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Unleashing India's Growth Potential

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Unleashing India's Growth Potential

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ABSTRACT: This paper analyzes the drivers of India's growth in the past five decades and considers baseline and upside scenarios of India's medium-term potential growth. Using a production function approach, the paper assesses the impact of the pandemic on the key factors of production and therefore its impact on medium-term growth. Successful implementation of wide-ranging structural reforms could help support productivity and potential growth over the medium term.

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WORKING PAPERS

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I. Introduction

The economic impact of COVID-19 on India has been substantial, as was the case for most emerging market countries around the world, with a decline in investment, employment, and productivity. While the recovery has been broad-based, as of end fiscal year 2021/22, there remain some gaps in contact-intensive services and micro, small, and medium enterprises (MSMEs) that were hard-hit by the pandemic. Despite improvements in labor market conditions after the initial shock, employment outcomes for youth and women continue to lag, which was the case structurally prior to the pandemic. Reduced access to education and training due to the pandemic may have also held back improvements in human capital, adversely impacting labor markets.

This paper aims to analyze the drivers of India's growth and potential growth. There are three main objectives. First, this paper examines the role of labor, capital, human capital, and TPF in explaining India's growth in the past 50 years and draws a comparison with other fast-growing economies. Second, this paper estimates the impact of the pandemic on potential growth, and projects potential growth in the medium term, accounting for the impact of the pandemic through different channels. Third, this paper considers both baseline and upside scenarios of medium-term potential growth. In the upside scenario, structural reforms play an important supporting role to unleash India's growth potential.

Our analysis is related to three main areas of the literature. The first strand examines the drivers of medium-term growth and potential growth in India, including Oura (2007), Anand et. al. (2014), Patnail and Pundit (2014), Bhoi and Behera (2016), and Reserve Bank of India (2022). The second strand examines the impact of the pandemic on productivity and medium-term growth more generally. These include Bloom et. al. (2020) and International Monetary Fund (2021, 2022a, 2022b). The third strand of the literature analyzes the role of structural reforms on output more broadly, including International Monetary Fund (2019) and Alesina et. al. (2020).

The results suggest that the pandemic affected multiple key factors of production (i.e., labor, human capital, physical capital, and total factor productivity (TFP)) leading to some medium-term impact under the baseline scenario. The upside scenario reveals that successful structural reforms could provide support to potential growth in the medium term and more than offset the losses from the pandemic.

The rest of the paper is organized as follows. Section II summarizes the data and methodology used in the paper. Section III investigates the drivers of India's economic growth in the past 50 years, prior to the pandemic. Second IV considers a baseline scenario and estimates the impact of the pandemic on potential growth in the medium term. Section V provides an illustrative

upside scenario of potential growth, by reflecting the impact of structural reforms and possible reform dividends. Section VI offers some concluding remarks.

II. Data and Methodology

On the data underlying our analysis, the historical growth accounting exercise from 1971 to 2019 was based on the Penn World Table (PWT) 10.0, with the latest observation in 2019.[1] For the pandemic period, we used several data sources for the estimation exercise, including the National Accounts (Haver Analytics/Central Statistical Office), the Periodic Labor Force Survey (PLFS), the United Nations/World Bank World Development Index, the Census of India and the CMIE Consumer Pyramids Household Survey (CMIE-CPHS). The choice of data sources follows the principal of relying on official sources to the extent possible and only using non-official sources when official data is not available.

Regarding methodology, we apply a production function approach to estimate potential growth in India. Specifically, we consider an augmented Cobb-Douglas production function (in logarithm), following Oura (2007):

$$y_t = a_t + \alpha \times k_t + (1 - \alpha) \times (n_t + h_t)$$

where y_t captures the potential growth rate; a_t is the total factor productivity (TFP) growth rate; k_t is the capital growth rate[2]; n_t captures the labor input (the total number of hours worked by all employed persons) growth rate; h_t is the human capital growth rate; and α is the share of capital.

For capital, we estimate the impact of the pandemic on capital in the medium-term using a perpetual inventory method:

$$K_{t+1} = (1 - \delta_t^K)K_t + I_t^K$$

where investment (I_t^K) growth underpinning the capital accumulation is consistent with the WEO projections, reflecting the initial contraction in investment from the onset of the pandemic (2020) and the rebound afterwards.

[1] Another candidate database for the growth accounting exercise was the KLEMS database by the Reserve Bank of India (Appendix 1). While the overall pictures and trends are similar between the two databases, there exist some differences due to methodologies. We decided to use PWT for consideration of international comparison as the database covers more than 180 countries.

[2] Capital growth rate captures capital services provided by structures, machinery, transport equipment, and other assets (such as software, intellectual property products, and cultivated assets). While land is not measured explicitly in PWT, structures that are built on land and cultivated assets that use land are captured in the definition of capital.

For labor input, we consider both employment and hours worked per worker and their evolution since the pandemic. For FY2020 and FY2021, we estimate the employment-to-population ratio using the quarterly PLFS for urban areas and both annual PLFS and CMIE-CPHS for rural areas. Given the reduction in sample size in CMIE-CPHS data following the pandemic, we adjust the sample size and weights to ensure a consistent and representative sample throughout our analysis. We also adjust the level difference between PLFS and CMIE-CPHS[3] to ensure that the rural employment data is broadly consistent with the official annual PLFS data.[4] In the forecast horizon (FY2022 onwards), we assume that the employment-to-population ratio returns to the pre-pandemic (2011-2019) trend. The population projections by the United Nations are then used to derive the actual number of employed persons. Working hours (per worker) are calculated based on the average hours worked by different employment statuses from the annual PLFS (till 2Q 2021). Then, we assume that hours worked gradually recover to the pre-pandemic level.

The estimation of growth in human capital ($\Phi(s)$) follows the approach of Penn World Tables,

$$\Phi(s) = \begin{cases} 0.134 * s \quad if\ s \leq 4 \\ 0.134 * 4 + 0.101 * (s-4) \quad if\ 4 < s \leq 8 \\ 0.134 * 4 + 0.101 * 4 + 0.068 * (s-4) \quad if\ s > 8 \end{cases}$$

where *s* denotes the average years of schooling for adults above 25.[5] In our analysis, the impact of the pandemic on human capital is captured through two main channels, which are lost years of schooling and forgone on-the-job training.

