World Economy after the Pandemic

CLAUDIO LOSER
HARPAUL KOHLI
LAURA SHELTON

Emerging Markets Forum

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CLAUDIO LOSER, HARPAUL KOHLI,
AND LAURA SHELTON

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SUMMARY OF FINDINGS

This paper focuses on recent developments in the World economy, presenting scenarios for the global economy emerging from the COVID pandemic and through 2060, with the primary focus on Emerging and Developing Economies (EMDEs). The current pandemic has had a major impact on economic performance in both Advanced Economies (AEs) and in the Emerging World. Economic consequences equivalent to those borne out of the pandemic have not been experienced since WWII.

Although in the period 2000 - 19 the average annual rate of growth for the Emerging and Developing Economies (EMDEs) at 5.6 percent was almost 4 percentage points higher than that of Advanced Economies (AEs) at 1.9 percent, it slowed down in the latter part of the period. So, during 2014 -19, the rate of growth declined to 1.2 percent for AEs and 3.5 percent for EMDEs, and the difference was only about two percentage points.

The impact of recent events and policies on international trade and cooperation are and will likely remain significant. Both pre-COVID and post-COVID projections now show a significant decline in the prospective growth rate for most regions. In this regard, it is important to note:

(1) Output losses for the world for the period 2020-22 with respect to what was projected in late 2019 could amount to a total of US$18 trillion, or the equivalent of 14 percent of GDP.

(2) For EMDEs, losses could be 17 percent of 2019 GDP.

(3) It may be much higher for Emerging and Developing Asia excluding China (37 percent of the relevant GDP), mainly on account of India (45 percent) but also reflecting the impact on the ASEAN-5 group (31percent), both constituting the non-China Asia GDP, while the losses for China could be in the order of 11 percent of GDP.

(4) The losses for Latin America could be in the order of 20 percent, and somewhat lower for Sub-Saharan Africa and the Middle East, while for all Advanced countries the losses could amount to only 9 percent.

(5) Global unemployment rose to 6.5 percent in 2020, to the highest level in the last 30 years.

(6) EMDEs debt stands at 65 percent of GDP, the highest in this century.

An additional element that will certainly affect the future outcome is climate change, which may lead to results that are more in line with the more pessimistic numbers presented here. An important additional observation is that even with significant overall rates of economic growth, when measured on a per capita basis, growth in the AEs was exceeded only by the East Asian countries (mainly China, India and the ASEAN-5 countries), and Emerging Europe.

Even with lower expected growth of GDP, as more residents of EMDEs join the middle class, they will have a greater impact on the world economic structure. EMDEs will continue to increase their share in global GDP, though they will experience

lower productivity, labor, and investment growth compared to before, as suggested by existing evidence. Furthermore, the path to the future will not be uniformly distributed. Eastern Asia, and more specifically China, is not expected to show a decline in growth with respect to earlier projections/scenarios. By comparison, South Asia -mainly reflecting India-, while it had grown strongly, has been hit very hard by the pandemic and may recover in the near future, but it will do so from a much lower base, although this will require considerable policy discipline to achieve it.

Other regions, most markedly Latin America, the Middle East, and Sub-Saharan Africa, will see a much lower rate of growth. Gains in terms of trade were a source of unprecedented prosperity in Africa, Latin America, and the Middle East, as they depend in large part on primary commodity exports. However, this was a boon that was reversed after 2012. Even with short term increases observed in the recent past, terms of trade in the longer term are expected to be below those in the first part of this century.

The impact of lower terms of trade can be staggering—a decline in GDP of half a percentage point for each percentage point change in terms of trade. Prices will continue to fluctuate, and they are unlikely to reach the levels observed a decade ago. Thus, it is essential that EMDEs prepare proactively for the lower price contingencies. Otherwise, volatility will take over and hinder future growth prospects.

The strong performance of Asia (mainly China, India and the ASEAN-5 group, which account for 97 percent of Asia's GDP) can be explained by factors such as high savings and investment rates, greater openness, better human capital development, and other actions reflected in stronger global competitiveness and "cost of doing business" rankings. However, in addition to relative weaknesses in these areas, Latin America, Africa, and the Middle East have continued to suffer from other structural weaknesses, possibly no longer-term vision, and a generally weaker macroeconomic policy framework.

All these factors have led to, amongst other indicators, relatively poor growth in total factor productivity, in those regions, and possibly in South Asia, precluding rapid convergence. Actual performance for those regions was weaker than projected in 2015, when The World in 2050 was prepared, in part due to the retreat of globalization and the decline in terms of trade, impacting measured total factor productivity – probably overestimated previously because of this phenomenon. Based on the experience of the last quarter century and assuming that terms of trade will not change in the future, new estimates of future growth within the model of Centennial suggest a lower growth path.

The economic slowdown caused by the pandemic will have far-reaching social and political implications and lasting impact caused by trade and connectivity disruptions. GDP growth following the pandemic will not be sufficient to raise output to pre-COVID expectations. Even regions that were not as hard hit by the pandemic still suffered economic losses that will have an impact. Countries that rely on tourism and commodity exports were particularly affected. Many of these countries entered the crisis in a precarious fiscal situation with little scope for policy response. The recovery period is to follow a severe contraction that has had particularly adverse employment and earnings impacts on the young, women, workers with relatively lower educational attainment, and the informal sector. Income inequality is likely to increase significantly because of the pandemic, with about 100 million more people estimated to have fallen below the threshold of extreme poverty in 2020 compared with pre-pandemic projections. Moreover, there is clear evidence that inequality has widened, even in the presence of a rising middle class in emerging economies. EMDEs were hit harder and are expected to suffer more significant medium-term losses than AEs. AEs were able to buffer some adverse impacts of the pandemic, thanks to policy response. In turn, declines in growth rates are observed for East Asia, which had not been hit so hard by COVID, and for the three commodity-intensive regions, with a slight decline in the case of South and Central Asia. Meanwhile, AEs experienced a slight increase after COVID.

The medium- and long-term outlook presented here is based on the global growth model of the

Centennial Group. As a long-term model, results and projections are stylized and not intended to predict the future exactly but provide a context for policymaking and reform. The latest scenarios generated by the model suggest that, as result of the pandemic, the world economy will incur an accumulated loss of at least one year of output in the next twenty years and that, even with global growth resuming in 2021, global GDP will not be on track to go back to the pre-pandemic trend line. Asia in general is likely to remain the most dynamic region, if appropriate policies continue to be pursued, and Latin America, the Middle East, and Europe will suffer the most from the recent events. Independent of the effects of the pandemic, there is a slowdown in the long-term global productivity growth, particularly for the commodity-dependent regions.

Projecting through 2060, the central scenario suggests that there will be a continued increase in the participation of EMDEs in World GDP. Under the central scenario, post-COVID annual GDP growth on average would be 3.2 percent for the period 2021-40 and 2.9 percent for 2021-60. Today's EMDEs would grow at an average annual rate of 3.6 percent, in comparison to 1.6 percent for today's advanced economies. However, as noted, these projections may need to be tempered by the likely negative effect of climate change, which is expected to hit EMDEs harder. Even so, certain areas of AEs can also be expected to have serious climactic events, in detriment of their expected growth rates more.

By 2060, the global economy will more than triple in size, reaching US$268 trillion at 2018 prices and market exchange rates ($396 trillion in PPP terms) and per capita income averaging close to US$28,000 ($40,000 in PPP terms) as compared to about US$10.6 thousand ($16.4 thousand in PPP terms) today.

Over time, the rate of growth of the global economy will decline as countries converge toward the global best practice and as population growth rates decline worldwide (with the likely exception of Sub-Saharan Africa at least in the initial phase). As shown by the optimistic and pessimistic scenarios, results could differ significantly depending on the quality of policies pursued by individual countries.

By the end of the period, the resulting global GDP could be almost 48 percent higher than in the central scenario for the optimistic scenario, and 38 percent lower under the more likely pessimistic scenario. Events like climate change and disturbances resulting from perceived unfairness in income distribution may widen the gap between scenarios. Even if EMDEs catch up to the trendline, there will still be a gap. TFP growth will be more marked among Emerging Economies, like China, India, Indonesia, and Korea. However, they will not catch up with the levels of TFP of the advanced countries.

Regional per capita Income Rankings would remain about the same, except that Asia — in particular, East Asia — will surpass Latin America by 2026 and the Middle East somewhat before 2050. Countries remain on a somewhat lower trajectory than they have followed in the past, but to remain on their trajectory, they will need to work hard as they catch up with the more developed economies. The challenge of improving their underlying productivity and competitiveness is a daunting one that will require overcoming significant obstacles — political, social, and institutional — worsened by the COVID shock and its structural consequences.

INTRODUCTION

This paper focuses on recent developments in the World and presents scenarios for the global economy emerging from the COVID pandemic and through 2060, as usual with the primary focus on Emerging and Developing Economies (EMDEs). For its future scenarios, it uses the Centennial growth model as a basis, considering recent trends.

In the period 2000 - 19, the average annual rate of growth for the Emerging and Developing Economies (EMDEs) at 5.6 percent was almost 4 percentage points higher than that of Advanced Economies (AEs) at 1.9 percent. However, in the period 2014 -19, with a slowdown in the rate of growth to 1.2 percent for AEs, and 3.5 percent for EMDEs, the difference was only about two percentage points. Furthermore, except for Emerging Asia and, to a lesser extent, Developing Europe, per capita income for Emerging economies grew by less than for Advanced economies. The world growth path was abruptly and traumatically interrupted by the emergence of COVID, and it is virtually impossible that World GDP will reach the levels expected before the onslaught of the virus, not to mention what was expected only five years ago. Currently predicted behavior of productivity, labor growth, and investment will likely not be as expected before the COVID Pandemic. Still, the long-term trend of the EMDEs gaining a greater share of global GDP will continue.

Furthermore, beyond the current slowdown, as more residents of EMDEs join the middle class, they will have greater impact on the world economic structure and governance. Nonetheless, the path to the future will not be uniformly distributed. Eastern Asia, and more specifically China, is not expected to show a decline in growth with respect to earlier projections/scenarios. Other regions, and more markedly Latin America, the Middle East, and Sub-Saharan Africa, will see a much lower rate of growth.

The current pandemic has had a major impact on economic performance in both AEs and in the Emerging World. Economic consequences equivalent to those borne out of the pandemic have not been experienced since WWII. Even with the massive and growing vaccination effort, the economic crisis will take time to revert and the adverse impacts on the level and structure of production, and thus on relative incomes, will have far-reaching social and political implications worldwide. The impact of recent events and policies on international trade and cooperation are and will likely remain significant. In this regard, it is important to note the following facts:

(1) Output losses for the world for the period 2020-22 with respect to what was projected in late 2019, could amount to a total of US$18 trillion.

(2) For EMDEs, losses could be 17 percent of 2019 GDP.

(3) It may be much higher for Emerging and Developing Asia, excluding China (37 percent of the relevant GDP), mainly on account of India (45 percent) bus also reflecting the impact on the ASEAN-5 group (31 percent), both

constituting the bulk of non-China GDP while the losses for China could be in the order of 11 percent of GDP.

(4) The losses for Latin America could be in the order of 20 percent, and somewhat lower for Sub-Saharan Africa and the Middle East, while for all Advanced countries the losses could amount to only 9 percent.

(5) The losses are unlikely to ever be recovered.

(6) Global unemployment rose to 6.5 percent in 2020, to the highest level in the last 30 years.

(7) EMDEs debt stands at 65 percent of GDP, the highest in this century.

(8) It has the potential to slow or even reverse the convergence between rich countries and emerging market economies that has contributed to the reduction of poverty.

Thus, despite the expected recovery and the underlying trends, the path ahead cannot be taken for granted. The strong performance of earlier years was largely the result of a combination of factors such as opening up to trade worldwide, greater mobilization of domestic and external resources, a steady improvement in education levels and infrastructure services, the effects of the demographic (population growth) dividend, the acquisition of new technologies, the increased role of global value chains, and for many, the commodity boom of the 2000s (reversed in 2012 - 13 and aggravated by the pandemic in its initial phase), and importantly, stronger institutions. This shock, because of its economic consequences, has the potential to slow or even reverse the convergence between rich countries and emerging market economies that has contributed to the reduction of poverty.

The prospects are for a solid recovery. As discussed in the most recent IMF World Economic Outlook of Update of July 2021[1], and by OECD in a separate report, issued in December 2020[2], one year into the COVID-19 pandemic growing vaccine coverage generates some optimism. High uncertainty surrounds the global economic outlook, primarily related to the path of the pandemic. The contraction of activity in 2020 was unprecedented in living memory in its speed and synchronized nature. Although difficult to pin down precisely, IMF estimates suggest that the contraction could have been three times as large without the enormous policy support, although considerable efforts remain to be done, to bring down the pandemic and fight increases in inequality among and within countries.

After an estimated contraction of –3.2 percent in 2020, the global economy is projected to grow at 6 percent in 2021, moderating to 4.9 percent in 2022. An encouraging sign is that the contraction for 2020 was 1.0 percentage points smaller than projected in the October 2020 WEO, as economies adapted to new ways of working and activity rebounded. The projections for 2021 are the same as in April and for 2022 are 0.5 percentage points stronger. This reflects some offsetting revisions. Prospects for emerging market and developing economies have been marked down far 2021, mainly for Emerging Asia, with lower projected growth for India and South East Asia, due to a resurgence of the pandemic, and some slowdown of China. By contrast, the forecast far advanced economies has been revised up. These revisions reflect pandemic developments and changes in policy support. The 0.5 percentage-point upgrade far 2022 derives largely from the forecast upgrade far advanced economies, particularly the United States, reflecting an anticipated legislation of additional fiscal support in the second half of 2021 and somewhat improved health metrics more broadly across the group.

According to the IMF, global growth is expected to moderate to 3.3 percent by 2026—reflecting projected damage to supply potential and pre-pandemic forces, including aging-related slower labor force growth in advanced economies and some emerging market economies. Thanks to the policy response, the COVID-19 recession as had limited impact on advanced economies but emerging market and developing countries have been hit harder and are expected to suffer more significant medium-term losses. Output losses have been large for countries that rely on tourism and commodity exports and for those with limited policy space to respond. Many of these countries

1 IMF WEO Update July 2021. The text in the next few paragraphs is based on that document.

2 OECD Economic Outlook, Volume 2020, Issue 2

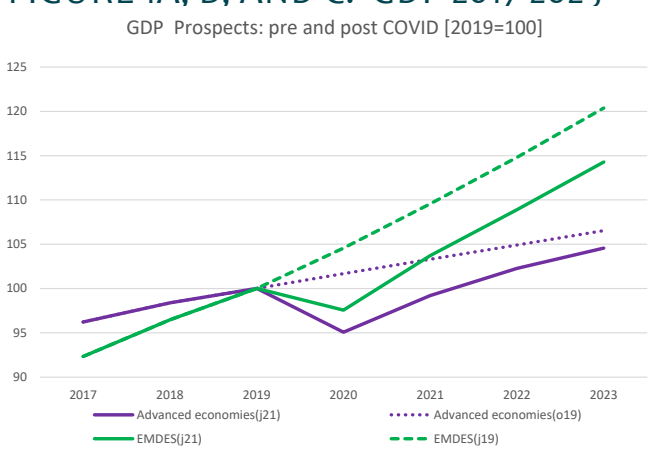
entered the crisis in a precarious fiscal situation and with less capacity to mount major health care policy responses or support livelihoods. The projected recovery follows a severe contraction that has had particularly adverse employment and earnings impacts on the young, women, workers with relatively lower educational attainment, and the informal sector. Income inequality is likely to increase significantly because of the pandemic. About 100 million more people are estimated to have fallen below the threshold of extreme poverty in 2020 compared with pre-pandemic projections, aggravated by serious disruptions in education. Evidence suggests that inequality between and within countries has increased due to the pandemic, a trend that is likely to continue in the near future.[3]

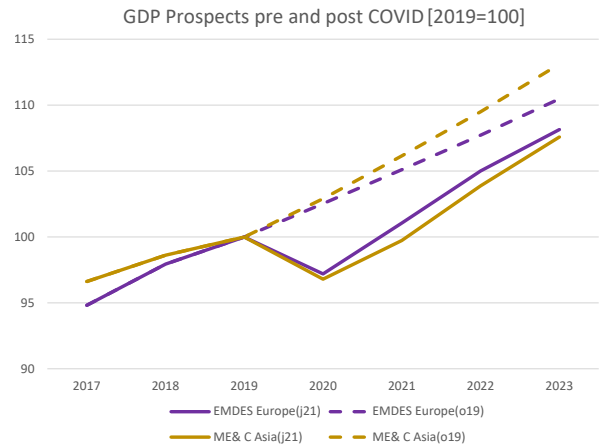
3 Fagenbaum, Jose; Kohli, Harpaul; Vilkeletye, Ieva; and Shelton, Laura. (2021) COVID-19 and Inequality Presentation. https://www.emergingmarketsforum.org/wp-content/uploads/2021/04/Covid-and-inequality-apr29b-1.pdf

Risks around the short-term projection are on the downside. Slower-than-anticipated vaccine rollout would allow the virus to mutate further. Financial conditions could tighten rapidly, if inflation expectations increase more rapidly than anticipated. A double hit to emerging market and developing economies from worsening pandemic dynamics and tighter external financial conditions would set back their recovery and result in slower growth.

