, India is unlikely to need or achieve the kind of investment rate that the East Asian countries needed to finance their rapid growth. India therefore could still grow at 8-10 percent if it can ensure prudent fiscal outcomes (i.e., public saving to GDP ratio of around 5 percent) and undertake domestic reforms to attract external capital to fill its emerging saving-investment gap.

7. The evolution of the Indian economy as outlined above could have important global implications. Early signs indicate that India has squeezed a lot more output from its capital stock, and perhaps complemented it with more human capital, to get the needed boost to its growth rate. This is likely to limit the country’s reliance on foreign saving as a source of financing for its future growth. But even then, if a moderate amount of India’s investment need is financed by external savings (say only 10 percent), this could translate into as much as $450 billion of cumulative capital flows into the country during the next 10 years. India’s growth, propelled by trade in services, will become increasingly dependent on two global factors: technological breakthroughs that lower transaction costs of outsourcing services and policies for skilled migration in developed countries. But on the whole, not only India is likely to remain a smaller economy than China during the next two decades, but its investment needs are likely to be much smaller than the latter, and therefore the impact of India’s growth acceleration on the global economy is likely to be a lot less dramatic than has been the case with China.

8. The rest of the paper is organized as follows. In Section II we examine the convergence in growth, saving and investment rate between India and selected East Asian countries. In Section III, we examine the major trends, composition and determinants of India’s savings and investment and how they are likely to evolve in the future. In Section IV we study the factor intensity of Indian economy. The last section concludes.

9. Before getting into the details of the paper, a number of caveats are in order. First, it is worth pointing out that the paper is not about making long-term growth forecast for the Indian economy nor does it pass any judgment on the accuracy of the forecasts made by others. Instead, it takes others’ prediction as given and builds on their premise. The results of the paper can thus be as good as the foundation it is based on. Second, while the paper emphasizes the importance of the long-term positive relationship between growth and saving, (without necessarily resolving the causality issue between them), it does not suggest that countries with moderate level of savings should emulate the East Asian model of growth; administratively engineering high saving in the economy is unlikely to produce high growth. Finally, the findings of the paper should not be construed to imply that India has addressed all its growth constraints sans the financing issue. Far from it, India continues to encounter many challenges to its growth prospects including lack of good infrastructure and finding resources to pay for them is unlikely to be a lot less dramatic than has been the case with China.

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increasingly specializing in these sectors (see Kochhar et. al.[2006]). For greater discussion on India’s services sector see, Gordon and Gupta (2003) and World Bank (2004).

7 The underlying assumption is that Indian economy will grow at 9 percent in US dollar terms (7 percent growth + 2 percent currency appreciation) over the next 20 years and its investment to GDP will be around 32 percent.

II. CONVERGENCE IN GROWTH BUT NOT IN THE SAVING AND INVESTMENT RATES

10. There is considerable evidence that India’s GDP growth rate is slowly converging to the East Asian level, while its savings and investment rates are not. This is best illustrated in Figure 1. The gap in the growth rates between India and East Asia has been gradually coming down, though large part of this reduction is due to the growth deceleration in East Asia after the 1997 currency crisis and a smaller part is accounted by the acceleration in India’s growth rate in recent years. If the forecasts made by some of the investment banks are to be believed, this gap will be completely eliminated, and perhaps reversed, in the next few years. In contrast, the difference in the saving rate between East Asia and India shows no sign of convergence. India’s saving rate is in fact not only considerably low by the East Asian level, it has grown at a slower pace than the latter. Given that India’s current account deficit averaged 1 percent of GDP, compared to around 1.5 percent of GDP for the East Asian countries between 1980 and 1996, the investment rate between the two regions has historically been wider than their difference in their saving rates.\(^9\)

![Figure 1- The difference in the growth rate between India and East Asia seems to have narrowed over time but not their underlying saving rates](image)

Source: Central Statistical Organization (CSO), India; Development Data Platform, The World Bank;
Note: Growth rate projections are from Goldman Sachs [2003], PwC [2006] and author’s own estimates; India recently changed the base year of its national income accounts from 1993/94 to 1999/00 which led to an upward revision of both its saving and investment rates.