The losses from school closures are expected to materialize in the long run when affected students enter the labor market. Studies of advanced economies, including the U.S., show that the negative impact of learning disruptions on output could materialize after 2030 and peak from 2045 to 2050 (Fernald et al., 2021). Other studies suggest that the learning losses could lead to a 3 percent decline in long-run output in an advanced country (IMF, 2022a), but the size of the losses could be smaller in developing countries (Samaniego et al., 2022). However, these studies assumed that schools and students would not compensate for any learning losses, which is not the case in most countries given the introduction of various catch-up programs. As the impact of education on growth would only materialize over the long horizon and is highly uncertain, we do not factor in the impact of school closure in this paper as in other studies on medium-term pandemic impact (IMF, 2022b).

[3] The analysis by Abraham and Shrivastava (2022) indicated that there is a large difference between the PLFS and the CMIE data regarding female employment, possibly because of a difference in reference period and data collection methodology.

[4] See Appendix 2 for the detailed estimation process.

[5] The coefficients of equations are the rate of return to education, based on Mincer type regression analysis from Psacharopoulos (1994). The data for average years of schooling is from Barro and Lee (2013) in the case of India. See the documentation at the Penn World Table home page for more details.

We estimate the impact of forgone on-the-job training based on the lost work experience due to reduced working hours and loss of employment during the pandemic. The estimation approach in this paper is closely related to IMF (2022b), which examined the impact of human capital losses in the U.K. by considering the loss of labor hours and wage return of an extra year's experience on the job.

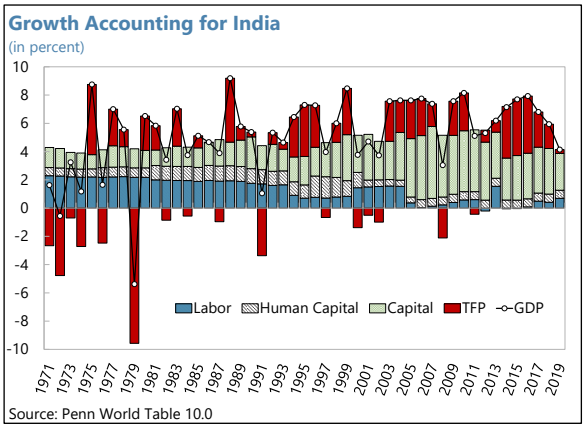
For TFP, we consider a decline in productivity due to a reallocation of labor from productivity sectors like industries to less productive sectors like agriculture. In our analysis, labor productivity is calculated as the ratio of gross value added and employment by sector. The relationship between labor productivity growth and TFP growth is estimated based on historical data from 1985 to 2019. Other channels of impact on productivity include resource mismatches, a decline in competition due the exit of firms, and diminished research and development expenditure. However, data from these other channels remain limited for purposes of quantifying the impact on TFP. The impact of digitalization is captured by the realized investment growth rates and gross value added that are captured in this paper.

III. What Drives India's Past Growth?

First, we aim to answer the question of what drove India's economic growth prior to the pandemic. Figure 1 presents a chart of growth accounting for four factors of production for India from 1971 to 2019. Statistical tests suggest three distinct growth phases during this period: 1) low growth in the 1970s with inward-looking policies; 2) about 5.5 percent average growth rate during 1980-2002 with the start of liberalization and outward-oriented policies; and 3) high growth period from the early 2000s until the pandemic (Patra, 2022).

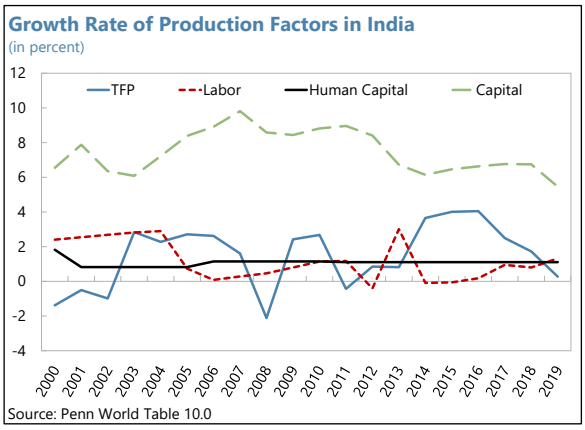
There are several interesting observations from Figure 1. First, labor appears to be one of the most important drivers of India's growth in the 70s and 80s. Second, the contribution from capital picked up in late 90s and 2000s. For example, capital played a predominant role in driving growth from 2005 to 2010, when the role of labor declined sharply. Third, more recently, but prior to the recent economic slowdown, TFP growth played an important role in supporting growth, together with capital. The increased contribution of capital and TFP growth could be attributed to the 1991 market reforms (such as trade liberalization, domestic deregulation, and privatization), succeeding the pro-business reforms in the 1980s (Das et al., 2021). The recent higher TFP contributions may be associated with an increase in foreign direct investment (Ghosh and Parab, 2021) and rapid growth in the services sector as suggested by the Indian KLEMS database. However, despite rapid growth following these reforms, the scope of job creation was relatively limited, and labor force participation declined, especially among female workers (Dasgupta and Kar, 2018).

Figure 1. Growth Accounting for India



Having seen the historical growth contribution, we then examine the growth rate of each factor of production over the same period (Figure 2). The growth rate of capital picked up gradually to peak right before the global financial crisis. While the growth rate of labor declined over the past 20 years, human capital growth has been relatively stable. More recently, the slowdown in GDP growth before the pandemic was largely driven by slower growth in capital and TFP.