According to the IMF, recent price pressures far the most part reflect unusual pandemic-related developments and transitory supply-demand mismatches. Inflation is expected to return to its pre-pandemic ranges in most countries in 2022 once these disturbances work their way through prices although there is considerable uncertainty. Elevated inflation is also expected in some emerging market and developing economies, related in part to high food prices. Central Banks are expected not to tighten monetary policy.

FIGURE 1A, B, AND C: GDP 2017-2023





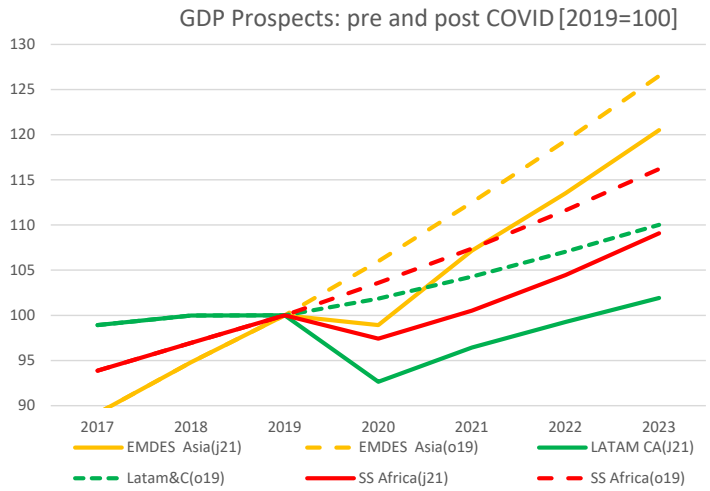
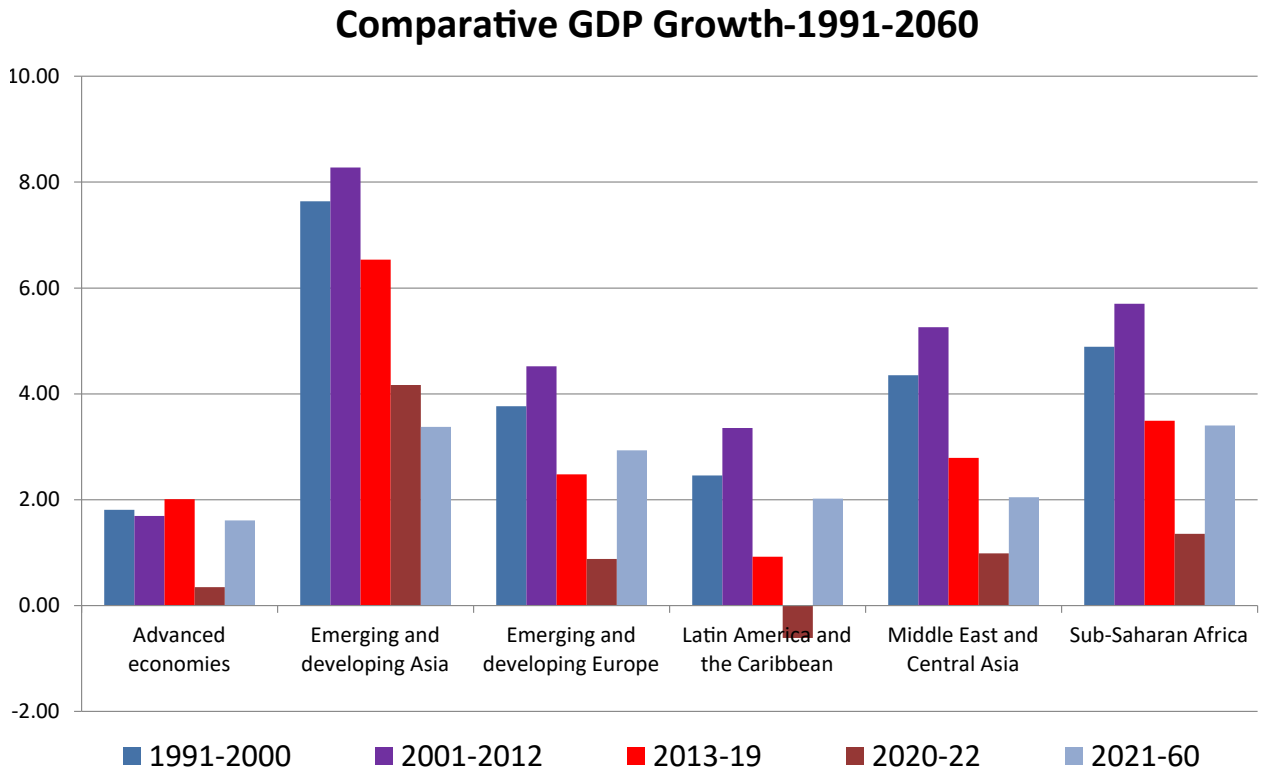


TABLE 1: OVERVIEW OF THE WORLD ECONOMIC OUTLOOK PROJECTIONS [PERCENT CHANGE]

	Estimate		Projections	
	2019	2020	2021	2022
World Output	**2.8**	**–3.2**	**6.0**	**4.9**
Advanced Economies	**1.6**	**–4.6**	**5.6**	**4.4**
United States	2.2	–3.5	7.0	4.9
Euro Area	1.3	–6.5	4.6	4.3
Japan	2.0	–10.8	6.2	5.8
Other Advanced Economies	1.9	–2.0	4.9	3.6
Emerging Market and Developing Economies	**3.7**	**–2.1**	**6.3**	**5.2**
Emerging and Developing Asia	5.4	–0.9	7.5	6.4
China	6.0	2.3	8.1	5.7
India	4.0	–7.3	9.5	.5
Emerging and Developing Europe	2.5	–2.0	4.9	3.6
Latin America and the Caribbean	0.1	–7.0	5.8	3.2
Middle East and Central Asia	1.4	–2.6	4.0	3.7
Sub-Saharan Africa	3.2	–1.8	3.4	4.1

World Economic Outlook, July 2021

FIGURE 2: COMPARATIVE GDP GROWTH BY REGIONS AND PERIODS [1991-2060]



However, there is a risk that price pressures may become persistent and central banks may need to take preemptive action.

Future developments will depend on the path of the health crisis; the effectiveness of policy actions to limit persistent economic damage; the evolution of financial conditions and commodity prices; and the adjustment capacity of the economy. Policymakers may have to prioritize policies to strengthen social protection; ensuring adequate resources for health care and broad education support, in addition to resources to deal with climate change, among others. Where elevated debt levels limit scope for action, effort should also be directed at creating space through improved revenue collection, and tax progressivity, and by reducing wasteful subsidies.

The factors shaping the appropriate stance of policy vary by country, especially progress toward normalization. Hence, countries will need to tailor their policy responses to the stage of the pandemic, strength of the recovery, and structural characteristics of the economy. The transition to a more stable environment will require particular attention, while working on longer term challenges, to strengthen total factor productivity. In addition to the required work by major Central Banks and multilateral institutions, hard work is required about external financial conditions in emerging markets and the impact that divergent policy stances have on capital flows. As the multilateral organizations and, among other entities, our Emerging Markets Forum indicate, strong international cooperation is vital for achieving these objectives and ensuring that emerging market economies and low-income developing countries continue to narrow the gap between their living standards and those of high-income countries. This includes adequate worldwide vaccine production and distribution; help for financially constrained economies to have adequate access to international liquidity to continue the process of growth and convergence; and resolve issues underlying current trade and technology conflicts.

The strength of the recovery is projected to vary significantly across countries, depending on access to medical action, policy support, exposure to cross-country spillovers, movements in terms of trade, and specific characteristics entering the crisis (Figure 1 and Table 1). Thus, by early year, China, on the basis of these estimates, will effectively be on the same path as before the pandemic surge; meanwhile, most of the rest of the world will be at the same level of output as at the pre-pandemic level, but below the previously estimated trajectory, and clearly with a lower per-capita income, for most countries.

Among major advanced countries, only the US would have recovered and increased output beyond the levels of 2019, as would be the case for the non-G-7 advanced countries as a group. By contrast, the rest of the G-7 countries would only recover well into 2022.

Among EMDEs, Emerging and Developing Asia would show strong although slower recovery, consistent with an increased incidence of the pandemic, mainly in India and South East Asia. Emerging Europe would also rebound solidly, although Russia could only reach 2019 levels of output in 2022. Sub-Saharan Africa would also rebound in 2021, although its largest economies would take longer, particularly in the case of South Africa. The Middle East and Central Asia would recover by 2022. Finally, the region that had been lagging all others prior to the Pandemic, Latin America and the Caribbean, is expected to recover somewhat faster than previously estimated, helped by still low but improved growth prospects in Mexico and Brazil, and to a lesser extent in Argentina, offset by the stagnation of Venezuela. These growth patterns have major effects on the medium and long run as discussed below.

Policy actions have tended to support the recovery, with an emphasis on raising output, seeking to reduce the effect of the pandemic on income inequality, poverty, and unemployment, taking advantage of the low interest rates still prevailing in the major economies of the world.

A quantification of the short-term losses resulting from the pandemic presented in Table 2 also illustrates the magnitude of the economic costs of COVID. In this regard, it is important to note the following facts:

(1) Output losses for the world for the period 2020-22 based on current projections compared with what was projected in late 2019, could amount to a total of US$18 trillion, or 14 percent of World GDP.

(2) For EMDEs, cumulative losses could be more than US$6 trillion, or 17 percent of 2019 EMDEs' GDP

(3) It may be much higher for Emerging and Developing Asia excluding China (37 percent of the relevant GDP), mainly on account of India (45 %) but also reflecting the impact on the ASEAN-5 group (31%), both constituting the bulk of non-China Asia GDP.

(4) Losses for China could be in the order of US$1.6 trillion or 11 percent of GDP.

(5) The losses for Latin America could be in the order of 20 percent, and somewhat lower for Sub-Saharan Africa and the Middle East, while for all Advanced countries the losses could amount to some 9 percent

Even if improved national policies and the global economic climate may help sustain the increasing role of the EMDEs as a group, different regions will perform differently based not only on the effects of COVID but the degree of uncertainty about their policies as well. Prior to 2020, East and Southeast Asia did exceedingly well, as did India during most of the period. The Eastern and Central European, as well as Central Asian, countries saw a period of rapid growth between the fall of the Soviet Union and 2007, but they were hurt first by the slow recovery of the European Union and then by the decline in commodity prices (particularly by the prices of oil and gas) before the recent recovery. The same can be said about the economies of the Middle East and Africa. Latin America saw a decade of fast economic growth until 2011, with improved conditions for many of its poorer social segments. However, the trend reversed dramatically, partly due to the sharply lower commodity prices after 2012 and, in several cases, the re-emergence of poor macroeconomic policies. Finally, Africa also suffered a slowdown from 2012 on, although not to the same extent as Latin America or the Middle East.

Even though the AEs as a group have seen a modest recovery since 2010, growth rates for all developing regions (other than Latin America and Emerging Europe) exceeded those of the Advanced Economies. Nonetheless, when measured on a per capita basis, growth in the AEs was exceeded only by the Asian countries and Emerging Europe, as discussed below. While events in the most recent decade and a half illustrate the complexities of the growth process, under most plausible scenarios, growth in the EMDEs is likely to continue to exceed growth in the AEs through 2060. However, the Centennial model suggests that growth rates

TABLE 2: GLOBAL CUMMULATIVE LOSSES, 2020-2022 (COMPARED TO 2019 PROJECTIONS)

Region	US $ billion (2019 values)	Percent of 2019 GDP
World	-17,607	-14.3
Advanced Economies	-4,463	-8.6
EMDES	-6,188	-17.5
EMDEs Asia	-3,869	-18.8
EMDEs Asia excluding China	-2,284	-36.7
China	-1,545	-10.8
India	-1,293	-45.0
ASEAN-5	-840	-30.7
EMDEs Europe	-429	-10.9
Latin America and Carib.	-1,053	-20.3
Middle East and Cent Asia	-589	-14.8
Sub-Saharan Africa	-295	-17.2

will recover but to levels below those that were experienced late last and early this century, as can be seen in Figure 2. Nonetheless, this is far from guaranteeing that per capita income will grow any faster than among advanced countries, thus indicating that convergence is not guaranteed for the universe of EMDEs.

DEVELOPMENTS IN THE TWENTY - FIRST CENTURY

A review of the recent performance of the EMDEs points out a continuation of the process of dramatic reduction in poverty that prevailed for so many years and through most of the last century. During the last decade of the 20th century, the rate of growth of the EMDEs increased from 3.5 percent in 1981-90 to 5.6 percent a year, and then rose again during the period 2001-12 to 6.2 percent. The rates of growth were far from uniform, but the trend was observed in all regions as can be seen in Table 3 and Figure 3. The rate of growth of the AEs declined to 1.8 percent and then to 1.7 percent during the same period, seriously affected by the Great Recession. Therefore, the share of EMDEs in total world GDP rose from 33 percent in 1980 to 39 percent in 2000 and to 51 percent in 2012.

By contrast, the rate of growth for AEs increased, even if slightly, in the period 2013 -19, to about 2 percent a year, while that of emerging economies declined markedly, from 6.2 percent in the previous period to 4.5 percent, in large part as commodity prices fell, resulting in declines in terms of trade from several regions. By that time, the share of EMDEs in total had increased to 55 percent compared to 51 percent in 2012, showing a deceleration compared to previous periods, even though the share has and will continue to increase.

TABLE 3: HISTORICAL RATES OF GROWTH OF GDP [1991-2022]

Average Rates of GDP Growth per period

	1991-2000	2001-2012	2013-2019	2020-2022
World	3.74	3.93	3.41	2.57
Advanced Economies	1.81	1.69	2.01	1.80
EMDES	5.56	6.17	4.50	3.13
EMDES Asia	7.63	8.28	6.52	4.33
EMDES Europe	3.79	4.52	2.54	2.40
LATAM CA	2.47	3.35	0.96	0.66
ME & C Asia	4.35	5.26	2.80	1.70
Sub-Saharan Africa	4.89	5.70	3.49	1.90

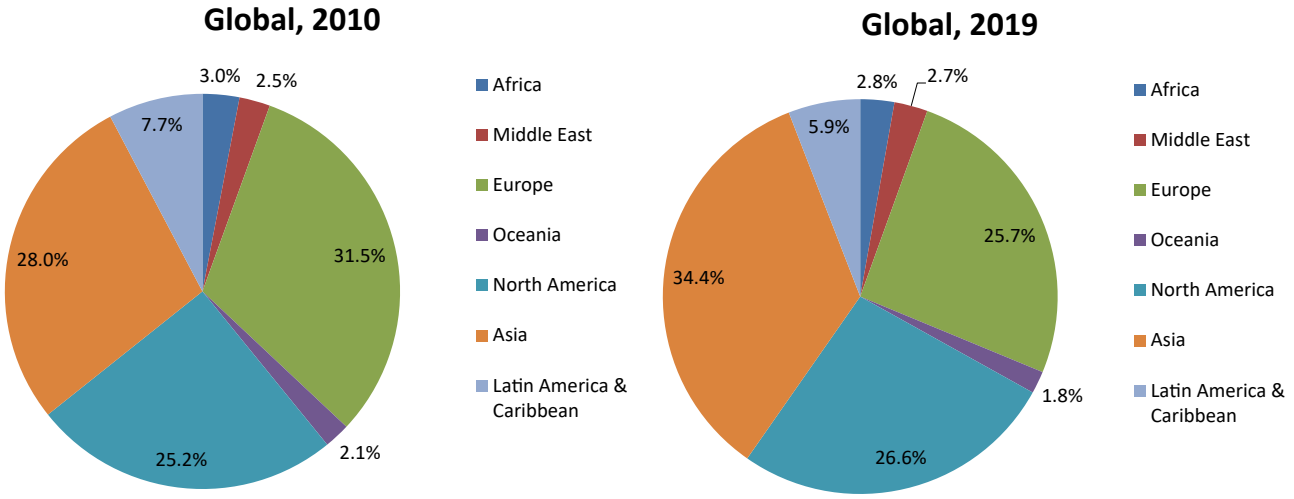
Source: IMF and Centennial

*2020-2022 Estimated and Projected

Increase

Decrease

FIGURE 3: REGIONAL SHARE IN GLOBAL GDP - 2010 AND 2019



Of course, performance was not uniform throughout the period among regions, with primary producing regions like Sub-Saharan Africa, Latin America, and the Middle East and central Asia, having slowed down much more markedly than Developing Asia. Within the Emerging and Developing Asia category, South Asia has fared more poorly than East Asia, nearly 2 percent lower for both the 1980-2000 and for the 2000-2020 average growth rates (Annex Figure 16). It also has varied between the regions in terms of the levels of per capita income and in terms of human development.