11. Regression analysis reinforces the above message, that is, convergence in growth appears to be much more rapid than convergence in savings rate between India and East Asia (for regression work we limit East Asia to the five countries mentioned in footnote-3). We begin with a simple panel regression equation (1) in which the underlying variable is regressed on a time trend (Trend) or on initial per capita income after controlling for country-specific variables using country fixed effects. A negative coefficient for the time trend or per capita income indicates convergence and a positive term implies divergence. We estimate the same regression with and without the inclusion of India in the panel. The results are reported in Table 1.

\[
\log(y_{i,j}) - \log(y_{i,j-k}) = \nu_i + \beta \log(y_{i,j-k}) + \varepsilon_{it}
\]

\(^{1}\)

\(^{9}\) This pattern however changed after the 1997 currency crisis when the East Asian countries began to post large surplus on their current accounts. For more discussion on this subject see IMF (2006).
where \( y_{i,t} \) is the per capita income in country ‘i’ (i = 1, ..., 6) in panel ‘t’ (t = 1965, ..., 2005), \( \nu_i \) is the country fixed effect (thus the panels are 1965-70, 1970-75, ..., 2000-05).

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Main explanatory var.</th>
<th>Coefficient ( ^\hat{\beta} )</th>
<th>t-Stat.</th>
<th>Adjusted R(^2)</th>
<th>No. of obs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growth rate of per capita income</td>
<td>Time Trend</td>
<td>-0.005***</td>
<td>-6.25</td>
<td>0.59</td>
<td>36</td>
</tr>
<tr>
<td>Gross Domestic Saving/GDP</td>
<td>Time Trend</td>
<td>-0.003**</td>
<td>-2.05</td>
<td>0.14</td>
<td>52</td>
</tr>
<tr>
<td>Growth rate of per capita income</td>
<td>Initial per capita income</td>
<td>-0.029***</td>
<td>-4.83</td>
<td>0.49</td>
<td>36</td>
</tr>
<tr>
<td>Gross Domestic Saving/GDP</td>
<td>Initial per capita income</td>
<td>-0.014*</td>
<td>-1.76</td>
<td>0.07</td>
<td>36</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Main explanatory var.</th>
<th>Coefficient ( ^\hat{\beta} )</th>
<th>t-Stat.</th>
<th>Adjusted R(^2)</th>
<th>No. of obs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growth rate of per capita income</td>
<td>Time Trend</td>
<td>-0.006***</td>
<td>-6.74</td>
<td>0.63</td>
<td>30</td>
</tr>
<tr>
<td>Gross Domestic Saving/GDP</td>
<td>Time Trend</td>
<td>-0.004**</td>
<td>-2.10</td>
<td>0.17</td>
<td>43</td>
</tr>
<tr>
<td>Growth rate of per capita income</td>
<td>Initial per capita income</td>
<td>-0.031***</td>
<td>-4.58</td>
<td>0.48</td>
<td>30</td>
</tr>
<tr>
<td>Gross Domestic Saving/GDP</td>
<td>Initial per capita income</td>
<td>-0.018*</td>
<td>-1.94</td>
<td>0.12</td>
<td>30</td>
</tr>
</tbody>
</table>

Note: (i) The regressions use ordinary least squares (OLS) to estimate equations of the form shown in (1); The OLS estimates are based on white heteroskedastically-consistent standard errors and covariance; (iii) Income data is GDP per capita income adjusted for purchasing power parity, as reported by World Development Indicators (2006). *, **, and *** indicate that the estimates are statistically significant at 10, 5, and 1 percent respectively.