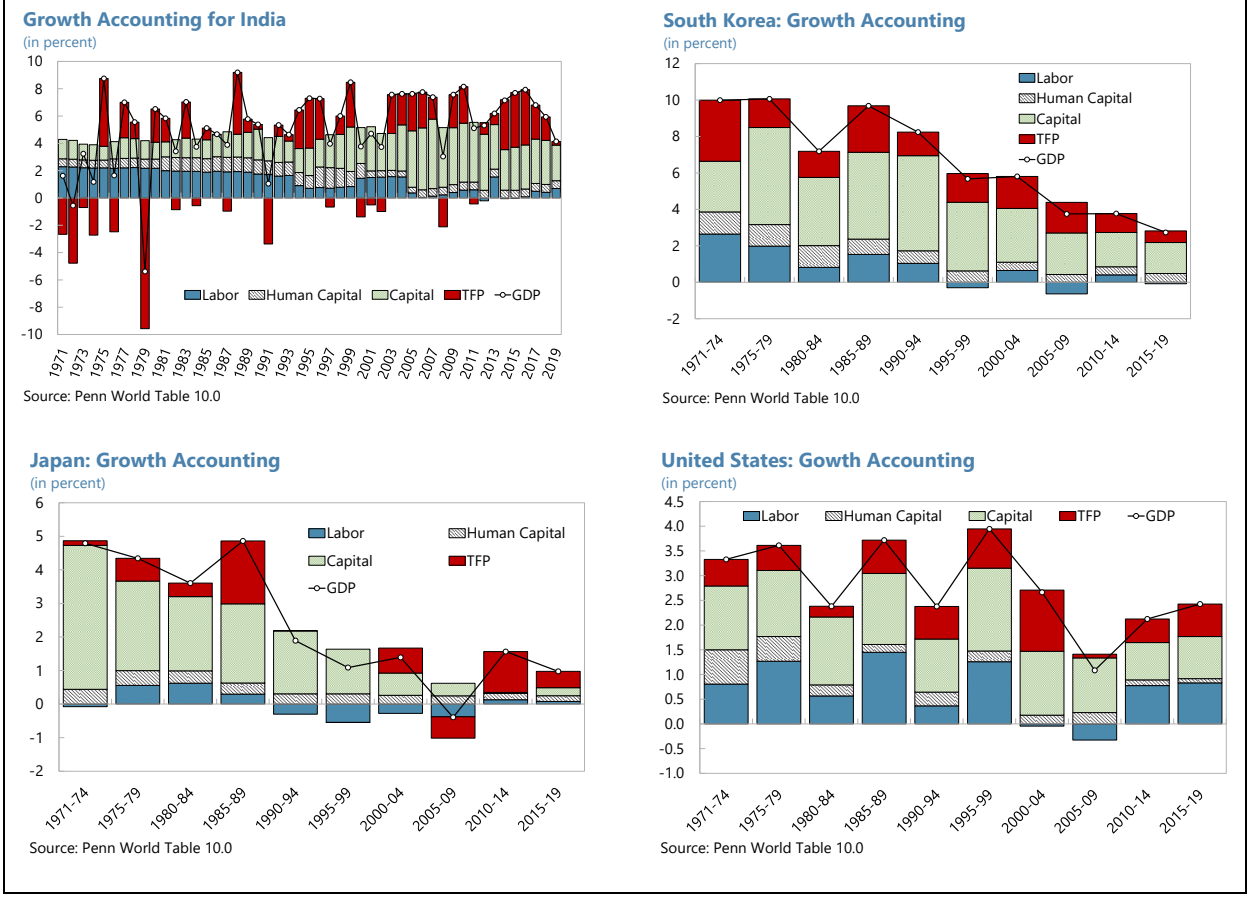
Figure 2. Growth Rate of Production Factors in India



How does India's past growth story compare with economies that experienced a take-off in the past 50 years? We picked three comparator countries, highlighting three different growth stories (Figure 3). The first one is South Korea. Labor initially played an important role in the early 70s, while growth was largely driven by physical capital and TFP in the past several decades. The second comparator country is Japan. In the rapid growth period in the 70s and 80s, capital played an important role. More recently, after 2010, TFP growth appears to be the most important driver for growth in Japan. The final comparator country is the U.S. Labor has consistently played an important role in supporting growth in the U.S., except during the global

financial crisis period. In addition, TFP growth has been a crucial growth driver in the past five decades.

Figure 3. Comparing Growth Stories



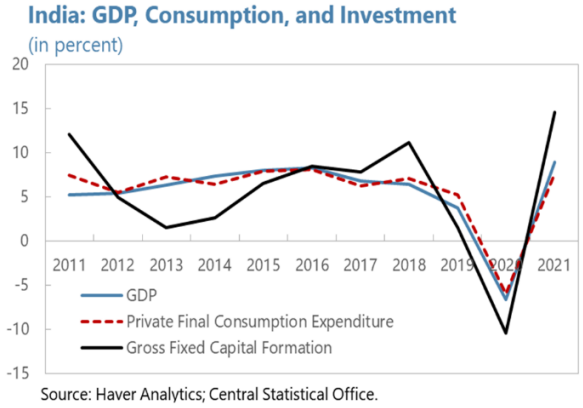
While every country has unique circumstances and growth stories, a simple comparison chart suggests the importance of building capital in transitioning to higher-income economies. In this regard, India has successfully accumulated capital stock over past decades and continued investment are needed to further enhance India's growth potential. On the other hand, the comparison chart also raises the question of whether there are ways to further unleash India's potential especially through labor and TFP channels. We will revisit this topic in Section V when we discuss possible reform dividends.

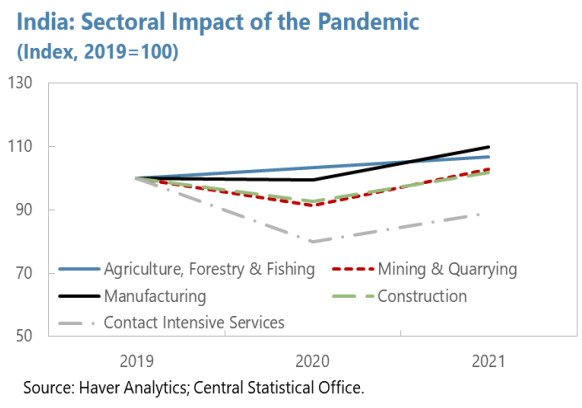
IV. Baseline Scenario: Impact of the Pandemic

A. Near-term impact

The pandemic has had a severe near-term impact on the economy. As shown in Figure 4, investment contracted about 10 percent in 2020 (or FY2020/21), more sharply than private consumption (-6 percent) and overall GDP (-6.6 percent) in the same period. While investment rebounded in the following year, the sharp initial decline in investment subsequently affected capital accumulation. From a sectoral perspective, contact intensive services (about 20 percent of GDP) were most affected during the onset of the pandemic, registering a contraction of about 20 percent in 2020, which was the main driver of the overall decline. Mining and construction (about 10 percent of GDP) were among the industrial sectors that contracted most at the onset of the pandemic (by about 8 percent). On the other hand, agriculture sector (about 15 percent of GDP) continued to grow in 2020. By March 2022, all sectors had returned to pre-pandemic levels, except for contact-intensive services.