As of 2019, the last year for which solid data is available at present, per capita income of the AEs was about US$46,500 ($52,000 in PPP terms), relative to an income of US$65,200 for the US, which is used as the benchmark with the same current and PPP income. AEs are followed by Emerging Europe with US$10,000 ($26,000 PPP); LATAM and Caribbean with US$7,900 ($15,500 PPP); Developing Asia with US$5,400 ($11,100 PPP); Middle East and Central Asia with US$4,600 ($11,300 PPP); and at the lowest, Sub-Saharan Africa with US$1,600 ($3,900 PPP).

The relative level of PPP per capita income has improved significantly in the case of the Developing Asia region, increasing from 9 percent of that of Advanced countries to 21percent in 2019. It grew from 32 percent to 50 percent for Emerging Europe, although the reduction in the gap is smaller in current terms.

Because these countries did well, they lifted the overall performance of the EMDEs as a whole relative to the AEs by 7 percent percentage points in PPP terms, and slightly less in current terms. In sharp contrast, the rest of the EMDEs (Latin America, Middle East and Central Asia, and Sub-Saharan Africa) saw a small increase in their relative position in current terms, and more strikingly almost no change in PPP terms for Africa, and a decline for Latin America and the Middle East. For the shorter period, since 2014 — the base period for "The World in 2050" — in PPP terms only, Asia has reduced the gap, with all other regions showing a retreat, keeping the ratio for all EMDEs to AEs virtually constant. As discussed below, the losses may well reflect the relative behavior of commodity prices.

These developments are reflected in terms of the share of world GDP. Latin America accounted for 8 percent of global GDP in 1980 and 6.5 percent in 2000. After rising to 8 percent subsequently, it declined to less than 6 percent by 2019, losing significantly in importance in the world economy (Figure 3). Meanwhile, Emerging Asia's share of world GDP, while stable at somewhat more than 6 percent in the last 20 years of the 20th century, rose to 20 percent in 2014 and to 24 percent in 2019. All other emerging regions increased their participation (except in the 90s), partly driven by high demographic growth and improved terms of trade through 2014-15 but declined in relative participation since then. In contrast, the AEs saw their participation in world GDP (at market prices)

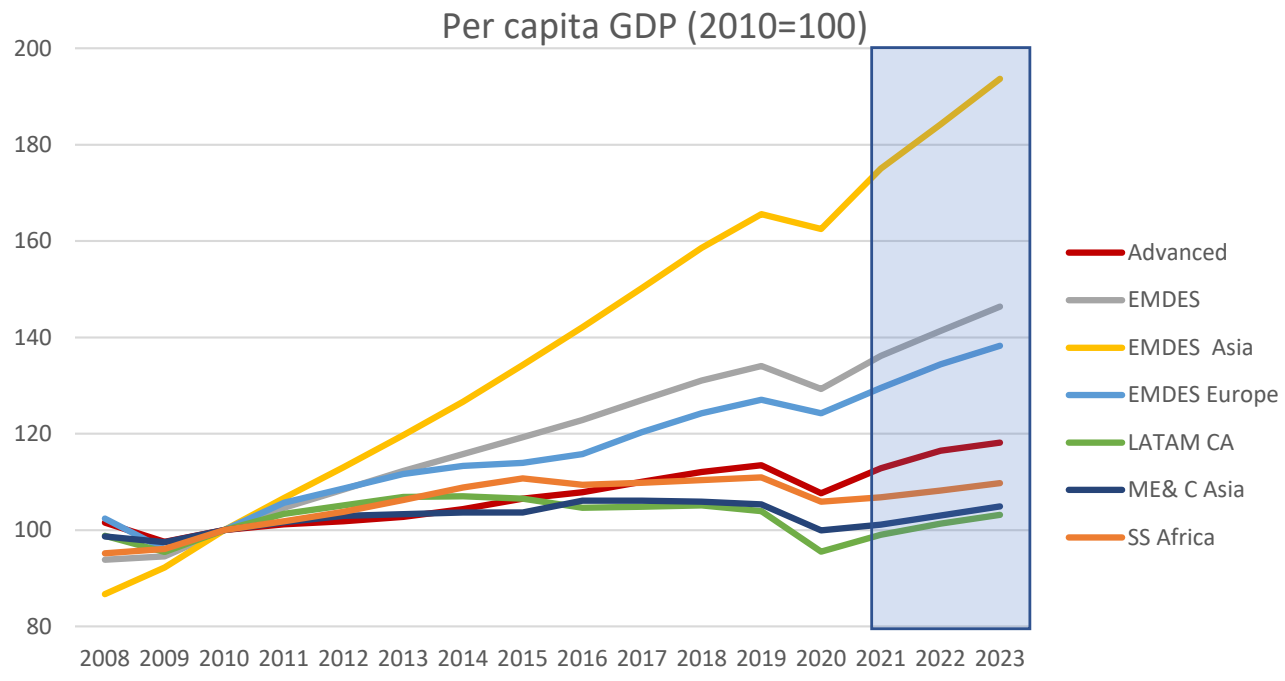
decline from more than 75 percent to 60 percent in the period 2014-15, but stood about that level in 2019. Equivalent changes occurred in PPP terms, with the share of emerging economies rising from 37 percent of the total to 56 percent in 2014-15 and 57 percent in 2019, mostly driven by Asia.

Another way to highlight the divergence of performance within the EMDEs is to look at changes over time in the share of individual regions of Emerging and Developing Economies' total GDP. While Latin America accounted for 32 percent of the Emerging and Developing Economies' GDP in 1980, its share of total EMDEs output had dropped to only 14 percent in 2019. By contrast, Emerging Asia's share rose from 27 percent to 58 percent, led by China; but Asia's rise reflected the high growth of others including India, South Korea, Taiwan, and ASEAN countries. Emerging Europe rose slightly, but all other regions declined.

To supplement the analysis of movements in income in different regions, it is important to note the behavior of per-capita income for the different regions relative to 2010 — at the end of the Great Recession. Since then, Emerging Asia and to a much lesser extent Developing Europe have witnessed sustained increases in per capita income, as seen in Figure 4, even with a one- or two-year reversal in 2020-21 — an event in common with all other regions. AEs saw modest but also steady increases. While the other three regions were characterized by declining or stagnant incomes, at least since the middle of last decade, Latin America has been clearly the worst performer during the period.

Finally, another useful measure to assess an economy's success in catching up with the AEs is progress (or regression) in its relative per capita income to that of the United States. By this measure, although the average per capita income of Latin America has remained stable (or at times even regressed) relative to the United States during the last three decades, that of Emerging Asia has risen considerably, reflecting its steady convergence with the United States. However, African countries and Emerging European countries showed a decline of their per capita income relative to that of the United States, indicating that, despite their periodic growth spurts, these regions have not yet achieved a long-term record of convergence.

FIGURE 4: PER CAPITA GDP, BY REGION (2010=100)



FACTORS AFFECTING REGIONAL PERFORMANCE

Asia's strong performance can be explained by many factors, such as much higher savings and investment rates, greater openness, better human capital development, and other actions reflected in stronger global competitiveness as well as "cost of doing business" rankings. However, in addition to relative weaknesses in these areas, Latin America, Africa, and the Middle East have also continued to suffer from other structural weaknesses, possibly lack of a long-term vision, and a generally weaker macroeconomic policy framework, even as inflation has tended to be contained. All these factors have led to, amongst other indicators, relatively poor growth in total factor productivity (see Table 4), with particular concern regarding Latin America, the Middle East, and, to a lesser extent, Sub Saharan Africa, precluding rapid convergence.

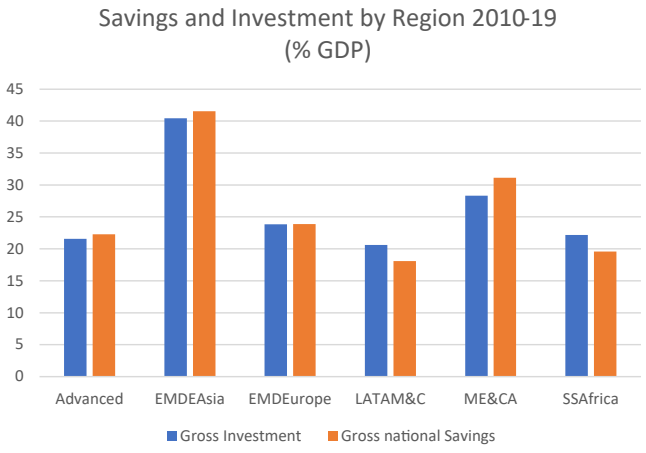
TABLE 4: TOTAL FACTOR PRODUCTIVITY GROWTH

Total Factor Productivitiy Growth Average 2000-2019	
Region	TFP
Advanced	0.79
EMDEs Asia	3.94
EDMEs Europe	2.36
LATAM CA	-0.06
ME&C Asia	0.56
Sub-Saharan Africa	1.22

Source: Centennial Group

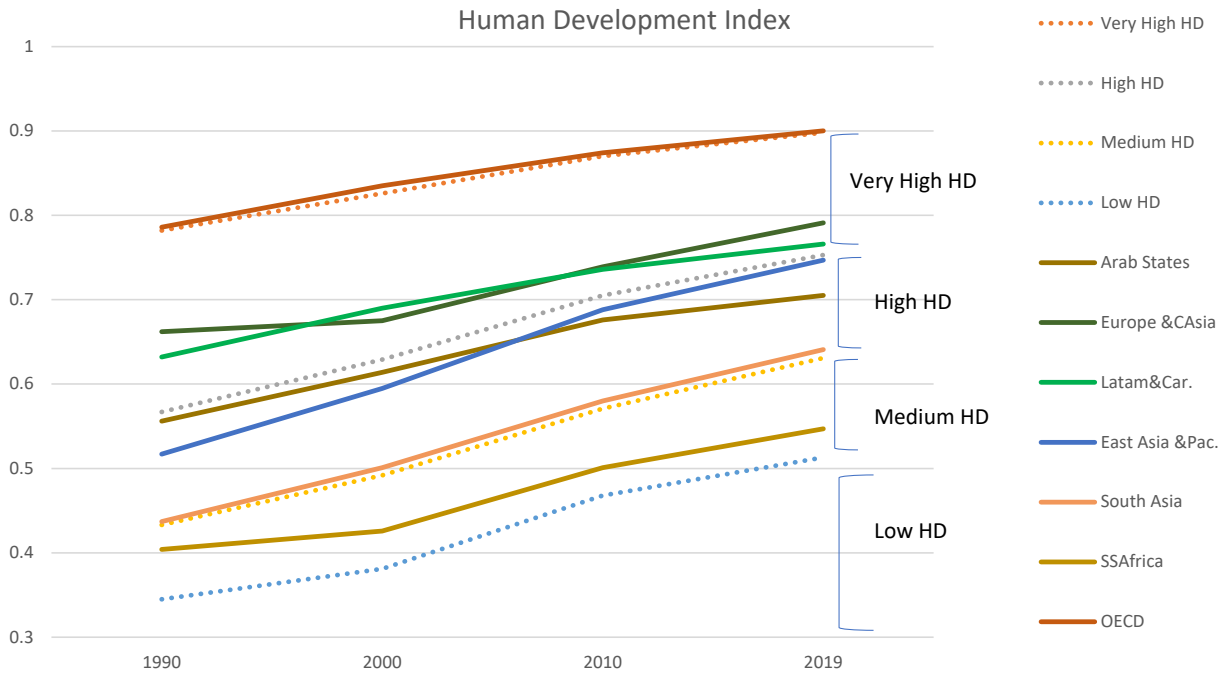
Differences in the savings and investment rates are another important factor in explaining differing growth performance around the world. With the highest per capita income, the AEs are likely to have a greater propensity towards consumer spending, resulting in low levels of savings and investment. However, from Figure 5, it can be observed that the Emerging World regions, with the clear exception of Emerging East Asia and to a much lesser extent the Middle East and North Africa, have also suffered from low savings and investment. These low investment rates, combined with poor productivity (TFP) growth, have resulted in sluggish growth rates compared to fast-growing East Asia.

FIGURE 5: SAVINGS AND INVESTMENT, BY REGION (2010-2019)



The relative progress of different regions is

FIGURE 6: HUMAN DEVELOPMENT INDEX (1990-2019)



again reflected in the behavior of the Human Development Index, produced by the UNDP, and which includes economic, educational and health performance, for its calculation. In the last thirty years, all regions have improved. However, as can be observed in Figure 6, East Asia has done particularly well, in addition to Emerging Europe and Central and South Asia these cases starting from lower levels. The laggards in terms of improvement are again the Middle East and Latin America, with Sub-Saharan Africa in an intermediate position between the two other groups.[1]

The Ease of Doing Business Index produced by the World Bank, while subject to controversy in terms of some of the countries' behavior, provides a strong case for alternative behavior. While countries in the LATAM and Middle East Region benefit from relatively high income, their lackluster performance is clearly associated with their low relative EDB ratings for the two regions, as is the case for SS Africa. Equivalent results can be extracted from the Global Competitiveness Index for 2019 (the last produced index in that format) of the World Economic Forum, although with a different country classification, as it includes

1 The Human Development Index (HDI) is a composite statistic of life expectancy, education, and per capita income indicators, which is used to rank countries into four tiers of human development.

FIGURE 7: EASE OF DOING BUSINESS SCORES, BY REGION

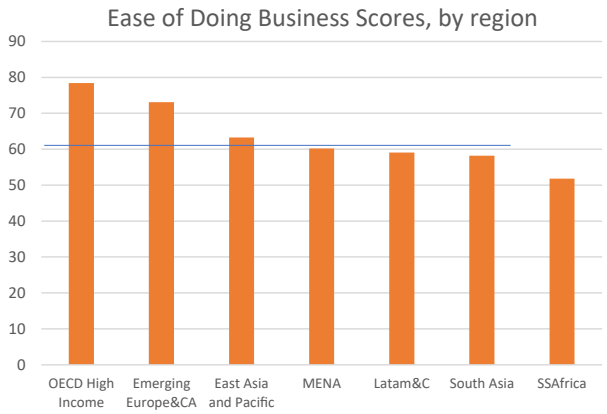
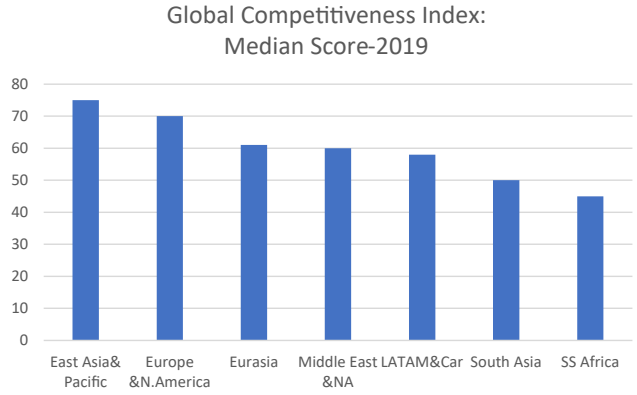


FIGURE 8: GLOBAL COMPETITIVE INDEX, MEDIAN SCORE (2019)

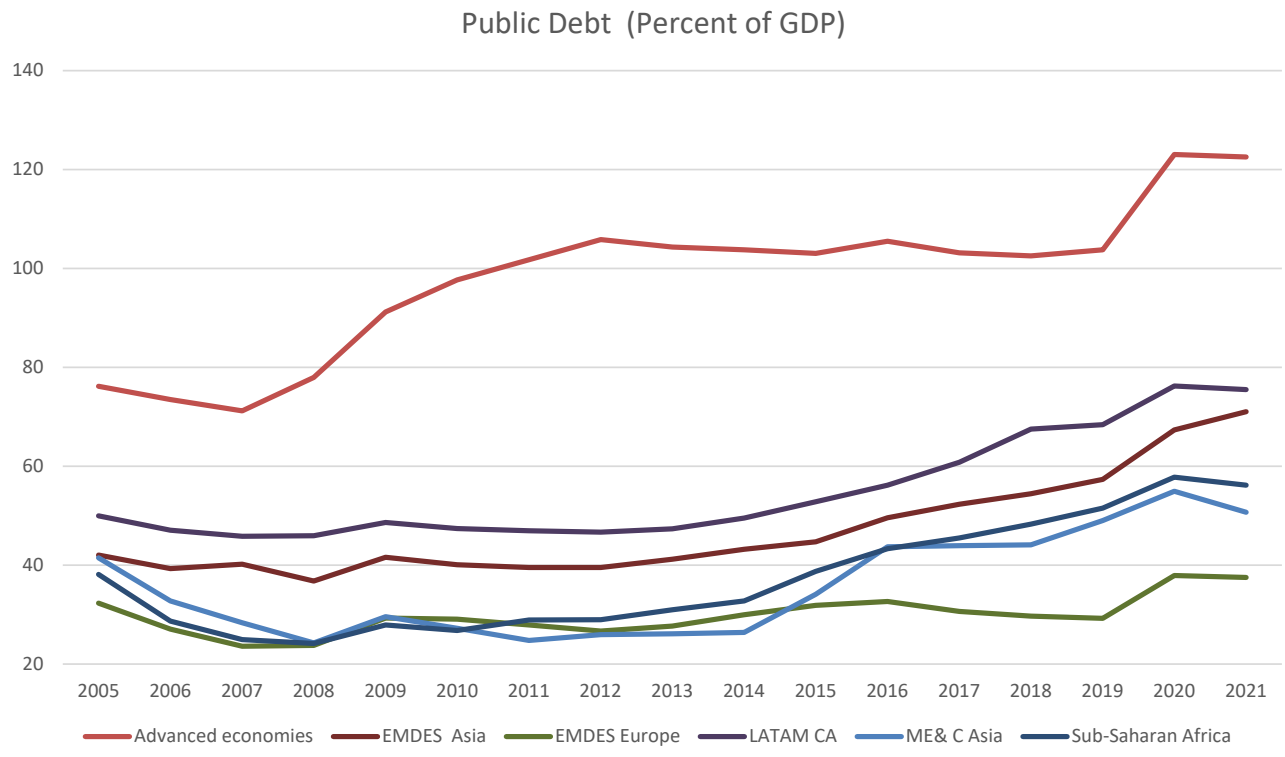


OECD countries in the geographical groupings. On that basis, East Asia comes first, being the most dynamic region, followed by Europe and North America, and in third place Eurasia.

