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**Research Report**

## Assessing the mid-term growth outlook for the Indian economy

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Jamie Barker and Risto Herrala

## Assessing the mid-term growth outlook for the Indian economy



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Jamie Barker and Risto Herrala

## Assessing the mid-term growth outlook for the Indian economy

### Abstract

Since embarking on economic reform in 1991, India has experienced three decades of rapid economic development. Recently, however, there has been significant uncertainty about the growth outlook of the Indian economy in the mid-term perspective. In this paper we use standard regression techniques to project the path of the Indian economy over the next 4 years. The analysis, which abstracts from the pandemic period, mainly serves as support to forecasting the global economy. After the pandemic, GDP growth is projected to rebound this year and then slide to-wards 6 – 7% in the medium term. The analysis broadly agrees with the recent projections of India’s mid-term growth rate by other institutions.

Keywords: Indian economy, forecasting, GDP growth

## 1. Introduction

Since embarking on economic reform in 1991, India has experienced three decades of rapid economic development. On average, its economy has grown by almost 7% per annum, overtaking Japan in 2011 to become the third largest economy in the world (adjusted for purchasing power). At current market exchange rates, India accounts for around 3% of global production and 2% of exports, with a particularly strong global presence in IT services.

With GDP per capita at around US\$2000 the Indian economy still has plenty of room for expansion, but despite this, it has grown slower than many other Asian economies over the last few decades. In the dynamic East-Asian region, China, Mongolia and Vietnam have grown even faster than India, even though they are now at significantly higher income levels. Most of the countries in the region that are poorer than India, such as Nepal and Cambodia, have been catching up in terms of GDP per capita, and neighboring Bangladesh overtook India by this measure in 2020.

Building on previous empirical work (Bhattacharya et. al. ,2019; Iyer and Gupta, 2019), the aim of this note is to estimate the path of the Indian economy over the next 4 years. Using standard econometric methods, we assess the role of selected internal and external factors on India's growth performance, and project a mid-term forecast for its economy. The analysis, which abstracts from the pandemic period, mainly serves as support to forecasting the global economy.

## 2. The empirical approach

A multitude of approaches can be taken to forecasting economic growth rates, but previous attempts to forecast medium-run growth in India generally fall into one of three categories. The simplest use a univariate filter such as Hodrick-Prescott to isolate the “trend” or long-run component of GDP growth (such as Behera and Bhoi (2016) at the Reserve Bank of India). Another popular approach – as used by Oura (2007) at the International Monetary Fund and Patnaik and Pundit (2014) at the Asian Development Bank – is to construct a production function based on labor, human capital, physical capital and technology or TFP, and to estimate each element separately before combining them into a forecast for GDP growth.<sup>1</sup> Finally, there is the multivariate estimation approach, where relevant components for forecasting GDP growth are identified through regression models, rather than theory or an identity. Recent investigations taking this approach include Bhattacharya et. al. (2019) and Iyer and Gupta (2019).

Our empirical approach also belongs to the third category, although we employ a much smaller set of exogenous variables and simpler estimation techniques than the two papers mentioned above. The choice for a simplified regression approach reflects the aim to integrate the Indian economy into a global short- to mid-term forecasting framework. In that context, all the exogenous variables in the forecasting model need to be projected individually, which creates extra work and additional, non-transparent, sources of forecast error. We therefore aim to capture the main development trends in the Indian economy with a parsimonious model that builds on exogenous variables for which reliable forecasts are readily available.

To this end, it is useful in the context of a global forecast to be able to project the Indian GDP growth rate in light of what is projected for other countries. We therefore include GDP growth globally (excluding India) as an exogenous variable in the forecasting model. We also include India's

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<sup>1</sup> The output identity approach is similar, but instead of estimating elements of a theoretical production function, estimates are instead constructed for an accounting identity.

working age population growth. Other development trends in India, including those related to deregulation, education, rule of law, technology and openness to trade and finance, are captured in the model implicitly by an autoregressive term and a trend term.