12. Several interesting results follow from these regressions. First, the coefficient of the initial per capita income and time trend (i.e., \( ^\hat{\beta} \), which measures the speed of convergence) is negative and significant in all the regressions. This implies that both per capita income and saving rate may be converging within countries in East Asia as well as between them and India. Second, there is considerable difference in the speed of convergence between the two variables. For example, \( ^\hat{\beta} \) for per capita income is -0.029 while for saving rate it is -0.014 (in Table 1A), which implies the per capita income is converging at twice the rate of saving rate. Third, the degree of convergence is faster with India than without India. This is seen by the fact that \( ^\hat{\beta} \) in Table 1A is higher than the corresponding \( ^\hat{\beta} \) in Table 1B.

13. Including additional explanatory variables in the regression equation (1), while changes the speed of convergence and affects the statistical significance of the coefficient, does not alter the main results reported in Table 1, i.e., per capita income seems to be converging at a faster pace than saving rate and the speed of convergence without India is faster than with India.
14. The above results raises the question, can India continue to grow and converge to the East Asian growth rate of 8 percent rate at its current level of savings and investment, which despite some acceleration in recent years, remain below 30 percent. We therefore take a much closer look at the evolution of India’s saving and investment rates in the next section.

III. EVOLUTION OF INDIA’S SAVING AND INVESTMENT RATES

III.A Variation Over Time

15. India’s saving rate has steadily increased over time, from an extremely low base of 8.9 percent in 1950-51 to more than 29.1 percent in 2004-05 (left panel, figure 3). This period has also been associated with a rising growth rate, resulting in a significantly positive and robust relationship between the two variables. At the same time, its investment rate has steadily increased, from a low base of 8.7 percent in 1950-51 to more than 30.1 percent in 2004-05. Given that Indian economy was until recently closed to the international capital flows, it is not surprising that its domestic saving and domestic capital formation are highly correlated (correlation coefficient is 0.97 percent for the entire period). In the past, periods associated with persistent divergence between the investment and saving functions have ended up with balance of payment crises, as was the case in the early 1970s and early-1990s. In fact, after the 1990/91 currency crisis, the gap between investment and saving functions has reduced further, even though a number of measures have been taken to facilitate greater integration of Indian economy with the rest of the world. A chow test indicates a break in the trend growth rate of investment in the late-1980s and a similar break in the savings in the mid-1990s.

Figure 2: While the saving-investment gap is shrinking in India, the flow of external capital is increasing


16. In the post reform period, India appears to have experienced two opposing trends: on one side, the correlation between saving and investment has been more or less unchanged from the pre-reform period and the gap between them has narrowed (current account deficit turning into surplus during 2001/02-

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10 Part of the reason why investment and saving rates track each other so closely is the way the two are measured. Central statistical Organization (CSO), the agency which compiles the national income accounts for India, sets household physical savings exactly equal to household investment, which in turn is determined residually. In national accounts, domestic investment is adjusted to equal the sum of domestic and foreign savings.
2003/04 period), implying lower financial integration with the rest of the world\textsuperscript{11}; on the other hand, flow of external capital has considerably increased, indicating greater financial integration with the rest of the world. The reason for this apparent contradiction lies in the changing source of external finance to the Indian economy. Until the early-1990s (except a few years in the late-1980s), the dominant source of external capital was from the official sources and so the gap between saving and investment function in those years was not a true measure of financial integration of the Indian economy with the rest of the world. On the other hand, since 1991, more than 90 percent of the external capital has come through private sources (foreign direct investment, portfolio flows, bank credit and non-resident deposits), indicating growing financial transactions between India and the rest of the world.

III. B Composition

17. While India’s saving rate has steadily increased, its composition has undergone considerable change over time (left panel, figure 3). The most noticeable trend is the growing divergence between the public and private savings, the former having declined from its peak level of 4.9 percent of GDP in 1976-77 to -2.2 percent in 2001-02. During the same period, saving rate of both the household and private corporate sectors has steadily increased, offsetting the decline in the public sector. The share of household saving in the total saving has increased from nearly 60 percent in the early 1960s to nearly 90 percent in the early 2000s. The private corporate sector, whose saving rate was stagnant till the late 1980s, has only recently emerged as the sector with the fastest rising saving rate in the country.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure3.png}
\caption{The composition of India's saving and investment rates have changed considerably over time}
\end{figure}