As was indicated in The World in 2050, while the pace and trajectory of different regions and countries in the EMDEs cannot be summarized easily because their economic and political conditions varied widely, there have been positive policy trends. In most cases by now, there has been a significant improvement in macroeconomic policies, even with some backtracking; there are robust financial systems, and, of equivalent and related importance, there has been a sharp reduction in the prevailing rate of inflation, of course accentuated by the COVID pandemic. While this is especially true for Latin America and the Middle East, patterns are observed in the other regions, including Sub-Saharan Africa, where countries were the last to embrace macro-economic and structural reforms and build modern institutions. Because of generally favorable conditions, countries appeared to have emerged from their previous pattern of non-convergence. As discussed, starting in the early 2000s, the average annual GDP growth rate of Emerging Asia, Africa, Latin America, and the Middle East rose rapidly, in large part for the three latter regions due to the decade-long improvement in terms of trade caused by the super commodity cycle, which extended through 2012. As noted earlier, as the impulse coming from China weakened and terms of trade declined, growth in the Emerging Markets declined through 2019, while the rate of growth of AEs rose.

As a result, the growth rate differential of EMDEs with respect to that of the AEs has narrowed from its peak of more than 5 percent between 2007-09 to 2.5 percent per cent in the period 2013-19, a level comparable to the beginning of the 21st century. As discussed, the differential is likely to narrow significantly further, for the period 2020-22. This may put in doubt the plausibility of continued significant changes in the relative shares of world output, at least in the near term. These developments, including the pandemic, raise questions about the long-term growth prospects of the global economy in general and of EMDEs more specifically.

FIGURE 9: PUBLIC DEBT BY REGION



One important consideration in terms of the capacity to adapt is that the increase in domestic public borrowing by advanced countries has and will continue to absorb significant resources. This, together with previous significant public borrowing (Figure 9) and consequently higher risks among emerging economies, will limit capital flows to these countries in the future. Furthermore, China's revival is resulting in a narrowing of its current account surplus and thus its ability to lend. These circumstances point to a problematic recovery in the medium-term and increased poverty.

Even with these difficulties, several regions are converging. The average annual GDP growth rate of Emerging Asia and Emerging Europe has remained strong, and convergence remains a strong possibility for those areas, but as discussed less so for the other regions. Furthermore, world GDP growth has decelerated and growth of most EMDEs has slowed in parallel. Their overall growth slowed to an annual rate of 3.4 percent in 2013-19 and will certainly be much lower in the pandemic period and the recovery of 2020-22. The performance of the AEs showed that their growth has recovered, albeit slowly, since 2010 (Figure 2), especially in the United States, the United Kingdom, Germany, and many northern European nations (plus Japan, though to a more modest degree and more unevenly).

In these circumstances, emerging economies will need to deal with several correlated but identifiable effects. AEs and some emerging economies have been able to counteract the sharp decline in activity through lockdowns and related business disturbances because of their deep fiscal resources as well as through their robust financial markets. The ability of most EMDEs to take equivalent actions has been limited by both fiscal constraints and their narrow domestic and closed foreign financial markets. This has resulted in a reduced effectiveness of countercyclical actions, with possible inflationary and balance of payments consequences. The sharp initial decline in global demand has hit primary producers extremely hard, although there has been a recent strong recovery. All this brings to the fore questions about the plausibility of continued significant changes in the relative shares of world output, at least in the near term.

COMMODITY PRICE CYCLES, TERMS OF TRADE[1], AND IMPACT ON GROWTH RATES

The process of globalization has had a strong positive effect on emerging economies. Many countries changed their structure of production based on their legacy-resource and dynamic comparative advantages. Emerging regions developed their commercial links with the rest of the world based on exports of commodities and other primary products. Over time, different countries moved up the technology scale with more complex industrial and higher-value-added and integrated-value-chain exports. The clearest examples have been China, India, Malaysia, and Taiwan R.C. in Asia, and Mexico among Latin American countries.

Nonetheless, commodities (be they agricultural products, minerals, or oil and gas) continue to be at the center of the exports of the EMDEs of Latin America, Africa, and the Middle East. As of 2019, commodities represented about 44 percent of Latin America and the Caribbean's exports (UNCTAD 2020). For Sub-Saharan Africa, they represented 72 percent, and for the Middle East (as approximated by Western Asia and North Africa), the ratio of primary commodity exports was 59 percent. By contrast, for Developing Asia and for high-income OECD countries, exports of commodities represented 21 percent and 22 percent of total exports, respectively.

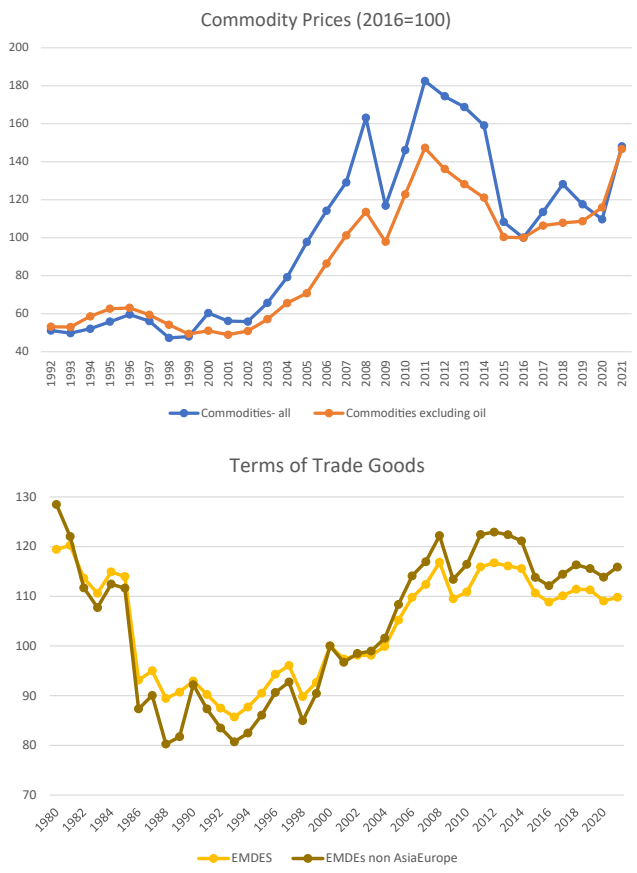
The increase in commodity prices at the beginning of the 21st century resulted in a marked improvement in their terms of trade. However, terms of trade declined subsequently, although by 2019 they were still higher by some 20 percent compared to 2000 for Latin America and the Caribbean, and for the Middle East and North Africa, and 43 percent for Sub-Saharan Africa. In contrast, terms of trade for Advanced economies and Developing Asia were about the same as in 2000. In 2020, terms of trade declined for all commodity exporters, but prices have recovered strongly in 2021, as the world economy pace improved. Prices are expected to stabilize in 2022.

The growth of Asia, particularly that of China, had the effect of an enormous gain in income of commodity exporters, as demand outpaced the increase in supply. Accordingly, Latin American and African countries and the Middle East experienced strong growth and prosperity for about a decade, ending in 2012. However, since the break of the super commodity cycle in 2012-13, commodity prices declined sharply, undermining the assumption that they were at a safe level of security and the countries were on the way to a prosperous future. This reality became evident during the period 2013-19, particularly in the case of oil and metals.

A slowdown in the advanced and emerging world caused major shocks. Reversals of commodity prices had a major impact on the incomes of all commodity exporters, including through the multiplier effects of a decline in export income, as prices reversed back to 2005 levels, and even earlier for some metals and fuels (Figure 10).

1 See Loser, Claudio M. "Commodity Terms of Trade in Emerging Markets: A Fragile Blessing." Global Journal of Emerging Market Economies 5, no. 2 (May 2013): 99–115. https://doi.org/10.1177/0974910113494538.

FIGURE 10: COMMODITY PRICES AND TERMS OF TRADE - GOODS



These events had not been expected. However, the evidence shows that throughout the past sixty years, terms of trade for commodity-exporting countries have presented a highly cyclical pattern. In addition, the terms of trade of these regions were much more volatile than those of the AEs and Emerging Asia and Europe, as suggested by the standard deviation in growth rates (Table 5).

In summary, gains in terms of trade were a source of unprecedented prosperity in Africa, Latin America, and the Middle East. However, it is also clear that since 2012 these trends were reversed in many cases. The impact of lower terms of trade can be staggering—a decline in GDP of half a percentage point for each percentage point change in terms of trade. With the certainty that in the future prices will continue to fluctuate and that they will not easily reach the levels observed a decade ago, it is essential that EMDEs prepare proactively for the lower price contingencies. Otherwise, volatility will take over and hinder future growth prospects.

As commodity importing EMDEs like China, India, and other Asian countries mature demographically

FIGURE 11: TERMS OF TRADE, GOODS

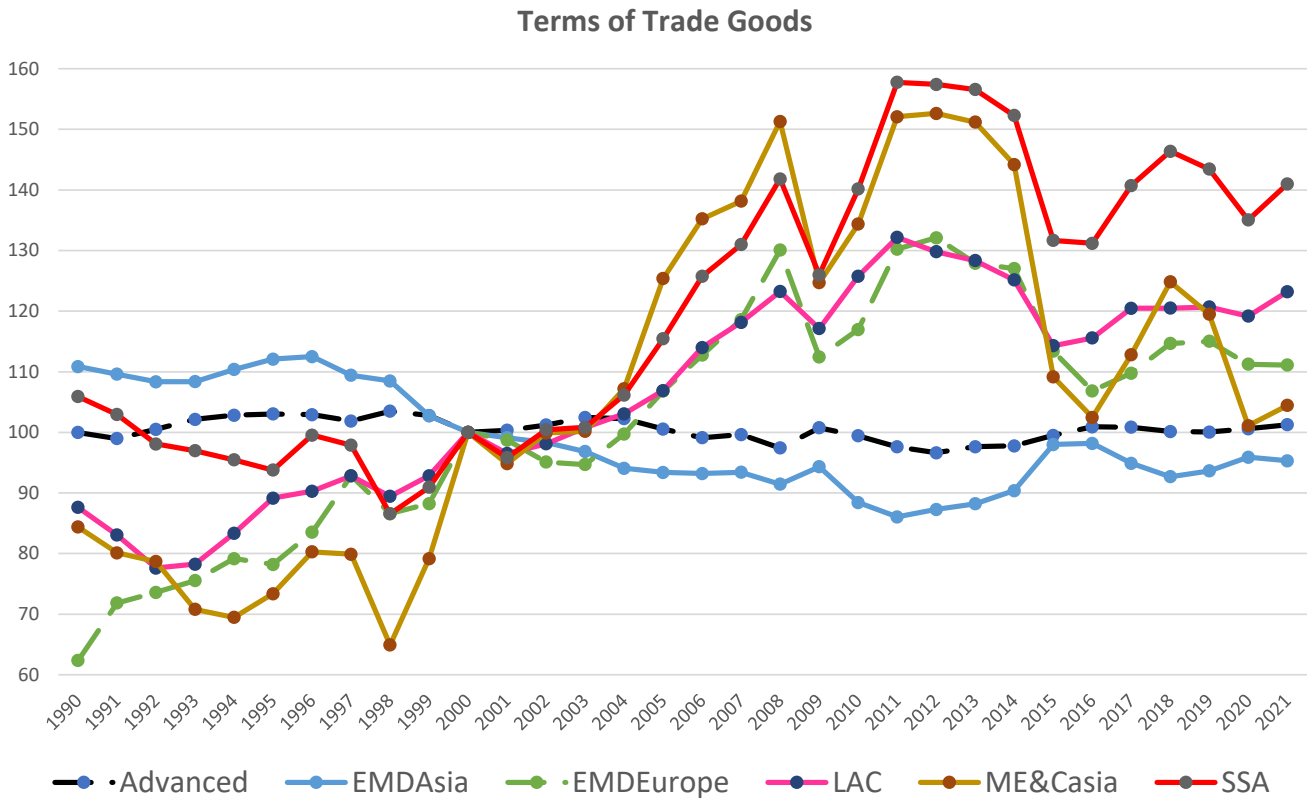


TABLE 5: REGIONAL AVERAGE CHANGE IN TERMS OF TRADE

Regional Average Change in Terms of Trade 2000-2020		
Region	**Average Percent Change**	**Standard Deviation**
Advanced	-0.09	1.46
EMDEs	0.83	3.22
EMDEs Asia	-0.28	2.95
EMDEs Europe	1.33	6.60
LATAM CA	1.28	4.10
ME & C Asia	1.86	11.61
Sub-Saharan Africa	2.14	6.97
Source: IMF and Centennial		

and economically by 2050, and as new technologies and concerns about climate change are expected to lead to conservation of natural resources, the sharp increase in demand for commodities observed in the last few decades may not be repeated, other than for cyclical factors as is the case at present. Moreover, a significant increase in output is taking place for many products in response to the high prices of recent years (oil and gas production through hydraulic fracturing). Exporters have to adapt to these new realities. Complacency among policymakers reflecting a benign view of the future may prove inimical to their long-term national interest. The past may repeat itself in terms of periods of growth and prosperity followed by times of crisis and needed reform unless actions are taken.

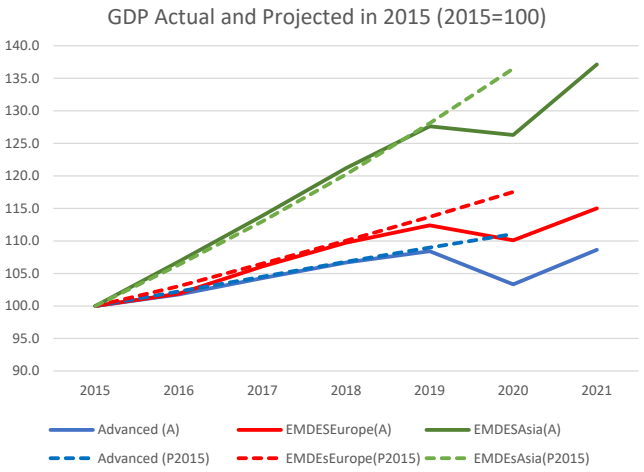
COMMODITY PRICES AND TOTAL FACTOR PRODUCTIVITY

In reviewing the performance of various regions in the last several years, we have indicated that major commodity exporting regions were considerably lagging Asia, the Advanced countries, and Emerging Europe, particularly if viewed on a per capita basis. Of equal importance, the growth trajectory for these regions as envisaged at the time of previous studies was much higher than the actual trajectory . In contrast, for the Advanced countries, Asia, and Emerging Europe, the growth path was very much in line with what was projected at that time. This can be observed in Figures 12a and 12b, which show the expected path of GDP as of 2015, and the actual numbers through 2020, with the most marked decline in regions that depend heavily on Commodities. In part this phenomenon may also be related to the retreat from globalization that is reflected in a shortfall in the volumes of trade with respect to the previsions in 2014-15, even though GDP for the world remained broadly in line with expectations through 2019, as observed in Figure 13.

In this regard, an important factor comes into the picture: the interaction between terms of trade and the estimate of total factor productivity. The process of globalization, opening of trade opportunities, and reduced import restrictions through the beginning of this century has resulted in a major increase in the importance of trade transactions in total GDP. Export and import prices have therefore taken on a growing importance in determining nations' real incomes. In particular, the effect of changes in terms of trade is central to the measurement of available resources to a specific economy.