Figure 4. Pandemic Impact on India



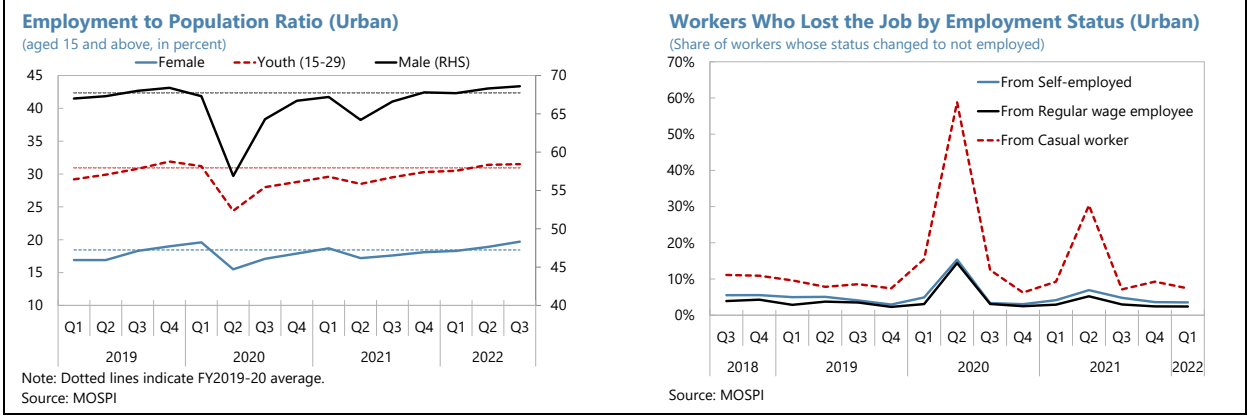


The pandemic and containment measures significantly affected both employed persons and hours per worker, leading to a large decline in labor inputs in FY2020 (Figure 5, left). For example, the employment to population ratio (EPR) declined by about 7 percent in urban areas, and hours per worker contracted by 20 percent in 2020Q2 compared with the previous year. A similar reduction was observed in 2021Q2 (the second wave of the pandemic), but the magnitude of the impact was smaller than the initial wave. The Omicron wave in early 2022 seems to have had almost no impact on labor markets from a macro perspective.

The pandemic impact was uneven and larger for the vulnerable, including casual workers, females, youth, and lower-skilled. About 60% of casual workers in urban areas lost their employment during the first wave and 30% during the second wave, which is about four to five

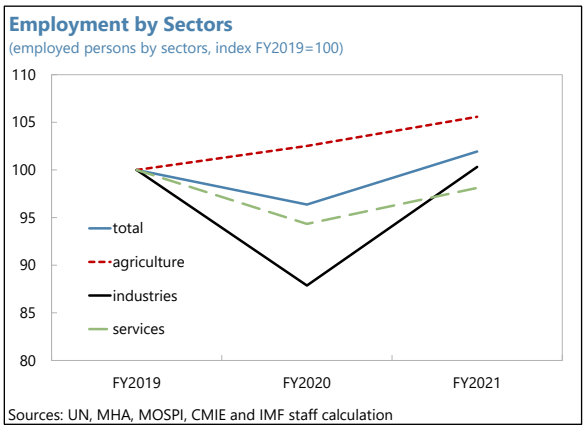
times higher than that of self-employed and regular wage employees (Figure 5, right). During the quarter following the peak of the pandemic wave, many unemployed people returned to employment as casual labor, which is the most vulnerable segment of the labor force. Analyses of employment trajectories showed that female, young, or less educated workers were more likely to lose employment during the pandemic (CSE, 2021). A panel survey by Allard et al. (2022) indicated that migrant workers returning to their home villages transitioned into agricultural work or became unemployed, suffering from lower income.

Figure 5: Pandemic Impact on the Labor Market



The labor market's recovery from the pandemic shock is ongoing but remains uneven across sectors. The EPR in urban areas exceeds the FY2019 levels in 2022Q3, including for females and youth. However, the recovery pace of sector-wise employment seems to be uneven with recovery in the services sector continuing to lag (Figure 6). During the pandemic, the agricultural sector partially offset employment losses in industries and services. The initial reduction of employment in industries was larger across all sectors because of the large share of casual workers in the construction sector. However, the recovery of employment in industries was faster than services, surpassing the services sector as of FY2021.

Figure 6: Labor Market – Sectoral Impact of the Pandemic

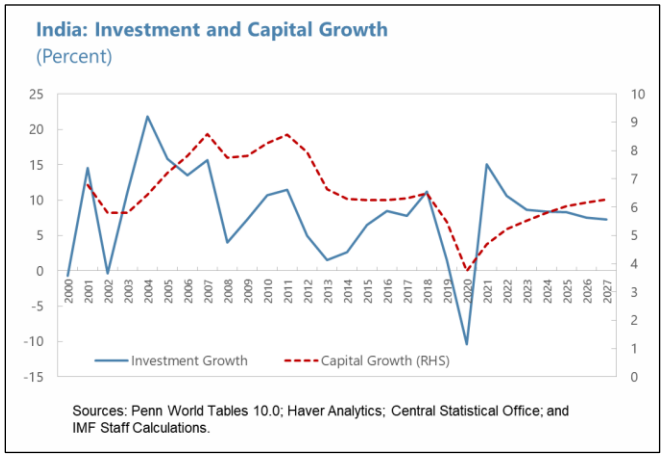


B. Medium-term Impact

In the medium term, the pandemic could affect potential growth through four main channels. The first one is capital input growth, through a contraction in investment. The second one is labor input growth, through a decline in employment and working hours. The third one is human capital stock growth, through disruptions to education and schooling, skills and on-the-job training. Finally, the pandemic could affect TFP growth through productivity. We examine each of these four channels in turn.