18. Similar compositional changes have occurred in the investment rate as well (right panel, figure 3). Till’ the late 1980s, the relationship between private and public investment seemed complementary, i.e., an increase in one was associated with an increase in the other. In recent years, their relationship can be better characterized as substitutes. Following the liberalization of the Indian economy in 1991, the public sector has gradually withdrawn from a number of sectors, whose place has been taken over by the private sector. This, along with the fact that India’s current expenditure grew rapidly while its revenue collection stagnated, resulting in more than 10 percent of general government deficit during the 1990s, explains why public investment declined during this period. From financing 50-55 percent of total investment in the

\textsuperscript{11} See Feldstein and Horrioka (1980).
economy in the early-1980s, the government’s share fell to around 5 percent by the early 2000s. With fiscal deficit on a declining trend in recent years, public saving has again turned positive. In fact, the improvement in government’s fiscal situation explains almost entirely the increase in gross domestic saving during the last two years.\footnote{See Pattnaik (2006).}

### III. C From an international perspective

19. Though India’s saving rate has been consistently higher than that of most other countries with comparable income, it has fallen short of the East Asian countries. As shown in the left panel of figure 4, India’s saving rate has steadily increased in the last four decades, from 18 percent in 1960s to 26 percent in the early 2000s. But even then, India’s current saving rate is lower than what the five East Asian countries had achieved by the 1980s. While the saving rate of the East Asian countries declined after the 1997 currency crises (and in case of Indonesia, Thailand and Korea Republic, the saving rates are yet to recover to the pre-crisis period), it was for a temporary period and currently all countries in the region except Indonesia exhibit saving rates that are considerably higher than those prevailing in India.

**Figure 4: India’s saving rate has been consistently lower than in the East Asian countries and its composition is significantly different than other countries**

![Figure 4](image)

Source: Development Data Platform, The World Bank; Author’s Own Estimate.

20. More than the difference in the level of savings, what is most striking is the difference in the composition of the saving. In all the East Asian countries as well as in the US, the corporate saving exceeds household saving by a magnitude of 10 percent (Korea) to nearly 400 percent in case of Philippines, while in case of India the reverse is true (right panel, figure 4). There does not seem to be any simple explanation to account for this anomaly and some of it can be attributed to the difference in the measurement techniques across countries. For example, because of India’s high depreciation allowance for tax purposes (as much as 25 percent), it is believed that Indian corporate tend to claim higher
depreciation of their capita assets and if the firms report their saving net of these depreciations, their investments are likely to be under-reported\(^\text{13}\).

21. A comparison of the saving rate between India and China provides some interesting contrasts (figure-5). Indian households are found to save more than their Chinese counterparts, while India’s corporate and public savings are considerably lower than the corresponding numbers in China. In fact, there is a whopping 15-18 percentage points difference between the enterprise saving in China and the private corporate saving in India which accounts for bulk of the difference in the aggregate saving between the two countries. In China, household saving to GDP ratio has fallen in recent years, which has been more than offset by the increase in enterprise and public sector saving to GDP ratio. In India, household saving fell in 2004/05, and subsequent econometric analysis seem to point towards a plateauing of India’s household saving rate in the near term (as has already happened in China).

**Figure 5: India’s saving rate has been consistently lower than in the East Asian countries**

<table>
<thead>
<tr>
<th>Household</th>
<th>Enterprise / Private Corporate</th>
<th>Public Sector</th>
</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>China</td>
<td>India</td>
</tr>
</tbody>
</table>

Source: Development Data Platform, The World Bank; Author’s Own Estimate.

### III.D Demography and Saving

22. The life-cycle hypothesis yields a rich set of predictions about the effects of demographic change on aggregate saving. Some studies in the literature have tried to explain international differences in saving rates by international differences in population structure and have found evidence in support of such a hypothesis (see, e.g., Leff, 1980; Ram, 1982; Hammer, 1986; Mason, 1987 and 1988; and Gersovitz, 1988). Lahiri (1989) finds that the age-dependency ratio (the fraction of the population under the age of 16 and over the age of 64) is a significant determinant of private savings in India. Similarly, Muhleisen (1996) finds that age-dependency ratio is the most significant determinant of private savings in India.