Over longer periods of time, terms of trade have fluctuated markedly, as discussed above. This

FIGURE 12A AND 12B: GDP PROJECTIONS SINCE 2015 [2015=100]



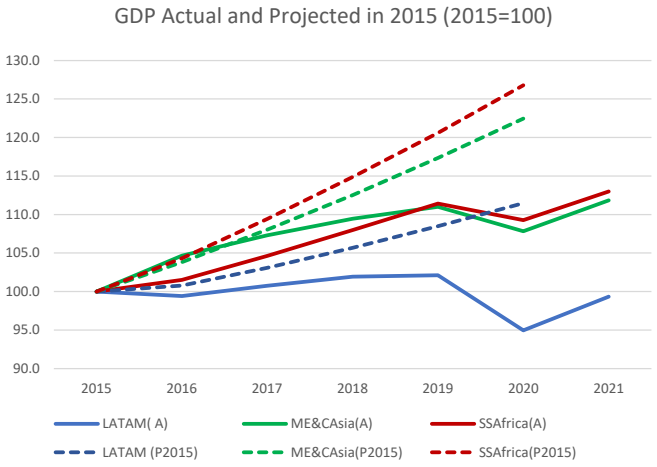
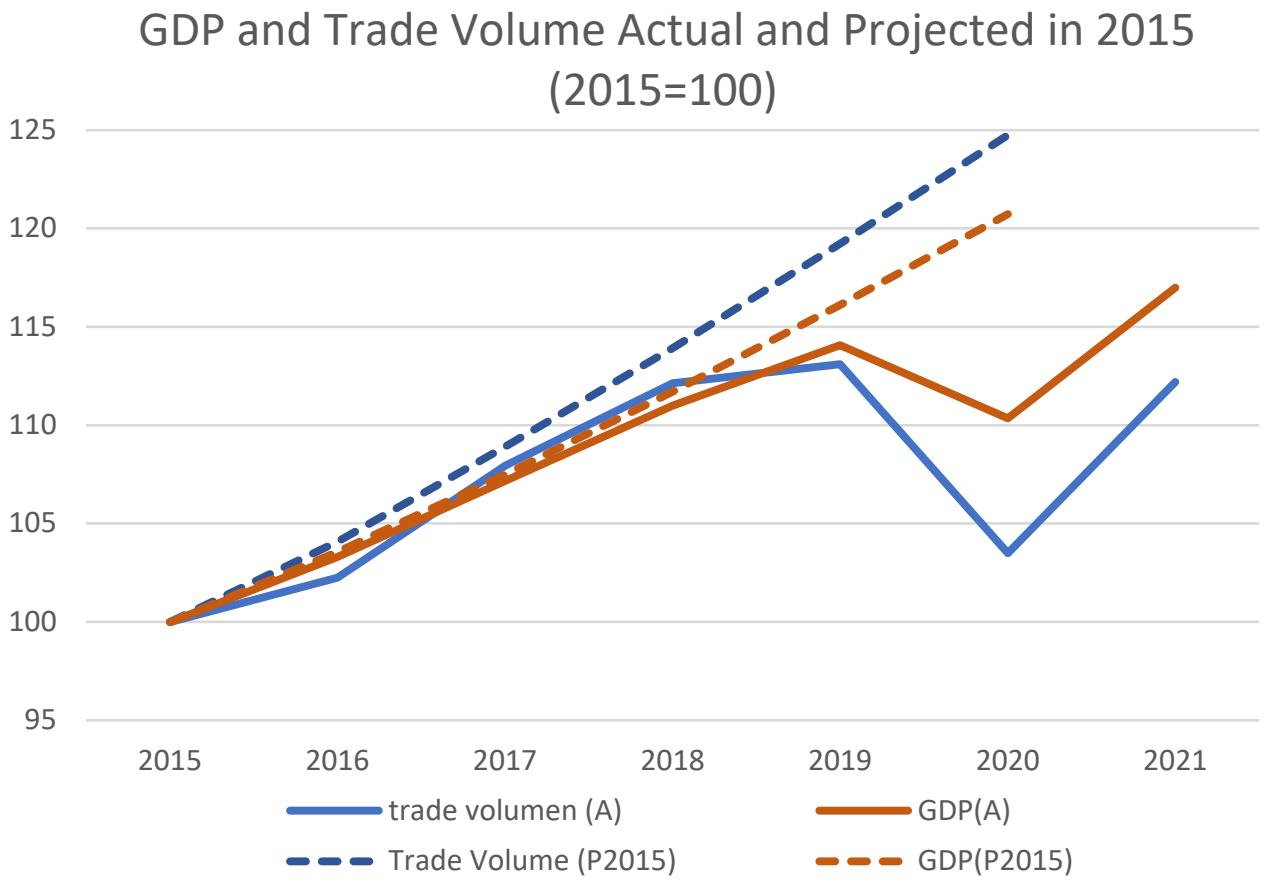


FIGURE 13: GDP AND TRADE VOLUME, ACTUAL AND PROJECTED SINCE 2015



has affected the level of prosperity of commodity exporters in Africa and Latin America in the last ten years and in the Middle East over an even longer period. When the terms of trade change, there is a significant divergence between the movements of GDP in output terms and real income. The difference between the change in GDP in volume terms and real income is generally described as the "trading gain" (or loss). The differences between movements in GDP in volume terms and real GDP including price effects may be large. In measuring the contributors to growth in GDP, as is applied in the Centennial model, these are divided into labor force; capital increase, measured by investment minus depreciation; and, as a residual, the gains in productivity, measuring implicitly technological and institutional change, improved levels of education, and by default, the impact of terms of trade.[1]

Work carried out by Centennial Group suggests a significant correlation of the estimates of total factor productivity and movements of terms of trade. The work consists of an econometric analysis linking the estimate of TFP with terms of trade as an independent variable, together with capital stock as a trend variable and with the understanding that most of the changes in total factor productivity not associated with human capital generally reflect improved technology normally embodied in new investment. Alternatives could be formulated with time as the additional variable, as a proxy for the underlying growth in structural improvements.[2]

$\text{Log}_{10}\text{TFP} = \text{intersect} + a*\log_{10}\text{Terms of Trade} + c*\log_{10}\text{Capital Stock}$

The regression formulation is as follows: where log TFP is the estimated rate of growth of total factor productivity, as a function of the rates of change in the capital stock and the level of terms of

1 See: Loser, Claudio (2013) "Commodity terms of trade in emerging markets: A fragile blessing"

2 Regressions run with time as the additional variable provide somewhat less meaningful results than the use of changes in the capital stock.

TABLE 6: REGRESSION ANALYSIS - TOTAL FACTOR PRODUCTIVITY, TERMS OF TRADE, AND CAPUITAL ACCUMULATION

Region	Intercept	Terms of Trade	Capital Accumulation	R^2	Observations
Advanced Countries	0.697	0.234	0.411	0.979	42
t stat	4.287	2.707	36.781		
p stat	0.000	0.010	0.000		
Emerging and Developing Asia	1.777	-0.313	0.421	0.995	41
t stat	4.287	2.707	36.781		
p stat	0.000	0.010	0.000		
Emerging Europe	0.389	0.195	0.561	0.831	32
t stat	2.514	1.856	6.771		
p stat	0.018	0.074	0.000		
Latin America and Caribbean	1.469	0.201	0.054	0.745	40
t stat	27.575	5.705	3.276		
p stat	0.000	0.000	0.002		
Middle East and North Africa	1.436	0.223	0.015	0.568	41
t stat	21.057	6.164	0.649		
p stat	0.000	0.000	0.520		
Sub-Saharan Africa	1.091	0.280	0.175	0.938	36
t stat	19.468	6.885	8.852		
p stat	0.000	0.000	0.000		

trade plus a constant.

The regression analysis is based on historical information for six key regions, namely the Advanced countries, Emerging and Developing Asia, Emerging Europe, Latin America and the Caribbean, Middle East and North Africa, and Sub-Saharan Africa. The data on total factor productivity and capital stock accumulation are obtained from the Centennial Growth Model, updated as of April 2021. Data on terms of trade of goods are obtained from the IMF WEO database. The data for the regressions generally start in 1979, with data for Sub-Saharan Africa starting in 1985, and 1989 for Emerging Europe. The results for the regressions are presented in Table 6. It includes for each variable the regression coefficient, t and p statistics, R^2, and the number of annual observations.

From these results it can be observed that terms of trade are a significant explanatory variable of measured TFP, even though slightly less so in the case of Emerging Europe. Capital accumulation is also a strong explanatory variable, with the exception of the Middle East.

Because of the significant changes and standard deviation of the variable (Table 5), the effect of terms of trade changes tends to be significant in the case of the three recently lagging regions: Latin America, Sub-Saharan Africa, and the Middle East

TABLE 7: AVERAGE ANNUAL % CHANGE IN TFP, TOTAL AND NET TERMS OF TRADE EFFECT

Region	Average Annual % Change in TFP	Change Net of T of T	Average Estimated % Change in TFP	Change Net of T of T
Advanced Countries	0.840	0.825	1.062	1.047
Emerging and Developing Asia	3.126	3.113	3.314	3.301
Emerging Europe	2.474	2.214	2.107	1.848
Latin America and Caribbean	-0.213	-0.216	0.126	0.123
Middle East and NA	-0.677	-0.960	-0.039	-0.322
Sub Saharan Africa	0.572	0.424	0.694	0.546

and Central Asia, with a much smaller effect on Asia and the Advanced countries.

Table 7 shows the average and average estimated TFP growth for all the regions. The estimates include the numbers for unadjusted TFP, and those where the effect of the terms of trade are subtracted, i.e., measuring non-terms-of-trade TFP changes. The rates of change, well described by the Centennial Model, show particularly high rates of growth for Asia, the Advanced countries, and Emerging Europe (in this case in reflection of the collapse of the Soviet Union and the integration of the region with Advanced Europe). The TFP growth rates for Sub-Saharan Africa are relatively low, while those for the Middle East and N Africa and Latin America are negative or extremely low for the period under consideration.

Looking at the path of commodity prices and terms of trade in the last forty years, it is possible to distinguish two clear periods: from the early 1980s to the mid-late 1990s, and from then to the mid-teens. For the first period, when commodity prices and terms of trade were falling, TFP may have been underestimated historically, while they were overestimated subsequently, as terms of trade increased for the Commodity exporting regions. For the Advanced, Asian, and Emerging European countries the impact was likely the reverse, but the movement of relative prices was considerably narrower, with limited impact on TFP.

As terms of trade turned against the exporters in the three lagging regions in more recent years, unadjusted TFP growth rates declined, and had an impact on actual GDP in comparison with what was projected in 2014-15 on the basis of a previous overestimate of TFP (although at the time serious warnings already had emerged with respect to the growth prospects of commodity-dependent regions). The regression analysis indicates that if the effect of terms of trade is subtracted from movements in total factor productivity (TFP), the rate of growth attributable to all other factors is much lower than the measured values for the period 2000-2019. The difference in growth rate of TFP for emerging economies including and excluding the terms of trade effect could be as high as 2 percentage points for the period. This is consistent with the results for the commodity exporters, although less marked for Africa.

Figures 14 - 19 below show for each region the measured and estimated TFP, the TFP (net of terms of trade), and the effect of terms of trade.

In the cases of the Advanced and Emerging Asian countries, the impact of terms of trade on the measurement of TFP is negligible, and

FIGURE 14: TOTAL FACTOR PRODUCTIVITY FOR ADVANCED COUNTRIES 1979-2019

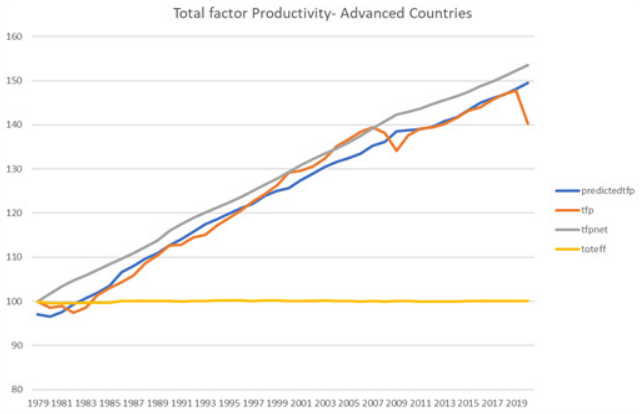


FIGURE 15: TOTAL FACTOR PRODUCTIVITY FOR EMERGING ASIA 1980-2020

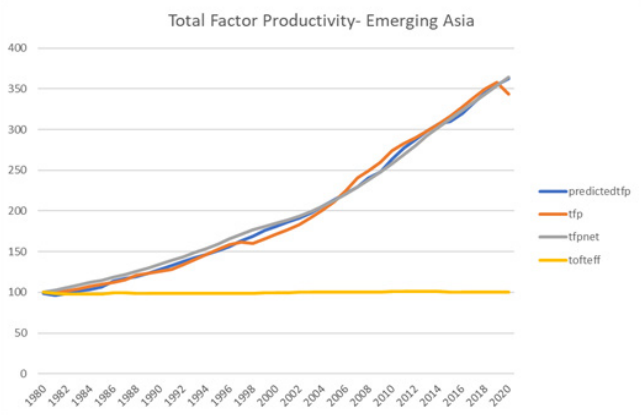


FIGURE 16: TOTAL FACTOR PRODUCTIVITY FOR EMERGING EUROPE 1989-2020

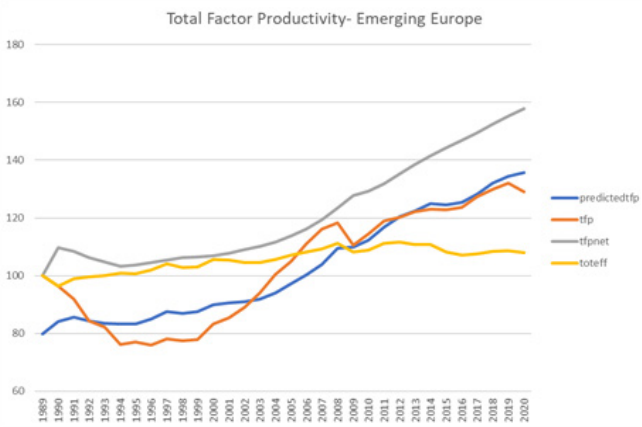


FIGURE 17: TOTAL FACTOR PRODUCTIVITY FOR LATAM 1981-2019

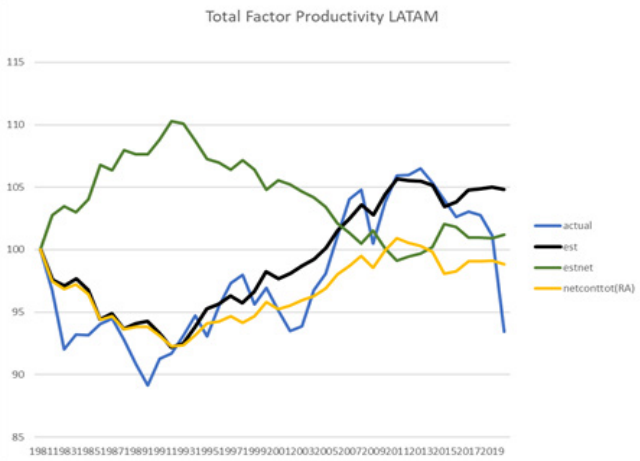


FIGURE 18: TOTAL FACTOR PRODUCTIVITY FOR SUB-SAHARAN AFRICA 1985-2019

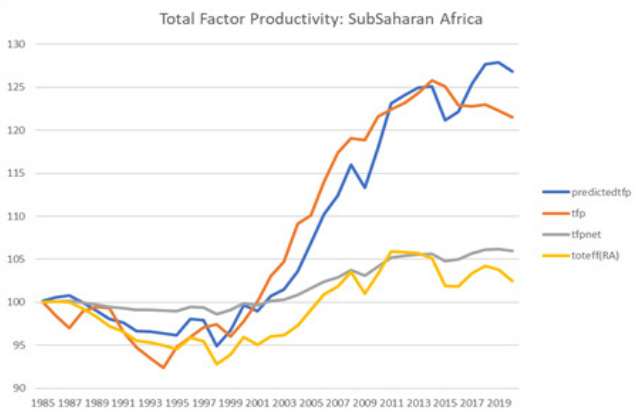
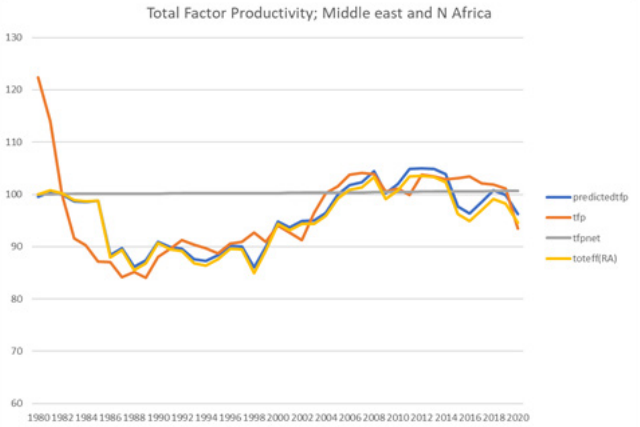


FIGURE 18: TOTAL FACTOR PRODUCTIVITY FOR MIDDLE EAST AND NORTH AFRICA 1980-2020



both regions show strong innovation. This is also the case, although to a lesser degree, in the case of Emerging Europe. In the case of Latin America and Sub-Saharan Africa, the effect of terms of trade in the unadjusted measurement of TFP is significant, and as suggested above, it is clear that TFP was underestimated initially and overestimated subsequently, with little trend growth at all. Probably the most dramatic case in terms of mis-measurement is that of the Middle East, where total factor productivity is estimated to have grown at a slow rate once the effect of the energy prices is subtracted from the estimate.