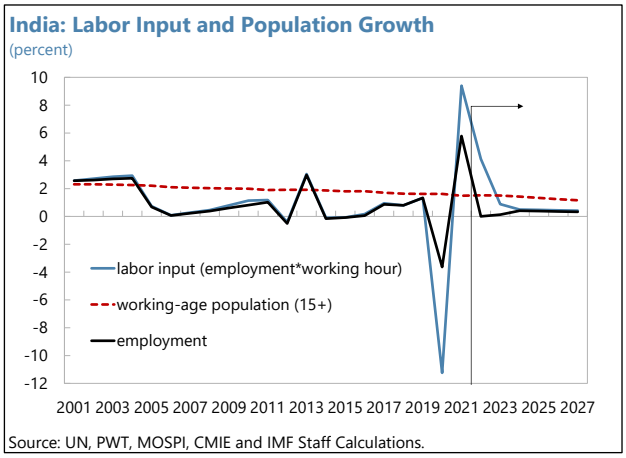
First, investment rebounded strongly from the contraction in 2020 and is assumed to remain relatively robust in the medium term, with capital stock growth gradually converging back to the rate prior to the NBFC crisis. Public infrastructure investment planned for coming years are expected to support capital accumulation and generate growth. We assume that credit growth would remain resilient (due to improvements in bank and corporate balance sheets), which would also support investment growth and capital accumulation under the baseline.

Figure 7. Projected Medium-Term Investment and Capital Stock Growth



Second, for labor inputs, we assume that employment will continue to grow consistent with the pre-pandemic trend (2011-19), implying a decreasing employment to population ratio (Figure 8) under the baseline. The official labor force survey indicates a declining trend in the employment ratio during the pre-pandemic period (2011-2019), especially among females. Under the baseline scenario, we assume that the employment ratio will return to this pre-pandemic trend in the medium term, reflecting two structural underlying factors in India's labor markets.

Figure 8. Projected Medium-Term labor input



The first one is the declining trend of the female employment ratio. Employment developments between 2011 and 2019 indicate that employment growth fell short of the population growth. Despite the two percent annual growth of the working-age population (aged 15 and above), employment is estimated to only grow at 0.6 percent annually (Figure 9, left).[6] Sluggish employment growth was mainly due to a reduction of female workers in rural areas. As a result, the female LFPR (FLFPR) in India remained at a relatively low level. World Bank data indicate that the FLFPR for lower-middle income group was about 35 percent in 2017-19 average, while the FLFPR for India was about 26 precent.

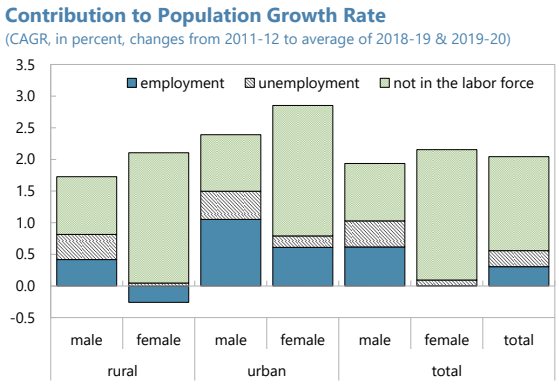
The second one is the limited employment opportunities for youth. The economy did not generate enough job for young people (aged 15-29), despite improvements in education. Estimates using official labor force surveys suggest that, excluding those at school, young people who completed more than upper primary level education increased by 44 million over the eight years before the pandemic. However, only 10 million could find employment, and the rest either struggled to find a job (14 million) or focused on domestic duties (21 million).[7] The fact that better educated youth had a higher unemployment rate also implies some structural mismatches in labor markets (Figure 9, right).

While the number of employed persons is assumed to increase under the baseline, thanks to the sizeable demographic dividend, the economy could benefit more from these dividends with a successful implementation of reforms that would raise labor participation in economic activity. The upside scenario in section V will incorporate this possibility.

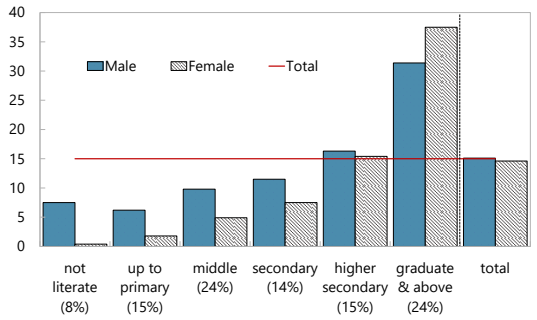
[6] The numbers are estimates using the National Sample Survey (NSS), PLFS, and the National Commission on Population (2020), comparing NSS 2011-12 and the average of PLFS 2018-19 and 209-20 (Note that the period of official labor force survey is from July to June). The employment definition is based on the usual principal status and subsidiary status. The issue of job growth is also pointed by Kannan and Raveendran (2019).

[7] See footnote 6 for the estimation source.

Figure 9. Structural issues of labor market in India



Sources: MHA, MOSPI, and IMF staff calculation



Note: The bracket indicates the labor force share of each general educational level.
Source: PLFS

Third, while human capital growth is estimated to be lower during the pandemic due to forgone on-the-job training, this impact is expected to be temporary, with limited medium-term impact on potential growth. We estimated that total working hours in the country were lower than the pre-pandemic trend by about 12 and 4 percent in FY2020 and FY2021, respectively. According to quantile analyses using India data, Das (2019) found that one additional year of work experience can lead to a roughly 2.7 percent increase in wage.[8] Based on this literature and loss of labor input, we estimate that human capital growth decreased by about 0.3 and 0.1 percent in FY2020 and FY2021, respectively. As labor is expected to return to the pre-pandemic trends in FY2022, human capital growth is projected to recover, although the human capital accumulation level will be lower than the pre-pandemic trend without any additional vocational training.