23. The current population structure of the Indian society is favorably positioned to generate higher savings in the future and to sustain a high level of saving rate for a longer period of time than most countries in East Asia. This is because, the proportion of working age population in the total population is currently lower in India than in the East Asia countries, but this share will rise for another 30 years in India while it will fall in many East Asian countries. Since fertility rate declined earlier and much more rapidly in East Asia than in India, the populations in the former set of countries will mature early and will

\(^{13}\) There was a similar problem with the measurement of FDI in India. It did not include retained earnings as part of FDI, while most other countries did included them, resulting in underestimation of India’s FDI numbers. The accounting issue has now been addressed.
age early than in India. According to UN projections, the share of working age population in total population is expected to peak in Indonesia and Republic of Korea in 2010, in China in 2015, in Thailand in 2025 and in Malaysia and India in 2035 (figure 6). India is therefore potentially better positioned to reap the dividend of its demographic structure longer than most East Asian countries, although realizing this potential will neither be easy nor quick.  

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24. During the past four and a half decades, the relationship between the share of working age population in total population and savings has been positive and robust in India, as is also the case with most of the East Asian countries. But because fertility rate did not change rapidly in India, the variation in the share of working age population in total population has been considerably lower in India than in the East Asian countries. For example, between 1960 and 2004, the share of working age population in the total population varied between 56-63 percent in India, while corresponding range was 53-73 percent in the Republic of Korea and 51-71 percent in case of Thailand. Clearly, the slow pace of change in its population structure is one of the explanations why India’s saving rate has not increased as rapidly as is the case in most East Asian countries.

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III.E Level of Financial Development and Saving

25. The level of financial development of a country can have considerable bearing on its saving rate. Financial development allows households and firms to use collateral more widely to reduce down payments on loans for housing and consumer durables and permits them to finance higher consumption at the current level of income (and thereby could reduce ‘precautionary motive’ of private savings). Several individual and cross-country studies have found evidence in support of such a hypothesis. But as Loayza, Schmidt-Hebbel, and Serven (2000), among others, have shown that, if saving rates are adjusted to include expenditure on consumer durables, financial development may not necessarily reduce the volume of private savings, though it could affect composition of their assets to favor durable goods (e.g., in India, household savings often take the form of gold and silver jewelries). Greater financial development could

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14 The current demography trend is as much an opportunity as it can be a liability. To reap the demographic dividends, the population has to be educated, trained and employable. For a critic of the demography dividends hypothesis, see Acharya (2005).
even facilitate increased savings by providing credible and stable rules of financial intermediation and a large menu of financial products to invest in. Muhleisen (1996), using data on India, finds that the ratio of M2 to GDP – a proxy for financial depth – has a positive long-run relationship with private savings.

26. In case of the East Asian countries, higher saving rate and increased deepening of financial sector has gone hand in hand. These countries have experienced dramatic expansion of domestic credit during the last four and a half decades, especially when compared to India. For example, while the ratio of domestic credit to GDP in India increased from 8 percent in 1960-61 to 37 percent in 2004-05, the corresponding numbers for Malaysia are 6 and 158 percent and in case of Republic of Korea, they are 12 and 113 percent respectively (figure 7). Clearly India has pursued a far more conservative credit policy than its East Asian counterparts. If and when the depth of India’s financial sector is deepened, will it mimic the experience of East Asian countries or will it spur greater consumption and lower the saving rate, as has happened in some of the developed countries? The answer is not obvious, though subsequent econometric results suggest that India’s saving rate is likely to fall with increased financial depth of its economy.

![Figure 7: The level of financial depth has been positively correlated with saving rates](image)

Source: Development Data Platform, The World Bank; Author’s Own Estimate.