Based on the experience of the last quarter century and on the assumption that terms of trade will not change in the future, new estimates of future growth within the model of Centennial suggest a lower growth path. Even so, terms of trade today are well above the levels observed in the last part of last century and early this century. However, at present there are no expectations of sharp increases other than of cyclical nature, and the possibility of a rapid convergence to the current advanced countries is less likely than had been expected previously, based on corrected TFP change.

MEDIUM- AND LONG-TERM OUTLOOK

This section presents scenarios up to 2060, based on the global growth model that has been widely used by the Centennial Group.[1] This is a long-term model, and therefore its results and projections are stylized; they are not intended to predict the future exactly but rather to provide a context for policymaking and reform.[2] Centennial Group's long-term models explore alternative scenarios for the global economy, with a focus on the outlook for Emerging and Developing Economies. The Global Growth Model has been adapted to reflect the developments described above. It also considers the fact that during the last few decades there has been a decline in the growth of the global productivity frontier. The latest scenarios generated by the model suggest that, as result of the pandemic, the world economy will incur an accumulated loss of at least one year of output in the next twenty years and that, even with global growth resuming in 2021, global GDP will not be on track to go back to the pre-pandemic trend line. Asia will remain the most dynamic region, and Latin America, the Middle East, and Europe will suffer the most from the recent events. Finally, independent of the effects of the pandemic, there is a slowdown in the long-term global productivity growth, particularly for the commodity-dependent regions, as discussed earlier.

The new growth model results take into consideration the effect of the COVID Pandemic and compares it with an alternative no-COVID exercise. It includes a significant convergence reclassification of countries, based on the indicators used in the model, plus consideration of the Resilience Index and the World Bank classification of states in high- or medium-intensity conflict. Based on the current run, summarized in the tables and figures of the next few pages, the World should recover relatively quickly, supported by the projections of the WEO and others.

The study presents three scenarios: baseline, optimistic, and pessimistic-, to allow a simple and clear presentation. These scenarios are not intended to constitute definitive projections. The current scenarios are also compared with pre-COVID projections, based in 2019, except for the pessimistic scenario. The scenarios revolve around a "central" scenario considered most plausible for the global economy. A crucial assumption under this scenario is that the global productivity frontier (the United States economy) will improve at an average annual rate somewhat below 1 percent. It had been about 1 percent for the past 100 years or so but has experienced a decline in more recent years. It further assumes that only the AEs that have performed well in the past 20 years will continue to move at the same pace as the United States and similarly that EMDEs that have a record of successful convergence in the past will continue to converge in the future as well. It also presents a further scenario for the EMDEs called "strong policy". Under the strong policy scenario, the

1 The medium and long term projections are based on the April 2021 IMF WEO. A new run will be made after these projections are revised in October. Current WEO revisions as of July 2021 only cover 2021-22.

2 Kohli, Harpaul Alberto, Y. Aaron Szyf, and Drew Arnold. "Construction and Analysis of a Global GDP Growth Model for 185 Countries through 2050." Global Journal of Emerging Market Economies 4, no. 2 (May 2012): 91–153. https://doi.org/10.1177/097491011200400202.

global productivity frontier improves at a faster rate than under the central scenario. In all other aspects besides the increased productivity frontier growth the advanced economies' performance remains broadly the same, but policy performance of EMDEs improves significantly. The poor-policies scenario combines two simultaneous adverse developments: many EMDEs fall into the middle-income trap because of their inability to maintain a reasonable policy regime and the global productivity growth rate slows to only 0.6 percent per year (as argued by some cautious experts). While this scenario could be considered overly pessimistic, it cannot be ruled out. In fact, without progress towards addressing the climate crisis, a pessimistic scenario may become more likely.

Central scenario

Based on these models and projecting through 2060, the central scenario for the global economy suggests that there will be a continued increase in the participation of EMDEs in World GDP. Under the central scenario, post-COVID annual GDP growth on average would be 3.2 percent for the period 2021-40 and 2.9 percent for 2021-60, slightly above the no-COVID projections, due to the recovery of output after 2020 (Table 8 and Figure 21). Per-capita income could grow at a rate of 2.2 percent a year. Today's EMDEs would grow at an average annual rate of 3.6 percent, in comparison to a rate of growth of 1.6 percent for today's advanced economies. The average rate of growth for Sub-Saharan Africa would be in the order 4.8 percent, and that of Emerging Asia, 4.0 percent. Disaggregating Emerging Asia, growth in

TABLE 8: INCOME AND INCOME PER CAPITA, PPP 2018 AND MKT 2018

Income and Income PC PPP2018							Average Annual Growth	
	GDP	GDPpc	GDP	GDPpc	GDP	GDPpc	2021-2060	
	2021		2040		2060		GDP	GDPpc
World	127634	16573	241781	26652	404949	40514	2.93	2.26
Advanced	53962	50600	77682	70252	101632	92147	1.60	1.51
EMDEs	70897	10774	159736	20217	297306	33692	3.65	2.89
EMDEs Asia	44414	10707	112163	24180	214792	45511	4.02	3.68
EMDEs Europe	10098	25840	16500	43672	23568	66437	2.14	2.39
LATAM CA	9304	14582	14698	20218	20653	27394	2.01	1.59
ME & NA	6918	14381	12470	19835	21207	28198	2.84	1.70
Sub-Saharan Africa	3979	3752	9799	5792	25247	10446	4.73	2.59
Income and Income PC mkt2018							2021-2060	
							GDP	GDPpc
World	81915	10636	156770	17876	273927	28449	3.06	2.49
Advanced	48877	45832	73111	66118	96494	87488	1.71	1.63
EMDEs	31711	4819	81512	10727	174438	20625	4.35	3.70
EMDEs Asia	21290	5132	60796	14019	136930	31458	4.76	4.64
EMDEs Europe	3660	9366	7064	18697	11056	31168	2.80	3.05
LATAM CA	4187	6562	7078	9736	10275	13629	2.27	1.84
ME & NA	2936	6103	5326	8472	9186	12215	2.89	1.75
Sub-Saharan Africa	1571	1481	4295	2539	11253	4656	5.05	2.90

FIGURE 20: WORLD GDP GROWTH

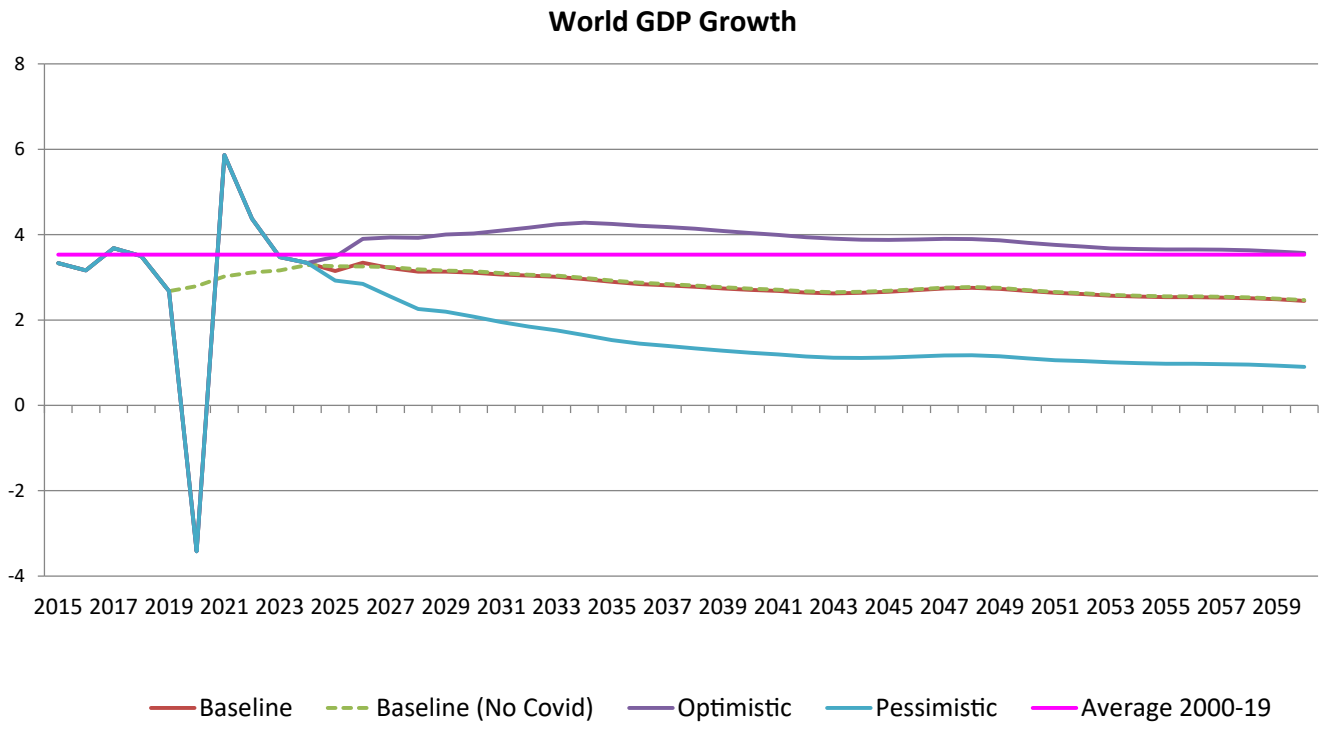
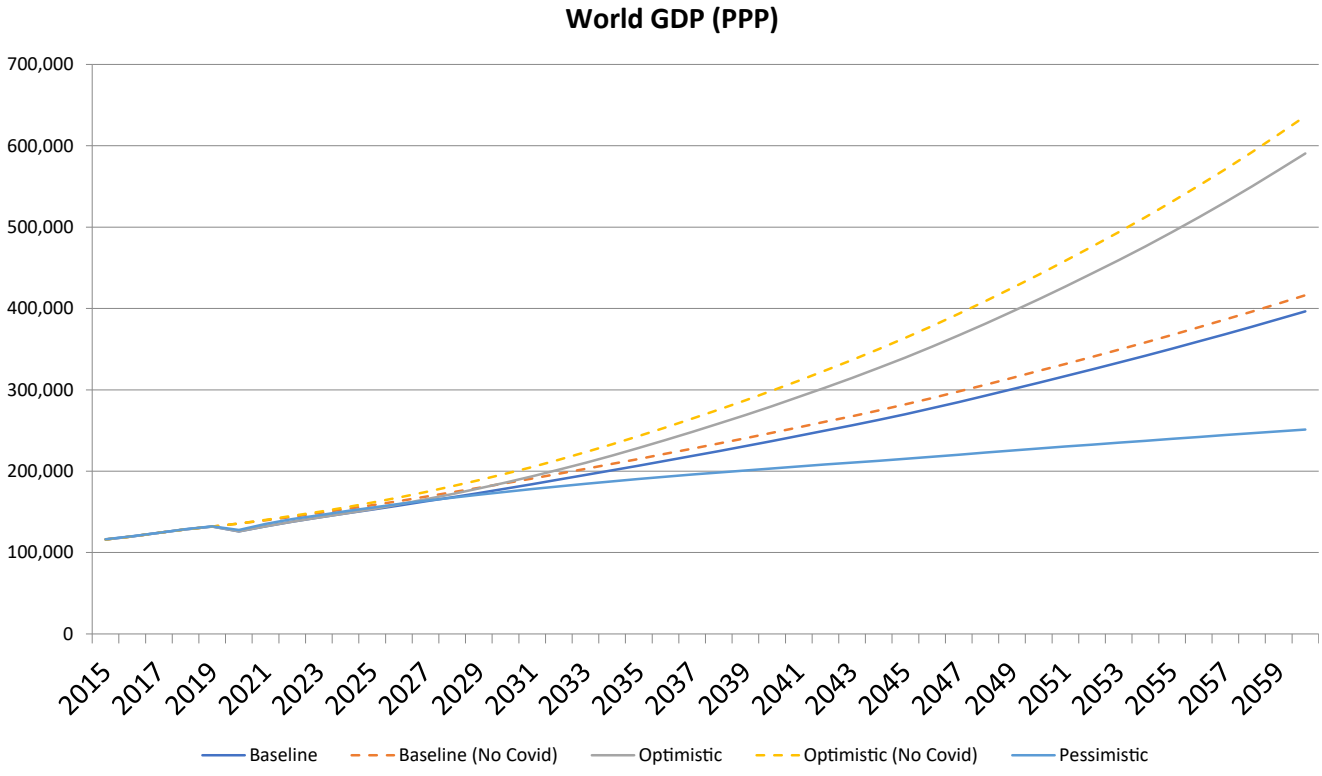


FIGURE 21: WORLD GDP (PPP)



East Asia would begin to slow and growth in South Asia would begin to recover from its previous poor performance (Annex Figure 16). The rate of growth of GDP in Emerging Europe would be 2.0 percent, somewhat above Advanced Economies, in Latin America 2.0 percent, and in the Middle East 2.8 percent.

By 2060, the global economy will more than triple in size, reaching US$268 trillion at 2018 prices and market exchange rates ($396 trillion in PPP terms). The world will be significantly wealthier, with the global per capita income averaging close to US$28,000 ($40,000 in PPP terms) as compared to about US$10.6 thousand ($16.4 thousand in PPP terms) today. Additionally, there will be dramatic improvements in the income levels and living standards of people who live in countries currently referred to as "developing."

For today's advanced countries, GDP per capita in terms of PPP (at 2018 prices) would rise from US$50,000 in 2020 to US$89,000 by 2060, with a growth rate of 1.5 percent per year. For EMDEs, per-capita GDP would increase from US$10.6 thousand to US$33 thousand; in other words, they would experience per-capita income average growth of 2.9 percent. Latin America and the Caribbean would go from US$14.3 thousand to US$26.4 thousand. This would mean that the difference in income levels between the region and the rest of emerging economies would be significantly narrowed. However, at market prices, the income gap would be maintained in an important way. In 2018, advanced countries had a per capita income of US$49 thousand and would move to US$81 thousand. In turn, emerging countries would go from US$4.9 thousand to US$20 thousand, with Emerging Asia going from US$5.3 thousand to US$32 thousand.

As shown in Figure 20, over time, the rate of growth of the global economy will decline as countries converge toward the global best practice and as population growth rates decline worldwide (with the likely exception of Sub-Saharan Africa at least in the initial phase).

In 2060, as many as 79 countries will have GDP per capita higher than the average 2015 income of Southern Europe, even though the list of richest countries will not be significantly changed. The distinctions between AEs and EMDEs that were so distinct half a century ago will have diminished radically. Perhaps even more importantly, as many as 5.5 billion, or 57 percent, of the world's expected total population of 9.6 billion in 2050 will live in these 79 countries; somewhat over 1 billion people, or 14 percent of the world's population, enjoy such affluence today.

By 2060, Emerging Asia will account for just over half (51 percent) of global output at market exchange rates (53 percent on a PPP basis) under the central scenario. China, India, and Indonesia will lead the way in this process. Asia's economic share will be more in line with its share of world population, though Emerging Asia's per capita income in 2060, at US$32,000 ($45,000 in PPP terms), will remain well below of that of the countries defined as advanced today, at US$81,000 ($89,000 in PPP terms).

Emerging Asia will account for about 62 percent of global growth between 2020 and 2060, and today's AEs for another almost 24 percent. The rest of the world will contribute only 14 percent of global growth, unless the other regions step up their economic performance, particularly Latin America, the Middle East, and Sub-Saharan Africa, as postulated in the strong policy (optimistic) scenario outlined below.

Even so, the shock from the COVID-19 pandemic and its traumatic human and economic effects are unlikely to disappear over time. Based on the current run, with results summarized in the tables and figures of the next few pages, the World should recover relatively quickly, supported by the projections of the WEO and others.

Post-COVID annual GDP growth on average would be 3.2 percent for the period 2021-40 and 2.9 percent for 2021-60, slightly above the no-COVID run due to the recovery of output after 2020. However, output will remain lower in the post-COVID period than what the Scenarios suggest for a no-COVID situation. On average, the level of GDP after COVID for the period 2020-40 would be 3.2 percent lower than in the no-COVID scenario, and 4.2 percent for the period 2020-60. Essentially, there will be a catch up in 2022-2024,

as growth is higher than it would be in the no-COVID situation. (The exact year depends on whether the analysis is made for the baseline or optimistic scenarios). This is illustrated in Figure 21.