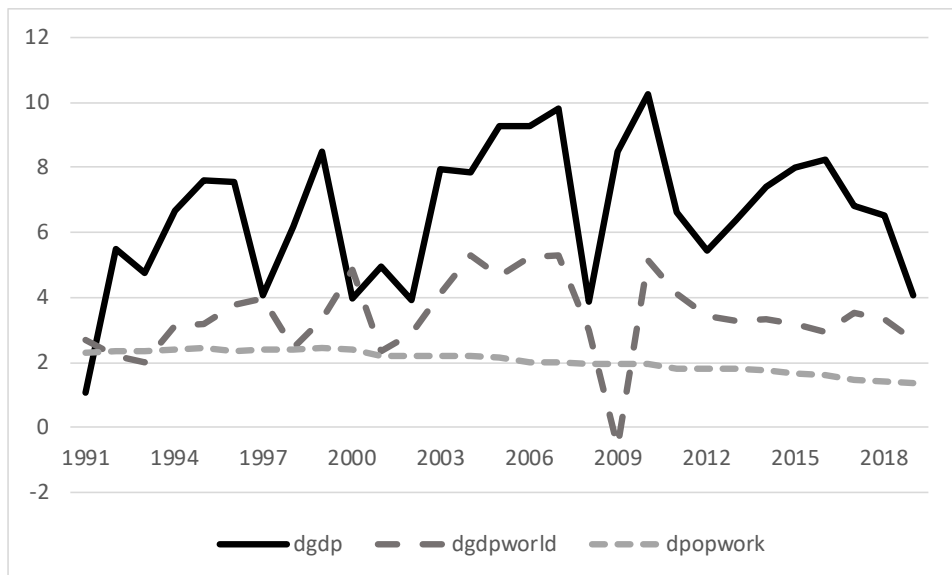
Formally, we estimate by OLS the following dynamic regression model:

$$dgdp_{t,India} = \alpha_1 + D2009 + time\ trend + \alpha_2 dgdp_{t-1,India} + \alpha_3 dgdp_{t,world} + \alpha_4 dpopwork_{t,India} + \varepsilon_t$$

where  $t$  denotes year,  $D2009$  is a dummy for the year 2009,  $trend$  is a time trend,  $dgdp$  is real GDP growth in India in percent,  $dpopwork$  is working age population growth in percent, and  $\varepsilon$  is the error term. The global gdp growth rate  $dgdp_{t,world}$  excludes India. The parameter  $\alpha_1$  is a constant term;  $\alpha_2$  and  $time\ trend$  capture dynamic growth factors as discussed above;  $\alpha_3$  indicates the co-movement of Indian economic growth with the global economy (excluding India); and  $\alpha_4$  captures the macroeconomic impact of India’s labor force growth. The dummy variable for the year 2009 captures an outlier associated with the global financial crisis period.

We estimate the model by OLS using the sample 1991-2019 (the analysis abstracts from the ongoing pandemic). Annual Indian and global real GDP data is taken from the April 2021 edition of the IMF’s World Economic Outlook database, and working age population data is taken from UN-DESA’s World Population Prospects database. India is excluded from the global GDP growth rate using the country weights given in WEO database. These variables are exogenous in the medium term, and forecasts are available on a regular basis using the same two databases.

Chart 1. Data description



Notes: dgdp is Indian real GDP growth, dgdworld is global real GDP growth (excluding India) and dpopwork is the change in Indian working age population, all series in %. The Indian GDP data for year  $t$  refer to the fiscal year April  $t$  to March  $t+1$ .

Data sources: IMF WEO and UN World Population Prospects database, author calculations.

### 3. Model selection

Building on official (fiscal year) data, the estimations proceed from a general to a more restricted specification mainly based on t -tests (Table 1). This estimation strategy results in a parsimonious final model (5) with two highly statistically significant regressors, namely global economic growth and the year 2009 dummy. Column 6 displays a robustness check using calendar year data. The parameter estimates of the final model seem rational in terms of sign and quantity. Based on the R<sup>2</sup> statistic, the final model explains about 35% of variation in India's economic growth rate. Based on Wald tests, we did not find signs of significant regime breaks in the model. Below, we refer to Model 5 (which only includes statistically significant variables) as the baseline model, and Model 1 (which is the most general model) as the alternative model.