### III.F Growth and Saving

27. There is a large body of empirical literature that focuses on the question of causality between saving and growth (Carroll and Weil [1993], Rodrik [2000]). Some of the studies in this literature find that growth drives saving rather than the reverse, especially over the short horizons. The result has led some analysts to suggest that saving should not receive high priority in designing growth strategies: once the obstacles to growth are removed, the response to saving could be nearly automatic (Gavin, Hausmann and Talvi [1996]). We are unlikely to resolve this debate by looking at the growth-saving relationship in the Indian context, especially because granger-causality test between the two variables using Indian data shows that neither of them cause the other. This result is subsequently validated in the regression results reported in the next section.
IV. EMPIRICAL EXPLANATION OF INDIA’S SAVINGS AND INVESTMENT

28. In this section we conduct a quantitative analysis of the determinants of savings and investment in India. While selecting the dependent variables, we take into account the literature on Indian saving, the cross-country studies on saving and the nature and availability of data for the entire period (i.e., 1950-51 to 2004-05). The explanatory variables we consider are the following: lagged dependent variable, ratio of public saving to GDP, the share of working age population in total population, lagged ratio of domestic credit to GDP, lagged growth rate, inflation rate and a reform dummy that takes a value of 1 from 1991 onwards and 0 for all other years. The specification of the regression equation is dependant on the series property of the dependent variables, i.e., whether saving and investment rates are stationary or not.

29. Tests to check the time series property of saving and investment rates show that both the series are more likely to be trend stationary than non-stationary. In case of the saving rate, the augmented Dickey-Fuller unit root test yielded t-statistics of -3.64, which is higher than the critical values at 5 percent (-3.49) and 10 percent (-3.17) but lower than 1 percent (-4.13) significance level. Thus the null hypothesis that the saving rate has a unit root can be rejected at 10 and 5 percent significance level but not at 1 percent level. Given that unit root tests cannot precisely discriminate between trend stationary and non-stationary series without sufficient observations (and we have only 54 observations), it was logical to assume that the saving rate is trend stationary. Similar results were obtained for the investment rate.

<table>
<thead>
<tr>
<th>Table 2: Regression Results</th>
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<tbody>
<tr>
<td>Dependent variable: Gross Domestic Saving/GDP</td>
</tr>
<tr>
<td>Explanatory Var.</td>
</tr>
<tr>
<td>Constant</td>
</tr>
<tr>
<td>Time Trend</td>
</tr>
<tr>
<td>Lagged Dependent Variable</td>
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<tr>
<td>Public saving/GDP</td>
</tr>
<tr>
<td>Reform Dummy</td>
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<tr>
<td>Share of working age population</td>
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<tr>
<td>Domestic Credit/GDP (-1)</td>
</tr>
<tr>
<td>GDP growth rate (-1)</td>
</tr>
<tr>
<td>Adjusted R square</td>
</tr>
<tr>
<td>Durbin-Watson stat</td>
</tr>
<tr>
<td>No. of observations</td>
</tr>
</tbody>
</table>

Note: The regressions use ordinary least squares (OLS) to estimate the equations; The OLS estimates are based on white heteroskedastically-consistent standard errors and covariance; *, **, and *** indicate that the estimates are statistically significant at 10, 5, and 1 percent respectively; The time trend term is assumed to remain invariant during the forecasting period.

30. The results of the regression analysis are reported in Table 2. In the saving regression, the coefficient of the public saving to GDP ratio and the share of working age population are both found to be positive and significant. A one percentage point increase in public saving is associated with a 0.67 percentage points improvement in aggregate saving, highlighting the importance of prudent fiscal outcomes in India. It also shows that every one percentage point increase in the share of working age population is likely to raise saving rate by 0.88 percentage points. A negative and significant coefficient for the reform dummy indicates that India’s saving rate has fallen in the post-reform period. This is not entirely unexpected, given that at the time of opening of the economy in 1991-92, Indian households and firms had a lot of pent-up demand for consumer goods and durables—both domestic and imports—satisfying which would have reduced the momentum for saving. The coefficient for domestic credit/GDP ratio is found to be negative and significant, which is consistent with the literature that shows that savings
(measured without consumer durables) tend to fall with increasing financial depth of the economy. As Loayza, Schmidt-Hebbel, and Serven (2000) have shown for India, when saving rates are adjusted to include expenditure on consumer durables, financial development does not reduce the volume of private savings.