While we do not incorporate the impact of school closure on human capital in this paper, policy support to address learning losses, especially for students from lower-income families, is critical to the recovery.[9] The impact of school closures on the long-term growth rate could be substantial in India, if affected students do not have the opportunity to catch up. According to UNESCO, schools were fully open for only 47 days from 16 February 2020 to 31 March 2022 in India, which is significantly lower compared with its peers (Figure 10, left).[10] Limited internet penetration would also limit the scope of remote or online learning opportunities, as the Internet

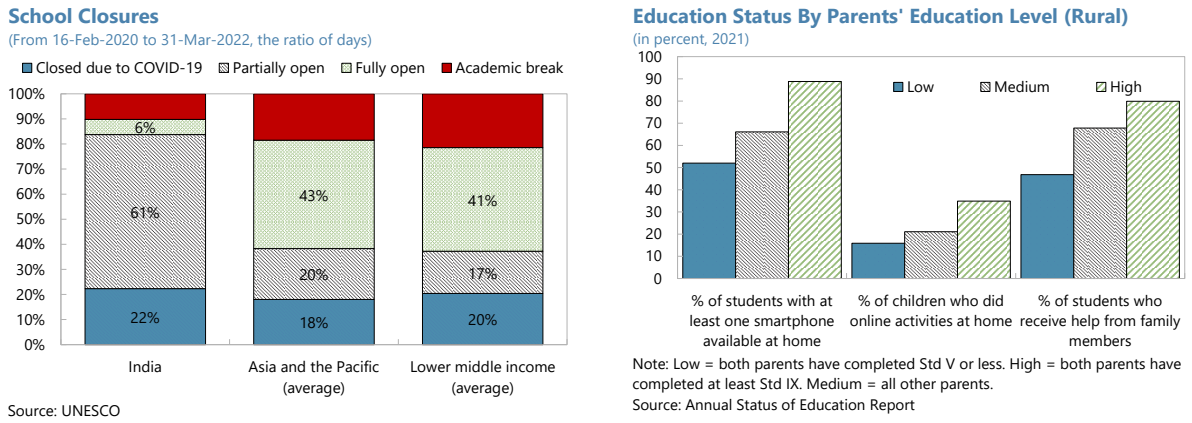
[8] Das (2019) estimated the impact of experience on log of wage as 0.05*experience –0.0005*experience^2. Assuming to start working at aged 15, the average experience years among aged 15-64 can be calculated as 24. The marginal impact of 2.7 percent here is calculated when the year of experience is this average.

[9] Based on the case study of education disruption in India during the pandemic, UNICEF and UNESCO (2021) recommend to reduce the digital divide, upskill teachers for e-learning, develop a distance learning strategy, and improve data collection for targeted investments.

[10] The partially open in Figure 10 means that schools are (a) open in certain regions and closed in others; and/or (b) open for some grades, levels, or age groups and closed for others; and/or (c) open with reduced in-person class time, combined with distance learning (hybrid approach). More details can be found here: https://covid19.uis.unesco.org/global-monitoring-school-closures-covid19/country-dashboard/

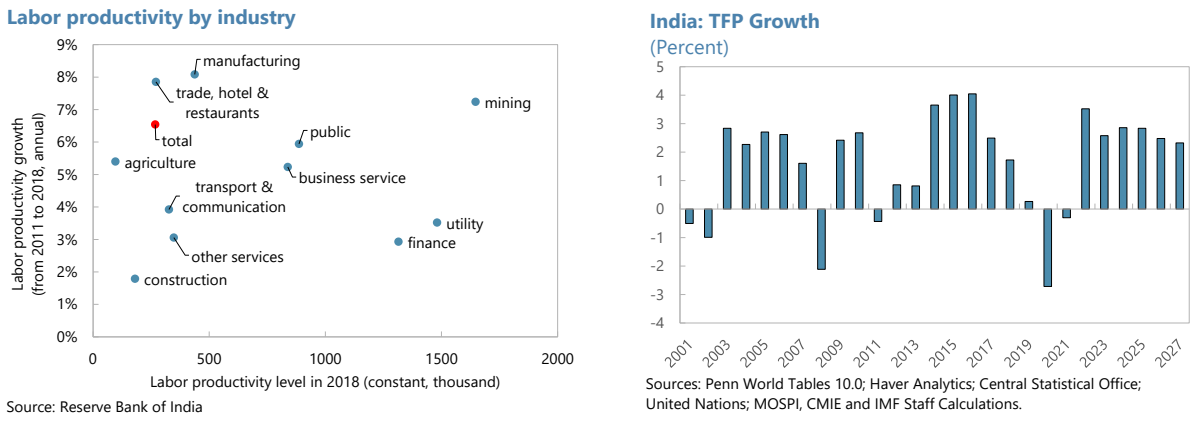
penetration rate was just 54% and 32% in urban and rural areas in 2019, respectively (IAMAI, 2019). Although the availability of smartphones has improved during the pandemic, the loss of learning is expected to be uneven across student groups depending on their parents' education or income level (Figure 10, right). Students from lower-income families faced greater learning losses during the pandemic and may struggle to catch up without support.

Figure 10. School Closures during the pandemic



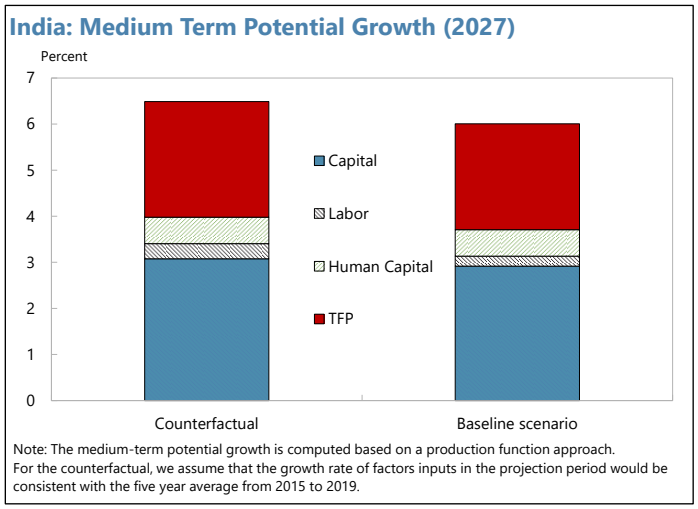
Lastly, labor productivity declined during the pandemic, reflecting the reallocation of labor from higher productivity sectors such as industries or services to lower productivity sector like agriculture. Pre-pandemic data shows that labor productivity in agriculture is the lowest among different sectors (Figure 11, left). Based on the past relationship between labor productivity and TFP growth, we assume that TFP growth will gradually recover as labor returns to higher productive sectors over the medium-term. Further digitalization is also expected to support improvements in TFP growth (Figure 11, right).