Table 1. Estimation results

| VARIABLES    | (1)                | (2)                 | (3)                 | (4)                 | (5)                 | (6)                 |
|--------------|--------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
|              | dgdp               | dgdp                | dgdp                | dgdp                | dgdp                | gdgpcor             |
| L.dgdp       | -0.265<br>(0.241)  | -0.283<br>(0.238)   | -0.251<br>(0.244)   |                     |                     |                     |
| dpopwork     | 2.946<br>(3.662)   |                     | -1.430<br>(1.152)   |                     |                     |                     |
| gdgdpworld   | 1.353**<br>(0.523) | 1.545***<br>(0.462) | 1.609***<br>(0.487) | 1.196***<br>(0.360) | 1.273***<br>(0.356) | 1.279***<br>(0.350) |
| time trend   | 0.183<br>(0.145)   | 0.0716<br>(0.0448)  |                     | 0.0481<br>(0.0405)  |                     |                     |
| D2009        | 6.351**<br>(2.670) | 7.259***<br>(2.402) | 7.775***<br>(2.447) | 6.718***<br>(2.377) | 7.236***<br>(2.355) | 7.267***<br>(2.314) |
| Constant     | -5.264<br>(8.983)  | 1.878<br>(1.367)    | 5.429*<br>(2.931)   | 1.558<br>(1.351)    | 1.998<br>(1.310)    | 1.951<br>(1.285)    |
| Observations | 29                 | 29                  | 29                  | 29                  | 29                  | 29                  |
| R-squared    | 0.43               | 0.42                | 0.39                | 0.38                | 0.35                | 0.35                |

Standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Notes: dgdp is Indian real GDP growth in %; gdgdpworld is global real GDP growth excluding India in %; dpopwork is the change in Indian working age population in %; trend is a time trend (1991=1); D2009 is a dummy for year 2009. L. denotes first lag. The Indian data for year t refer to the fiscal year April t to March t+1 except in Model 6, which is based on calendar corrected GDP estimates for India that follow the standard calendar year.

Data sources: IMF WEO and UN World Population Prospects database

These estimations indicate that variation in India's economic growth is substantially dependent on global economic developments. Based on the parameter estimates, the contribution of global economic growth on India's historical (1991 – 2019) average growth rate of 6.6% is about two thirds,



while that of other factors is therefore about one third. The growth rate of India's working age population does not appear significant, possibly reflecting the long lags associated with its macroeconomic effects.

The main findings are in broad terms robust<sup>2</sup> to lagging the global growth (excluding India) variable; adding global trade or a second dummy for the year 2008 as an explanatory variable; adding real investment growth (lagged by one year) as an explanatory variable; adding a step dummy for year 2000 when FDI approval was markedly enhanced; using robust standard errors; and using per capita GDP growth or an adjusted calendar year series for GDP growth as the endogenous variable (shown as Model 6 in Table 1). Undoubtedly, India's economic reform has played a crucial role in its growth performance. We attempted to explicitly control the deregulation process by including dummies based on timing of the regulatory change, but this was not effective, most likely due to the associated endogeneity and long lag times.

Since the result that the Indian economy closely follows the international economy was surprising given the previous literature (which emphasizes domestic factors as referenced above), we explored the issue further. We found that the VIX (volatility index, one year lagged), which is widely used in econometric models to characterize global financial volatility, is a statistically significant regressor that is also associated with a marked drop in the statistical significance of the global growth variable. Based on this finding we speculate that global GDP growth functions in the model in part as a proxy to global financial conditions. During periods of high global economic growth, global financial conditions tend to be benign, thereby promoting access to finance for emerging economies like India, which in turn can drive GDP growth. Despite its statistical and theoretical significance, we choose not to include the VIX as an exogenous variable in the forecasting model because it is hard to project reliably.

A study of the out of sample forecasting properties of the baseline model is complicated by the global pandemic, which started in 2020. We instead re-estimated the baseline Model (5) over the shorter sample period 1991-2016, and then used the years 2017-2019 to assess its forecasting properties (not shown). Re-estimation over the shorter sample does not markedly change the parameter estimates of the model. The average forecast error of the re-estimated model over the three years is -0.2 pp, or about -5% of the average Indian GDP growth rate. We deem this level of accuracy to be satisfactory for present purposes.

## 4. Projections

Our projections of Indian GDP build on the forecasts of the global economy by the IMF and the projections of India's labor force growth by the UN. During the projection window (2021/22-2024/5), the global economy is forecasted to rebound strongly in 2021 (after a sharp contraction in 2020), and then gradually return to growth of around 3% per annum. Looking at the second major factor in our projections, Indian working age population growth is expected to slow from 1.4 % to 1.1 % per annum.