31. The results for the investment regression are similar to the savings regression. Most variables have the right sign, though reform dummy and domestic credit are found to be not significant predictors of investment rate. The coefficient of public savings and demography variables continue to remain positive and significant.

32. How are India’s saving and investment rates likely to evolve in the future? Using the estimated coefficients in Table 2 we project these variables into year 2020 (figure-8). Saving rate after modestly increasing till’ 2010, begins to decline. Investment rate however increases to around 34 percent before beginning to decline. India’s reliance on external capital to bridge the gap between its gross domestic investment and saving is projected to increase in the future. Note that even in 2010, India barely reaches the saving and investment rates we currently observe in the East Asian countries.

Note. The following assumptions about the explanatory variables are made to estimate the above forecast: (i) Public saving to GDP ratio to increase by 0.5 percentage points each year until it reaches 5 percent and remains constant thereafter; (ii) The demographic changes are based on UN projections; (iii) Domestic credit to GDP ratio increases by 5 percentage points each year; and (iv) GDP growth is assumed to be constant at 8 percent.

V. INDIA’S PATTERN OF GROWTH AND FACTOR INTENSITIES

33. It is a well established fact that growth in East Asia has come mostly through rapid growth in the manufacturing sector and much of this growth has been made possible due to rapid accumulation of capital (as well as labor). In contrast, India’s high growth rate is primarily based on fast growing services sub-sectors (e.g., business services, banking and insurance, trade etc.) and these sub-sectors are known to use much less physical capital than the manufacturing and infrastructure sectors (top panel, 15)

For example, capital intensity of the electricity, gas and water sub-sector is nearly three times that of the business services sector. Moreover, between 1993-94 and 2004-05, capital-output ratio fell in all sub-sectors and some of the largest declines were recorded in the services sub-sectors, like financing, insurance, real estate and business services, and transport, storage and communication.

Figure 9: India’s capital-output ratio has declined across all sub-sectors and its fast growing sub-sectors tend to have lower capital intensities

Source: Reserve Bank of India, CSO, India Stat and Author’s estimates

Note: While India’s investment to GDP is increasing, why is its capital-output ratio falling? That’s because the above capital output ratios are net capital stock and given its high depreciation rate, while the gross capital-output ratio may be rising the net capital-output ratio is falling!

34. Not only the services sector on average used less physical capital per unit of output, but it also happened to be sector that was driving the overall growth rate of the economy. Thus the multiplicative effect of the two resulted in low capital-output ratio for the entire economy. Using a crude estimate of capital-output ratio we prepare a scatter plot between capital intensity and the growth rate (both in current prices).

For in-depth discussion on India’s pattern of growth, see Kochhar, Kumar, Rajan, Subramanian and Tokatlidis (2006).
and constant prices) across fourteen sub-sectors in the economy (bottom panel, figure 9). The relationship between the two variables is found to be mildly negative, which indicates that faster growing sub-sectors in the Indian economy are likely to have lower capital-output ratio than the slower growing sub-sectors. Assuming that the current capital-output ratios are market determined and undistorted by any government policies and regulations, it implies that India’s growth generating process has been less capital intensive than it would have been the case if it had relied on manufacturing-led growth.

35. From an international perspective, Indian economy does exhibit lower capital intensities and higher utilization rate for installed capacity, especially when compared with the East Asian countries. As shown below, India’s capital-output ratio has hovered around 2, relative to 3-4 for the East Asian countries. Interestingly, India has not been an economical user of capital historically, as its capital-output ratio was considerably higher than the East Asian average during the 1970s and the 1980s (not shown here). India’s lower capital-output ratio reflects higher productivity as well as more intensive use of its existing capacity as shown below.