Figure 11. Projected Medium-Term TFP Growth



Based on a production function approach and the key assumptions for the four factors of production presented above, potential growth is estimated to be about 6 percent in the medium term (2027) under the baseline scenario (Figure 12). The baseline potential growth rate is lower than a counterfactual without pandemic and subsequent geopolitical shocks. Similar to recent growth patterns, capital and TFP are found to be the main drivers of medium-term potential growth in the baseline, with a relatively small contribution from labor inputs despite the sizeable demographic dividends. This finding suggests potentially significant growth benefits from reforms that improve labor market functions.

Figure 12. Medium Term Potential Growth (Baseline Scenario and Counterfactual)



V. Upside Scenario: Reform Dividends

An illustrative upside scenario is considered to reflect the potential dividends of structural reforms on potential growth. On investment and capital, we assume that investment-friendly policies, including continued infrastructure investment and easing foreign direct investment (FDI) regulation, could help support capital accumulation and raise potential growth.[11]

On labor, we assume that further reforms to improve female labor force participation and reduce youth unemployment rate will help slow the decline in the EPR and unleash the potential in India's labor markets and enable India to benefit further from its demographic dividend. These

[11] A benchmarking exercise using the IMF's structural reform database (see, Alesina and others, 2020, and International Monetary Fund, 2019) also pointed to reform opportunities in external finance in India, which captured capital flow restrictions, including on FDIs. As discussed in RBI (2022), the absorption of foreign capital in the economy for productive investment through higher FDI flows would raise the benefits of financial openness for India. Recent reform initiatives by the government, which include the privatization program, the PLI scheme, further liberalization in the insurance sector, and an increase FDI limits, could also help attract investment.

objectives can be met through swift implementation of past reforms, such as the new labor codes (by states)[12], and further reforms to ease administrative bottlenecks, support formalization, and improve targeting of social benefits.[13] Enhancing the non-agricultural job opportunities, especially in rural areas, would also be critical to increase female labor force participation (Chatterjee et al., 2015). Furthermore, improving female labor force participation could have a positive spillover impact on productivity (Ostry et al., 2018).

On human capital, strengthening vocational training and education will help improve productivity, contributing to higher accumulation of human capital. According to the PLFS, only about three percent of the working age population benefits from formal vocation training every year. Empirical analyses show that formal vocational training can enhance wage growth by 4.7% in the Indian economy, and the effect is the greatest for those working in the primary sector (Kumar et al., 2019). In addition, increasing the educational level, accompanied by a higher return to education, can further support human capital accumulation, especially in rural areas.

On TFP, ensuring a business-friendly environment conducive to creating additional job opportunities in industries and services could help facilitate the shift of labor from the less productive agriculture sector to more productive sectors, improving TFP growth.[14] Advancing agriculture and land reforms will address market distortion and increase efficiency and productivity. In addition, further progress in formalization and digitalization and reducing the digital divide could help improve India's productivity and TFP growth in the medium and long run.[15] Furthermore, building on India's important progress in implementing its climate agenda, additional efforts, including sectoral adaptation policies, to support a green transition could help improve India's productivity in the long run.[16]

[12] The 2020 labor code on social security included enhancements in paid maternity leave (from 12 weeks to 26 weeks), mandatory childcare facilities (in establishments with 50 or more employees), and providing female workers in night shifts with adequate security measures.

[13] For example, gender gaps in the labor market can be addressed by promoting women's entrepreneurship and flexible work arrangements, enhancing public care services and social infrastructure, ensuring parental leave to both men and women, and establishing a transparent wage system (ILO, 2016). Skill development targeting young people, especially enhancing technical and digital skills, will also be critical to benefit from the new opportunities created (ILO, 2022).

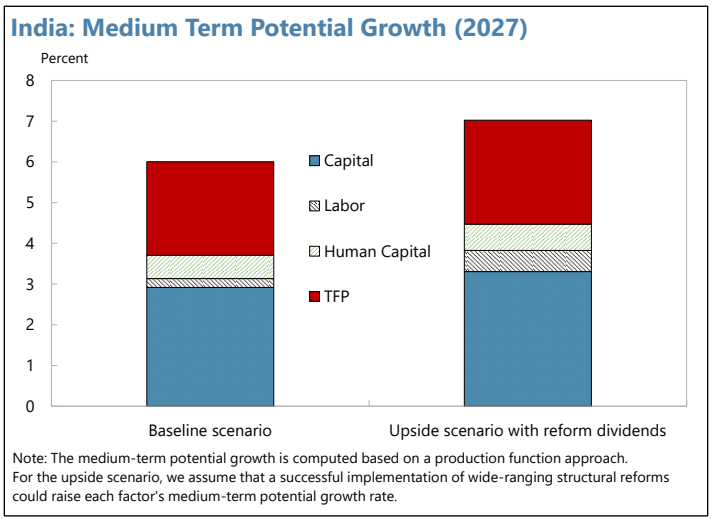
[14] Under the upside scenario, we assume that labor productivity in India would increase considerably compared with the baseline scenario. The relationship between TFP growth and labor productivity growth in India was estimated based on regression analysis using past data in both baseline and upside scenarios.

[15] The Ministry of Electronics and Information Technology (MeitY) (2019) identified 30 digital themes that have the potential to increase productivity across all sectors and presented required actions. Another research analyzing India manufacturing sector also confirms TFP gains associated with IT investment (Khanna and Sharma, 2021). Although the impact of digitalization is hard to capture quantitatively due to data limitations and various spillover impacts, its successful implementation will have the potential to increase productivity further.

[16] See Chateau, Dang, MacDonald, Spray, and Thube (forthcoming) "A Framework for Climate Change Mitigation in India" for more discussion on India's green transition.

In the upside scenario, a successful implementation of the wide-ranging structural reforms presented above could raise medium-term potential growth to about 7 percent, more than offsetting the persistent impact of the pandemic (Figure 13)[17]. Compared with the baseline scenario, the contribution of each factor (capital, labor, and TFP) would increase by around 0.3 to 0.4 percentage points, benefiting from the reform dividends. However, as in the baseline scenario, uncertainty about potential growth estimates remains sizable under the current environment.

Figure 4. Medium Term Potential Growth (Baseline and Upside Scenario)



VI. Conclusion and Policy Implications

This paper shows that India's growth was mainly driven by labor in the 1970s and 80s. Capital was the key driver in the 90s and 2000s, with TFP growth picking up in the past decade or so before the recent growth slowdown. Overall, India has made important progress in accumulating productive physical capital over the past few decades, which has been crucial in supporting its economic growth and transformation. This paper finds that while the pandemic could lead to some medium-term adverse impact on potential growth, a successful implementation of structural reforms could more than offset the impact of the pandemic and provide support to potential growth over the medium term.