As an example, in the baseline scenario, in 2021, GDP is 5.3 percent less than in the no-COVID scenario; whereas in 2030, it is just 3.6 percent lower, and in 2040, it is 4.1 percent lower. The cumulative loss will be significant. The present value of the loss of GDP over the period 2020-40 would be equivalent to 81 percent of 2019 GDP, and 172 percent over the period 2020-60. [3]

Because of the slowdown at the base years, Latin America, and, less so, Asia and North America, would have a smaller share of total output than under a no-COVID scenario. (Table 9)

3 Present value estimates have been carried out using the average rate of growth as the relevant (for simplicity) discount rate. Other discount rates can be used and give similar results.

The largest economy is expected to be China under the Baseline and the Optimistic scenarios, with the US as the second largest economy, and India as the third largest. The US would remain the largest economy in 2060 under a globally more pessimistic scenario. Japan would be the fourth largest economy, except under the optimistic scenario, where it is surpassed by Brazil. For other countries, emerging economies would tend to take higher positions in the optimistic scenario, while the more traditional rich countries would keep their relative positions under the more pessimistic scenarios.

Per capita income on a PPP basis does not show major surprises, with Qatar, Luxembourg, Singapore, Ireland, Switzerland, Norway, and the US showing high levels of income. (The values in Appendix Table 2 are not ranked by PPP levels, but by market income)

TFP growth will be more marked (as expected)

FIGURE 22: GDP PER CAPITA (PPP), BY REGION

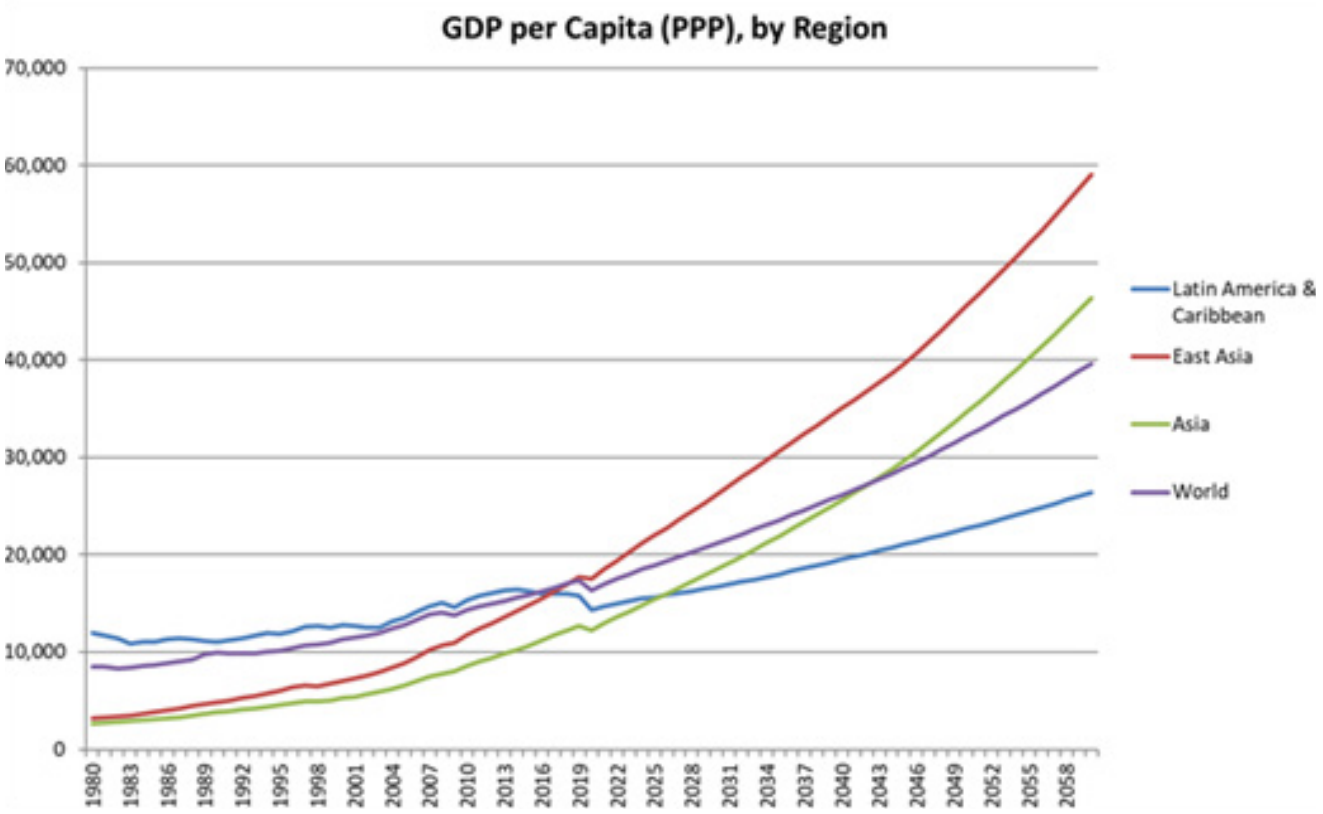


TABLE 9: REGIONAL SHARES OF GLOBAL GDP (MK FX), 2019-2060

2019	GDP	Percent of Total
Africa	2,380	2.80%
Middle East	2,343	2.70%
Europe	21,998	25.70%
Oceania	1,564	1.80%
North America	22,763	26.60%
Asia	29,418	34.40%
Latin America & Caribbean	5,040	5.90%
World	**85,506**	**100%**

2040	Global Baseline	Percent of Total	Global Baseline (No COVID)	Percent of Total
Africa	5,825	3.80%	6,137	3.80%
Middle East	3,327	2.20%	3,558	2.20%
Europe	31,417	20.40%	30,885	19.20%
Oceania	2,394	1.60%	2,475	1.50%
North America	32,179	20.90%	34,064	21.20%
Asia	71,863	46.70%	76,007	47.30%
Latin America & Caribbean	6,714	4.40%	7,594	4.70%
World	**153,720**	**100%**	**160,721**	**100.00%**

2060	Global Baseline	Percent of Total	Global Baseline (No COVID)	Percent of Total
Africa	14,634	5.40%	15,395	5.40%
Middle East	5,035	1.90%	5,425	1.90%
Europe	41,732	15.50%	41,360	14.50%
Oceania	3,454	1.30%	3,617	1.30%
North America	44,208	16.40%	47,076	16.50%
Asia	150,085	55.80%	160,552	56.40%
Latin America & Caribbean	9,775	3.60%	11,107	3.90%
World	**268,923**	**100%**	**284,533**	**100%**

FIGURE 23: SHARE OF GLOBAL GDP, BY REGION (2019)

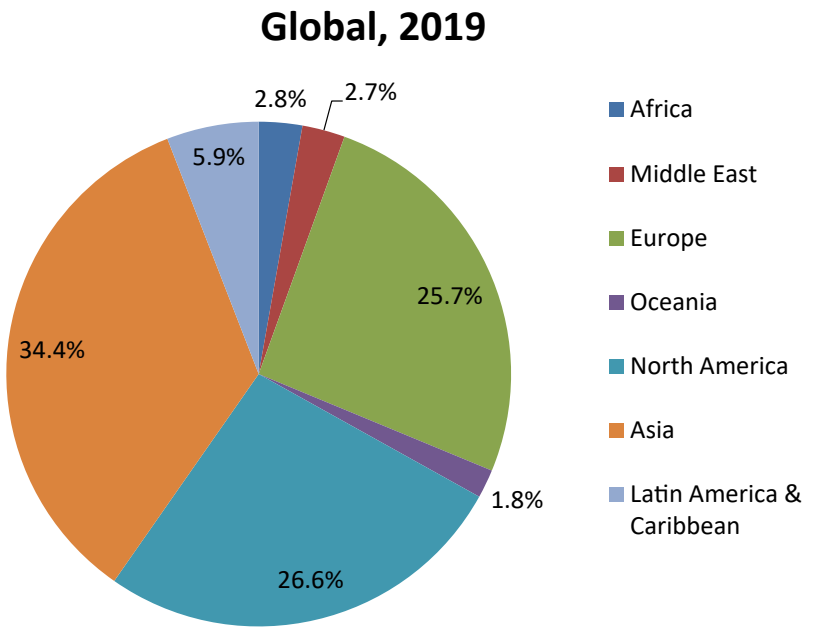
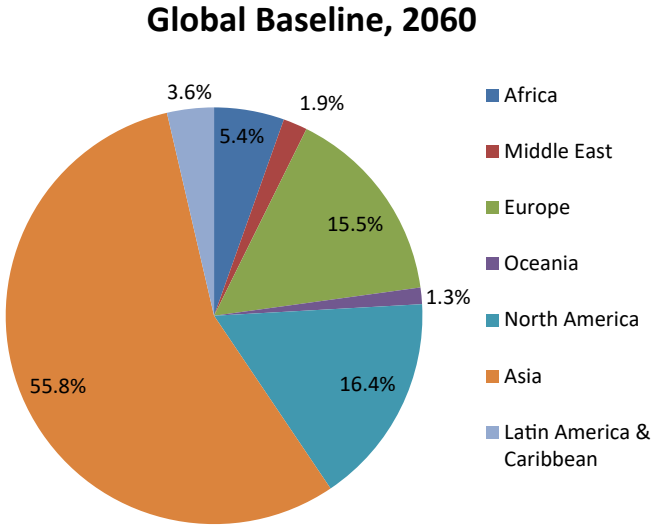
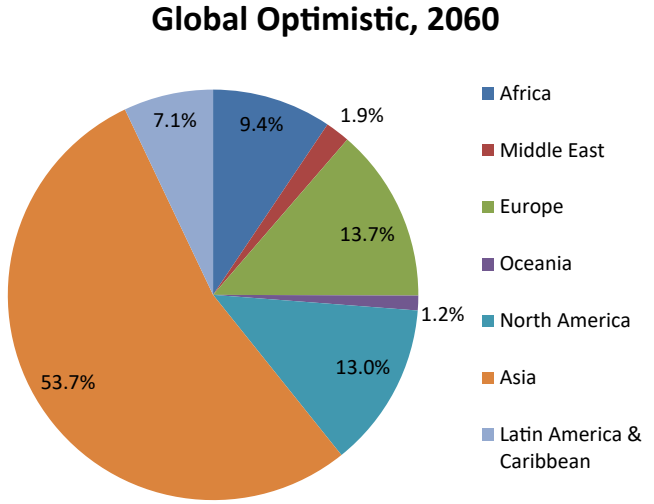


FIGURE 24: SHARE OF GLOBAL GDP, BY REGION, BASELINE VERSUS OPTIMISTIC AND PESSIMISTIC (2060)





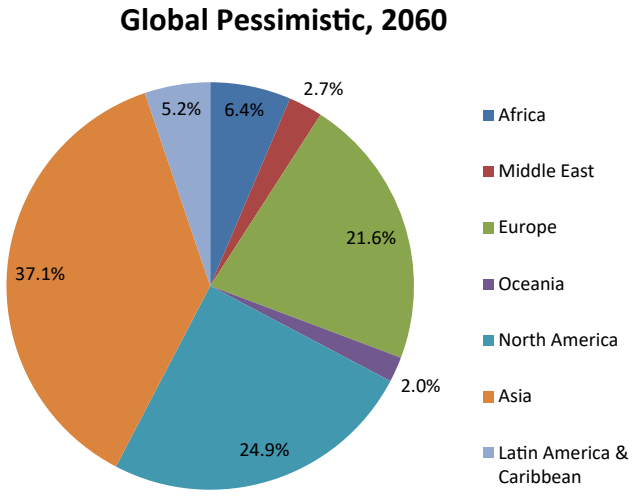


TABLE 10: GDP AND GDP PER CAPITA 2019-2040-2060 UNDER ALTERNATE SCENARIOS

Region	Scenario	2019	2040	2060	2019	2040	2060
		GDP (US$ mill PPP2018)			GDPPC (US$ PPP2018)		
World	Baseline	131933	237064	396209	17311	26132	39639
	Optimistic		279723	586787		30834	58706
	Pessimistic		201103	248224		22168	24834
Africa	Baseline	6480	14878	35433	5064	7329	12493
	Optimistic		20807	80237		10249	28291
	Pessimistic		13364	24127		6583	8507
Middle East	Baseline	4092	6095	8998	26982	29969	37255
	Optimistic		7166	13328		35232	55183
	Pessimistic		5725	7265		28146	30080
Europe	Baseline	32082	43410	57242	38504	52627	72687
	Optimistic		48784	73147		59142	92883
	Pessimistic		39589	44779		47994	56861
Latin America	Baseline	9978	14180	19898	15784	19505	26393
	Optimistic		20046	43287		27575	57416
	Pessimistic		13121	16118		18049	21379
Asia	Baseline	54823	123911	226960	12667	25599	46354
	Optimistic		144896	319178		29934	65188
	Pessimistic		97154	116140		20071	23720
North America	Baseline	22944	32330	44417	62608	78842	101115
	Optimistic		35436	53164		86418	121026
	Pessimistic		30049	37074		73279	84399
Oceania	Baseline	1534	2260	3260	51158	62776	80132
	Optimistic		2588	4444		71891	109256
	Pessimistic		2101	2720		58350	66863

Source: Centennial Group Growth Model 2021

FIGURE 25: GDP(PPP), PROJECTED GROWTH RATES: PROJECTED 2016, PROJECTED PRE-COVID AND PROJECTED POST-COVID

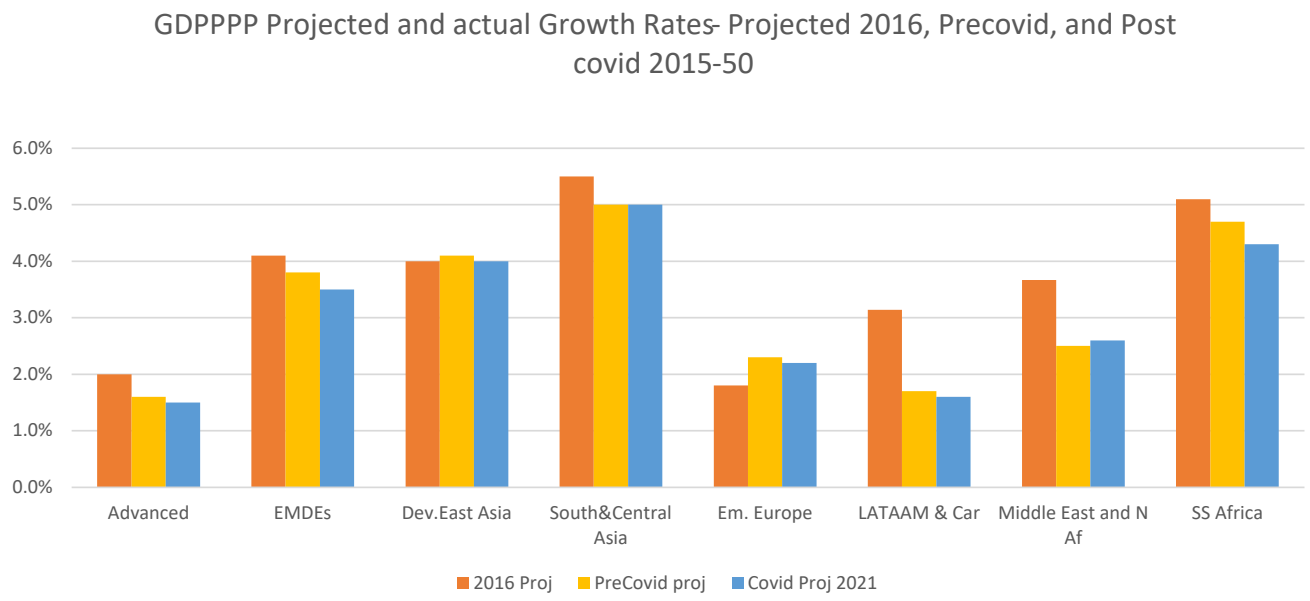
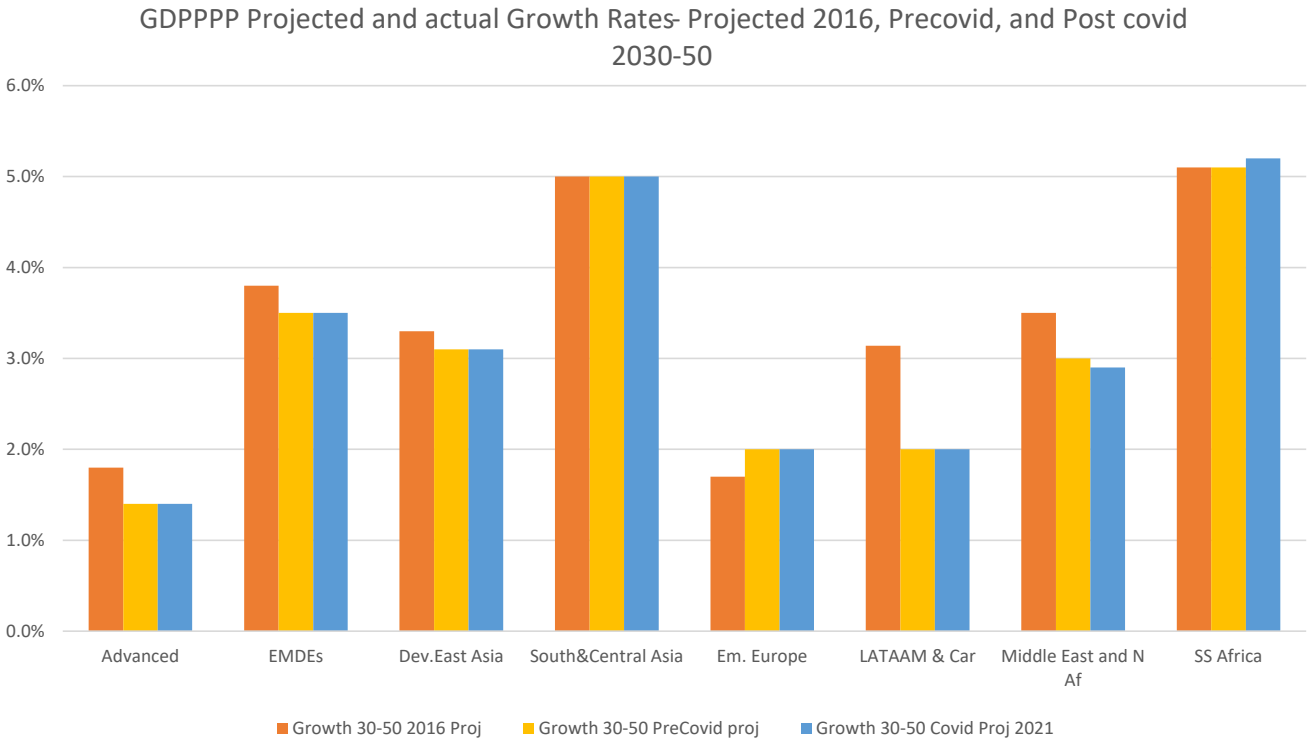


FIGURE 26: GDP(PPP), PROJECTED GROWTH RATES: PROJECTED 2016, PROJECTED RE-COVID AND PROJECTED POST-COVID (2030-50)



among Emerging Economies, like China, India, and Indonesia, among larger countries, followed by Korea. However, they will not catch up with the levels of TFP of the advanced countries, as was the case in the no-COVID estimates. Regional per capita Income Ranking would remain about the same, except that Asia will surpass Latin America by 2026 and the Middle East somewhat before 2050 (Figure 22).