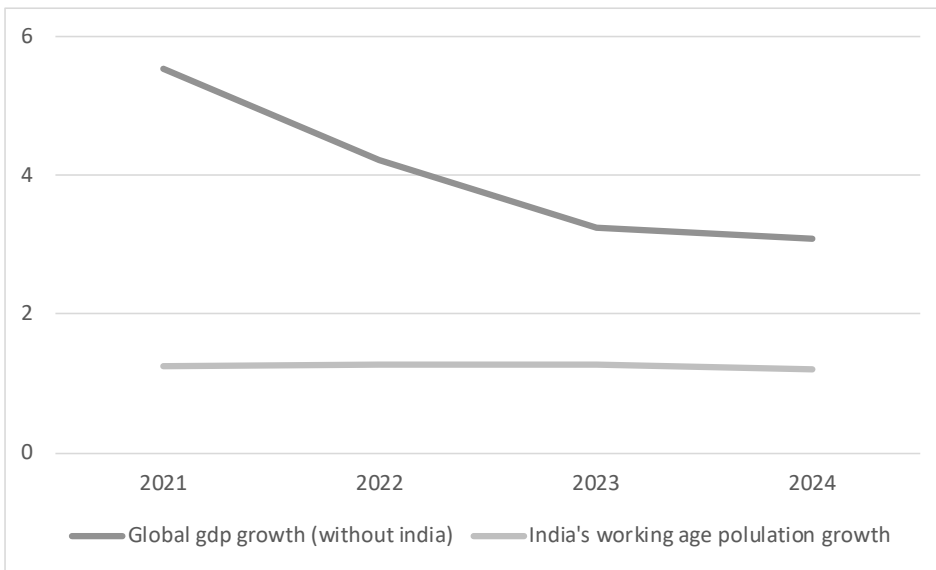
Our projections for India are subject to the caveat that there is at present much uncertainty about the progression of the pandemic and the strength and speed of the recovery in India and also globally. Fortunately, the outlooks for India's three largest export markets (the US, China and the UAE, which together purchase almost one third of Indian exports) are fairly strong at present.

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<sup>2</sup> The estimation results for robustness checks are not reported here in full but are available upon request.

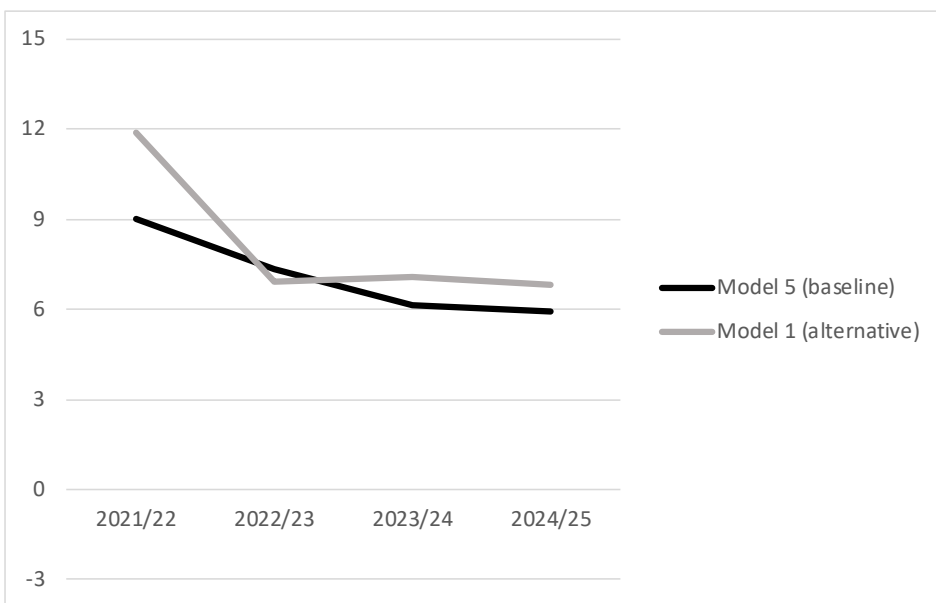
The baseline projection (Model 5 in Table 1) and the alternative projection (Model 1 in Table 1) of Indian economic growth display broadly similar dynamics. Both models (similar to the global forecast from the IMF) generate a strong post-pandemic rebound in FY2021/22, followed by a gradual moderation in FY2022/23-2024/25 (Chart 3). In the baseline projection the Indian economy rebounds by 9% in FY2021/22, and economic growth settles at around 6% by the end of the projection window (Table 2). The alternative projection is somewhat more optimistic, with a bounceback of almost 12% and a mid-term growth rate of around 7%. The two forecasts are broadly similar to the medium-term GDP growth forecasts from the IMF (Table 2).