These results point to several policy considerations. First, investment-friendly policies could help support capital accumulation and consequently potential growth. Second, further reforms to improve female labor force participation and reduce youth unemployment rate could help

[17] The estimate for the upside scenario is within the range of the RBI's estimates (6.5 percent to 8.5 percent), see Reserve Bank of India (2022). In contrast, Subramanian (2021) estimated a higher range of 7.4 percent to 8.3 percent.

unleash the potential in India's labor markets. Third, vocational and education policies should support the catch up from pandemic-related learning losses, especially in poorer households. Finally, wide-ranging structural reforms, including agriculture, land and business environments, and further progress in digitalization could improve India's productivity in the medium and long run.

Appendix 1. Growth Accounting by KLEMS

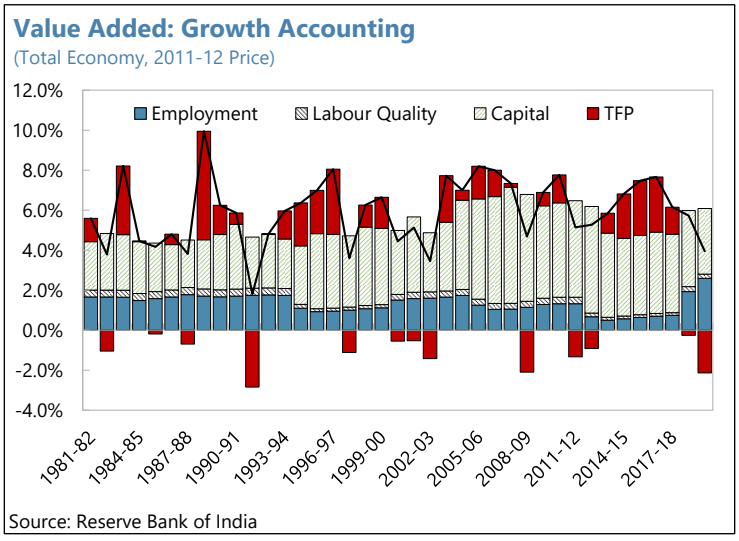
The growth accounting exercise using KLEMS (Reserve Bank of India, 2022) can be expressed as follows:

$$y_t = a_t + \alpha_t \times (z_t + qk_t) + (1 - \alpha_t) \times (l_t + ql_t)$$

where a_t is TFP growth, z_t is capital stock growth, qk_t is capital quality growth, l_t is employment growth, and ql_t is labor quality growth. Similar to Penn World Tables (PWT), KLEMS considers capital service growth, expressed as $(z_t + qk_t)$. The capital input series are estimated based on the investment data from the National Accounts for both PWT and KLEMS. The labor input differs between PWT and KLEMS, as KLEMS does not include working hours per worker. Both PWT and KLEMS rely on the official labor force survey to estimate the employment level, but PWT uses ILO estimates from 2017 to 2019. KLEMS captures the quality of labor by considering the earnings of five educational groups, while PWT captures this concept by estimating human capital based on average years of schooling for those aged 25 and above.

To compute the economy-wide growth rate, KLEMS applied the Tornqvist index to aggregate the real value added, capital, and labor growth rate of each industry. On the other hand, PWT uses the growth rate of the entire economy. The KLEMS growth accounting exercise is presented in Figure A.1, which suggested similar trends as those based on the PWT.

Figure A.1. Growth Accounting



Appendix 2. Employment Estimation

As the quarterly PLFS is only available for urban areas, we use both annual Periodic Labor Force Survey (PLFS) and Centre for Monitoring Indian Economy - Consumer Pyramids Household Survey (CMIE-CPHS) to estimate rural employment. The survey period of annual PLFS is from July to June, which does not match the fiscal year (April to March), and the latest available data for annual PLFS is July 2020 - June 2021 at the time of writing. To address these gaps, our approach to estimating rural employment is to rely on PLFS for annual employment level and CMIE-CPHS for capturing quarterly fluctuations. We also adjust the sample weights of CMIE-CPHS to mitigate the sample size fluctuations and to ensure sample representativeness after the pandemic, as with other recent literature (e.g., Hensel et al. (2022)).

We estimate rural employment as follows. First, we set the employment-to-population ratio (EPR) of CMIE-CPHS in 2019 as the base year and then estimate the ratio by using common samples/respondents to address pandemic-induced sample fluctuations[18]. Specifically, we apply the change in EPR in the common sample to the level of employment ratio in 2019, to estimate the EPR in the pandemic years (2020 and 2021).

In addition, we adjust the sample weights to be consistent with the population distribution projected by the National Commission on Population (2020), as follows:

$$fw_{ijk} = \frac{s_{jk} * N}{N_{jk}} pw_i$$

where fw_{ijk} is the final weight used for individual (*i*) in gender (*j*) and age group (*k*)[19], pw_i is the CMIE-CPHS weight adjusted for the non-response factor for individual (*i*), s_{jk} is the fraction of the projected population for the category (*j, k*), N is the sum of all pw_i, and N_{jk} is the sum of pw_i for the category (*j, k*).

Second, we adjust for the level difference in EPR between the modified CMIE-CPHS and annual PLFS 2019-20 (2020-21) series. We calculate the difference between the two series for the common period (July - June) and apply the difference to the adjusted CMIE-CPHS series, so that the levels of the CMIE-CPHS data are consistent with the official PLFS data.

For the total employment data in India, the adjusted EPR of rural areas and EPR of urban areas (taken from the quarterly PLFS) are combined by using the rural and urban population ratio from the National Commission on Population (2020).

[18] The available sample size of CMIE-CPHS reduced significantly after the pandemic (about one-third of the pre-pandemic level in April 2020). The available samples dropped again during the second wave, and the size was about 90% of the pre-pandemic level in December 2021. The advantage of using the same composition of respondents will be addressing the concerns coming from the different compositions of individuals at different times.

[19] We use two categories for gender (j) (male and female) and 11 categories for age group (k) (15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-59, 55-59, 60-64, and 65+)

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