![Figure 10: India has lower capita-output ratio and higher utilization of installed capacity than most East Asian countries](image)

<table>
<thead>
<tr>
<th>Average utilization rate of installed productive capacity in industry in 2003/2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>• United States 77% (Federal Reserve measure)</td>
</tr>
<tr>
<td>• Japan 83-86% (Bank of Japan)</td>
</tr>
<tr>
<td>• European Union 82% (Bank of Spain estimate)</td>
</tr>
<tr>
<td>• Australia 81% (National Bank estimate)</td>
</tr>
<tr>
<td>• Brazil 60-80% (various sources)</td>
</tr>
<tr>
<td>• <strong>India 70%</strong> (Hindu business line)</td>
</tr>
<tr>
<td>• China perhaps 60% (various sources)</td>
</tr>
<tr>
<td>• Turkey 72.5% (July 2001; Statistics Bureau)</td>
</tr>
<tr>
<td>• Canada 87% (Statistics Canada)</td>
</tr>
</tbody>
</table>


36. In a recent paper, Kochhar et al (2006) explore the policy and institutional underpinnings to India’s pattern of growth. They find that India’s skilled intensive manufacturing, which was already high in 1980 despite its lower level of per capita income, has been increasing and is at levels reached by Malaysia or Korea at much higher levels of per capita income. In terms of productivity, they find that the relative productivity of skill-intensive industries has increased compared to large scale capital intensive industries. Similarly, at the sub-national level, they find that either fast growing states have constancy or decline in their share of manufacturing or where there has been an increase, it has occurred in skill (and capital) intensive industries. Interestingly, pattern of growth of some of the fast growing Indian states has started to mimic the pattern of industrial countries at nearly a quarter or one-fifth of latter’s income levels.

37. Why is India’s pattern of growth so distinctive, especially when compared to countries in East Asia? Kochhar et al provides the following explanation: Relative to other comparable poor countries,

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17 International comparison of capital-output ratio is fraught with many risks. The depreciation rate and accounting procedures tend to vary considerably across countries and so these numbers should be interpreted with caution.
India’s emphasis on tertiary education, combined with a variety of policy distortions, may have channeled the manufacturing sector into more skill-intensive industries. India spent 86 percent of per capita GDP per student in tertiary education in 2000 while it spent 14 percent of per capita GDP per student in primary education. In contrast, China spent 10.7 and 12.1 percent respectively of per capita GDP per student in tertiary and primary education. This far greater investment in tertiary education for a country of its per capita income—of which the Indian Institute of Technology and the Indian Institute of Management are just the best-known examples—resulted in the plentiful availability of highly skilled and cheap labor. This then enabled India to generate relatively greater value added and employment in skill-intensive industries as compared to the typical poor country.

VI. CONCLUDING REMARKS

38. Based on its current level of saving and investment rates, it seems, India is trying to achieve the East Asian growth rate with South Asian level saving and investment rates. Will it succeed in its objective? This paper answers it in affirmative. It finds evidence in support of the hypothesis that, while India’s GDP growth rate is slowly converging to the East Asian level, its savings and investment rates are not. So clearly, India is not following some of the commonly known stylized facts concerning growth, saving and investment rates that are observed in the East Asian countries during their growth transition. But can this converging growth and non-converging saving pattern be sustained?

39. Empirical examination of India’s domestic saving and investment rates show that they are likely to register only moderate increase in the medium term and are unlikely to reach the level seen in East Asia. While demographic composition will positively affect India’s savings, increased financial depth and continuing liberalization of the economy are likely to reduce it. To boost its growth, India therefore has to rely on more productive use of its capital stock and on external sources to finance its emerging investment-saving gap. Fortunately for India, its pattern of growth is such that it is likely to be less dependent on physical capital accumulation and more on human capital accumulation than has been the case with the East Asian countries. This imply that with appropriate macroeconomic and structural reforms, India could be able to attract the necessary external capital and continue to preserve its low capital intensity pattern of growth to achieve the 8 percent growth rate.
Bibliography


Devarajan, Shantayanan and Ijaz Nabi. 2006.