Chart 2. Input variables during the projection window



Notes: The projections are in %.

Chart 3. Selected projections of GDP growth



Notes: The projections are in % for Indian fiscal years (from April to March).

Table 2. Baseline and alternative projections, and IMF forecast

| <u>Fiscal</u><br><u>Year</u> | <u>Model 5</u><br><u>(baseline)</u> | <u>Model 1 (al-</u><br><u>ternative)</u> | <u>IMF</u><br><u>(Apr. 2021 WEO)</u> |
|------------------------------|-------------------------------------|--|--------------------------------------|
| 2021/22                      | 9.0                                 | 11.9                                     | 12.9                                 |
| 2022/23                      | 7.4                                 | 6.9                                      | 6.9                                  |
| 2023/24                      | 6.1                                 | 7.1                                      | 6.8                                  |
| 2024/25                      | 5.9                                 | 6.8                                      | 6.7                                  |

Notes: The projections are in % for Indian fiscal years (from April to March).

We note that there are significant risks around the forecasts in both directions. In the short term, the speed of recovery of the global and Indian economies from the pandemic is highly uncertain. In the longer term, India's economic performance depends in part on the implementation of its reform agenda.

## 5. Discussion and conclusions

Our analysis broadly agrees with the recent projections of India's mid-term growth rate by other institutions. After the pandemic, GDP growth is projected to rebound this year and then slide towards 6 – 7% in the medium term. This projection implies that, after the ongoing pandemic subsides, India would continue to catch up to the level of economic welfare in the developed world, and at a faster rate than almost any other large emerging market economy. The Indian economy is not yet large enough or open enough to have a major impact on the global arena. However, its continued economic development may have strong influence within its main trading sectors (IT services, business services and commodities such as precious stones). For India, the UK is among the largest trading partners with a 2.7% share of exports and 1.4% of imports in 2019. India covered about 1.3% of the exports and 1.4% of the imports of the UK. It covered about 0.8% of the exports and about 0.5 % of the imports of Finland.

A notable finding is the apparent strong dependence of the Indian economy on global economic developments and the associated global financial conditions. Whilst this is fairly common for emerging market economies, it contrasts somewhat with the common presumption that the Indian economy is relatively closed. Notwithstanding the current government's protectionist stance, the Indian economy has opened substantially over recent decades. Since the early 1990's, its exports to GDP ratio has more than doubled to 20% of GDP. In 2019, India accounted for around 2% of global exports. While its financial system is still relatively closed in international comparison (Herrala, 2020), India is dependent on external capital flows to finance its current account deficit.

Success in implementing domestic economic reforms is likely to be the key determinant of how India fares in relation to our baseline prediction. India's economic rise since 1991 has been built in part on the gradual opening of its economy to private enterprise, both through the privatization state-owned enterprises and through opening more sectors of the economy to competition. Although the rate of reform slowed after 2004, it has picked up again after the National Democratic Alliance led by the Bharatiya Janata party (BJP) gained power in 2014.

The most substantial reforms enacted during BJP's first term (2014-2019) were a rationalization of indirect taxation, the relaxation of restrictions on inward FDI, opening up the coal sector to private competition, and re-initiating the privatization of state-owned companies. During its ongoing second term it has approved two major legislative reforms in agriculture and labor, which if successfully

implemented have the potential to markedly boost labor productivity in the still largely agrarian country.

There are still many areas where further changes could be made, including banking sector reform, greater capital account liberalization, and land law reform. However, despite the current government's reformist intentions, there are a number of reasons to believe that the pace of change may slow over the coming years. Much of the "low-hanging fruit" – both in terms of impact and popular support – may already have been picked. Reforms of individual sectors (especially agriculture) are increasingly met with significant resistance from organized groups.

Additionally, many core sectors such as health and education are primarily outside of the control of the national government and are instead managed by the state administrations. Even for those sectors that do fall under national control, key public institutions such as regulators often do not have sufficient capacity to implement major new reforms quickly and successfully. Finally, the government is prepared to wait for an offer that meets its valuation when privatizing a state-owned enterprise, as can be seen in the case of Air India. Whilst this is fiscally prudent, it does still slow the pace of reforms.

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