Comparison of 2016, Pre-COVID, and Current Scenarios

A crucial issue that comes out of this exercise is that, beyond the slowdown in growth caused by COVID, both the pre-COVID and the post-COVID projections show a significant decline in the prospective rate of growth for most of the regions of the world, with respect to the projections incorporated into the WORLD in 2050. Using a slightly different classification than the one used above to conform with the projections made at that time, Figure 25 shows that all regions show a decline in the rate of growth for the period 2015-50, except for E merging East Asia which remains basically unchanged and Emerging Europe, which shows an increase in more recent estimates. The regions with the largest negative adjustments are Latin America, Middle East and North Africa, and Sub-Saharan Africa, hit by declines in terms of trade, and thus estimated TFP, as discussed above, with smaller projected declines for Southern and Central Asia, and Advanced countries. To some extent the difference in the projections reflect the actual performance of the World economy between 2015 and 2020, and the expected recovery from the Pandemic in the next few years. To observe the possible differences in the scenarios in the medium- and long-term projections, Figure 26 provides a comparison of the GDP growth rates for the period 2030-50, included in the 2016 Scenario as well as the pre-COVID and post-COVID estimates. It can be observed that declines in the growth rates are observed for East Asia, which had not been hit so hard by COVID, and for the three commodity-intensive regions, with a slight decline in the case of South and Central Asia; a slight increase after COVID for the advanced countries can also be observed. Effectively, the current scenarios adjust for the terms of trade bias that had been discussed above and provide a more realistic assessment, based on the newly available information. It should be noted also that the new projections incorporate a reclassification of countries from "convergers" and "half-convergers" to lower categories, based on the experience in the last ten years.

Strong policy (optimistic) scenario

The strong policy scenario differs from the central scenario by quantifying effects of three key "what if" questions. The first is what would be the outcome if most EMDEs became fast-growing "convergers"? The second is what would be the impact of this convergence occurring at a faster rate than that assumed under the central scenario? This of course assumes that the current "non-convergers" will successfully adopt the adequate policies and institutional reforms needed to unleash a rapid catch-up process and accelerate productivity-driven growth. The third is what would be the impact of faster global productivity frontier growth?

Under this scenario, the average rate of growth of the EMDEs group will increase from an average annual rate of 3.2 percent in the central scenario to 3.7 percent. By 2060, the difference for the relevant economies becomes highly significant. By the end of the period, the resulting global GDP will also be almost 48 percent higher than in the central scenario. While GDP per capita in EMDEs will almost triple from its 2020 level under the central scenario (jumping from US$10,800 to US$27,900), it will nearly quadruple, reaching US$41,000 under the strong policy scenario.

Though the regional differences will remain significant, they will become less pronounced. This is because the largest contributors to growth in Asia are already "convergers": China, India, Indonesia, and others. By contrast, growth in the less-dynamic regions under the central scenario (Africa, Middle East, and Latin America) is much higher in this more optimistic scenario. (See Table 10)

The poor policies and low productivity growth (pessimistic) prospects

On the contrary, the global 2060 outcomes could

be dramatically worse if domestic policies are not as desired in most EMDEs (particularly in the cases of China, India, and the rest of Asian Emerging Economies) and if the rate of global productivity growth were to slow down dramatically. Under this pessimistic scenario, preliminary results suggest that average annual world GDP growth could be 1 1/4 percentage points lower than in the central scenario (Table 10). The fall would be particularly harsh in the case of Asia, with a decline in the rate of growth of 1.7 percentage points, followed by a decline of 1 percentage point for Africa. However, all regions would suffer. In absolute terms, overall world GDP would be 38 percent lower than in the central scenario and about half of the estimate for the strong policy scenario. The range of possible results is a function of the assumptions about country policies and about the global productivity frontier, but it clearly shows the dramatically different impacts of good and poor policies as well as the importance of the rate of growth in global productivity.

CONCLUDING REMARKS

The main message resulting from the new run is that the central scenario envisions a future where countries remain on a somewhat lower trajectory than they have followed in the past, but to remain on their trajectory, countries will need to work hard as they catch up with the more developed economies. The challenge of improving their underlying productivity and competitiveness are daunting. It will require overcoming significant obstacles—political, social, and institutional—that have worsened with the COVID shock and its structural consequences.

The strong policy scenario remains unlikely given recent experience. This scenario will require all developing regions to emulate the past record of East Asia, which is actually weakening for its more advanced countries. Achieving this scenario will require great discipline and dedication to economic development on a massive scale, particularly because over the long-haul commodity exporters cannot expect sustained improvements in their terms of trade — a key factor in their earlier and transient success. Still, the possibilities envisaged in the more optimistic scenarios are significant, and should be sought, subject to unexpected natural or human-caused disasters.

The likelihood of a more pessimistic outcome is high and is a warning that countries can also move in an adverse direction, failing to learn lessons and stagnating or even falling below their own record. In the end, success or failure is more dependent on domestic actions and inaction, and not the result of exogenous events, uncontrollable but expected, if positive, or denied in the planning horizon, if negative.

APPENDIX

ADDITIONAL TABLES AND FIGURES

APPENDIX TABLE 1: GDP LEVELS 2020-2040-2050

2020 - Default	GDP (MkFX)	%, World GDP
United States	20,156.6	25.05%
China	14,396.1	17.89%
Japan	4,757.0	5.91%
Germany	3,662.3	4.55%
India	2,511.5	3.12%
Brazil	1,321.1	1.64%
France	2,471.7	3.07%
United Kingdom	2,555.8	3.18%
Russia	1,418.3	1.76%
Korea	1,537.2	1.91%
Canada	1,550.2	1.93%
Italy	1,790.4	2.22%
Australia	1,292.9	1.61%
Mexico	1,007.8	1.25%
Saudi Arabia	659.6	0.82%

2020 - Optimistic	GDP (MkFX)	%, World GDP
United States	21,461.7	24.49%
China	15,007.3	17.12%
Japan	5,039.8	5.75%
Germany	3,815.0	4.35%
Brazil	1,826.9	2.08%
India	2,940.4	3.35%
France	2,704.1	3.09%
United Kingdom	2,826.1	3.22%
Russia	1,698.7	1.94%
Korea	1,655.9	1.89%
Canada	1,737.2	1.98%
Italy	1,961.0	2.24%
Australia	1,389.6	1.59%
Saudi Arabia	783.5	0.89%
Mexico	1,237.4	1.41%

2040 - Baseline	GDP (MkFX	%, World GDP
China	42,219.9	27.47%
United States	29,664.1	19.30%
India	9,120.2	5.93%
Japan	5,794.9	3.77%
Brazil	2,039.1	1.33%
Germany	5,208.0	3.39%
Indonesia	2,609.9	1.70%
United Kingdom	3,887.6	2.53%
France	3,636.6	2.37%
Mexico	1,562.3	1.02%
Korea	2,537.1	1.65%
Australia	2,092.5	1.36%
Canada	2,515.4	1.64%
Saudi Arabia	1,103.6	0.72%
Turkey	1,475.9	0.96%

2040 - Optimistic	GDP (MkF	%, World GDP
China	48,216.6	26.63%
United States	32,383.1	17.88%
India	10,684.8	5.90%
Brazil	3,527.6	1.95%
Japan	6,842.3	3.78%
Mexico	2,230.5	1.23%
United Kingdom	4,517.4	2.49%
Germany	5,853.9	3.23%
Indonesia	3,845.2	2.12%
France	4,146.7	2.29%
Russia	3,147.9	1.74%
Korea	2,712.6	1.50%
Saudi Arabia	1,331.2	0.74%
Australia	2,389.2	1.32%
Canada	2,880.9	1.59%

2040 - Pessimist	GDP (MkFX)	%, World GI
United States	27,571.2	21.64%
China	28,269.8	22.19%
India	6,231.8	4.89%
Japan	5,395.8	4.23%
Brazil	1,895.5	1.49%
Germany	4,840.0	3.80%
United Kingdom	3,610.8	2.83%
France	3,383.9	2.66%
Mexico	1,452.2	1.14%
Korea	2,159.6	1.69%
Canada	2,337.8	1.83%
Saudi Arabia	1,039.5	0.82%
Australia	1,944.6	1.53%
Indonesia	2,142.8	1.68%
Russia	2,059.2	1.62%

2050 - Baseline	GDP (MkFX	%, World GDP
China	61,158.9	30.15%
United States	34,820.9	17.16%
India	16,780.4	8.27%
Japan	6,119.3	3.02%
Indonesia	3,940.8	1.94%
Brazil	2,330.7	1.15%
Mexico	1,875.9	0.92%
Germany	5,746.3	2.83%
United Kingdom	4,573.1	2.25%
France	4,112.5	2.03%
Korea	2,950.5	1.45%
Australia	2,523.3	1.24%
Saudi Arabia	1,354.1	0.67%
Canada	2,959.8	1.46%
Turkey	2,051.5	1.01%

2050 - Optimistic	GDP (MkF	%, World GI
China	75,127.7	27.79%
United States	40,066.5	14.82%
India	21,748.4	8.04%
Brazil	5,759.3	2.13%
Japan	8,348.5	3.09%
Indonesia	7,454.0	2.76%
Mexico	3,939.5	1.46%
United Kingdom	5,979.5	2.21%
Germany	7,039.8	2.60%
France	5,190.8	1.92%
Russia	4,274.2	1.58%
Korea	3,304.3	1.22%
Saudi Arabia	1,718.9	0.64%
Nigeria	3,612.5	1.34%
Australia	3,188.1	1.18%

2050 - Pessimisti	GDP (MkF	%, World GD
United States	30,711.0	21.86%
China	29,229.2	20.80%
India	7,662.0	5.45%
Japan	5,413.0	3.85%
Brazil	2,055.6	1.46%
United Kingdom	4,029.3	2.87%
France	3,633.8	2.59%
Germany	5,071.6	3.61%
Mexico	1,654.3	1.18%
Saudi Arabia	1,210.9	0.86%
Australia	2,224.7	1.58%
Canada	2,610.3	1.86%
Indonesia	2,578.4	1.84%
Korea	2,216.5	1.58%
Turkey	1,487.3	1.06%

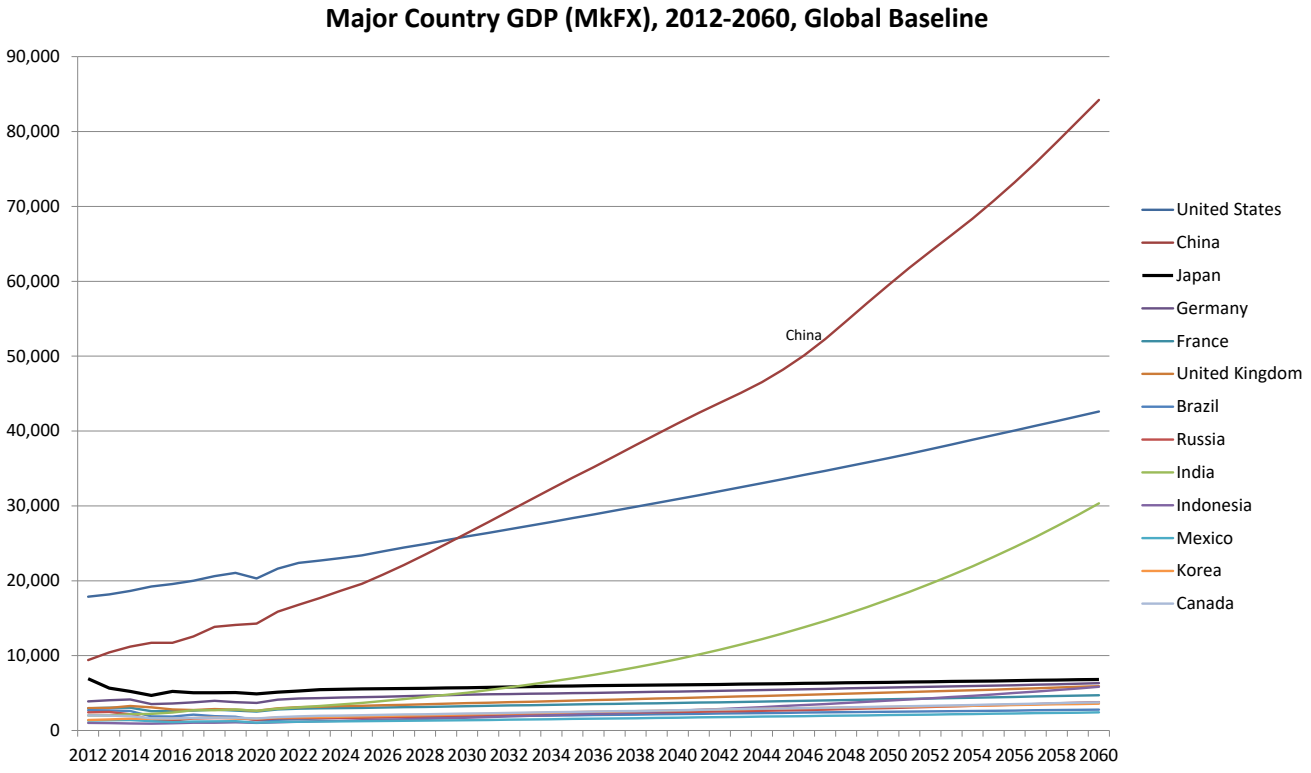
APPENDIX TABLE 2: GDP PER CAPITA 2020-2040-2050

2020 - Default	GDP per Capita (PPP	2020 - Optimisti	GDP per Capita (PPP	2020 - Pessimist	GDP per Capita (PPP
Qatar	86,571.7	Qatar	91,498.0	Qatar	86,571.7
Luxembourg	109,338.3	Luxembourg	118,002.5	Luxembourg	109,338.3
Singapore	91,343.4	Singapore	99,274.4	Singapore	91,343.4
Norway	62,456.3	Norway	65,245.9	Norway	62,456.3
Hong Kong, China	56,795.9	Hong Kong, China	61,040.1	Hong Kong, China	56,795.9
United States	60,899.7	United States	64,838.5	United States	60,899.7
Brunei	63,024.3	Brunei	63,941.8	Brunei	63,024.3
Switzerland	66,141.2	Switzerland	70,733.9	Switzerland	66,141.2
Australia	49,694.0	Australia	52,868.2	Australia	49,694.0
Taiwan (China)	51,887.0	Taiwan (China)	53,082.6	Canada	46,431.9
Canada	46,431.9	Canada	50,918.9	Taiwan (China)	51,887.0
Austria	53,047.6	Austria	57,756.8	Austria	53,047.6
Ireland	87,838.6	Ireland	96,353.3	Ireland	87,838.6
Sweden	52,907.5	Sweden	56,652.1	Sweden	52,907.5
Netherlands	55,786.4	Saudi Arabia	47,606.7	Netherlands	55,786.4

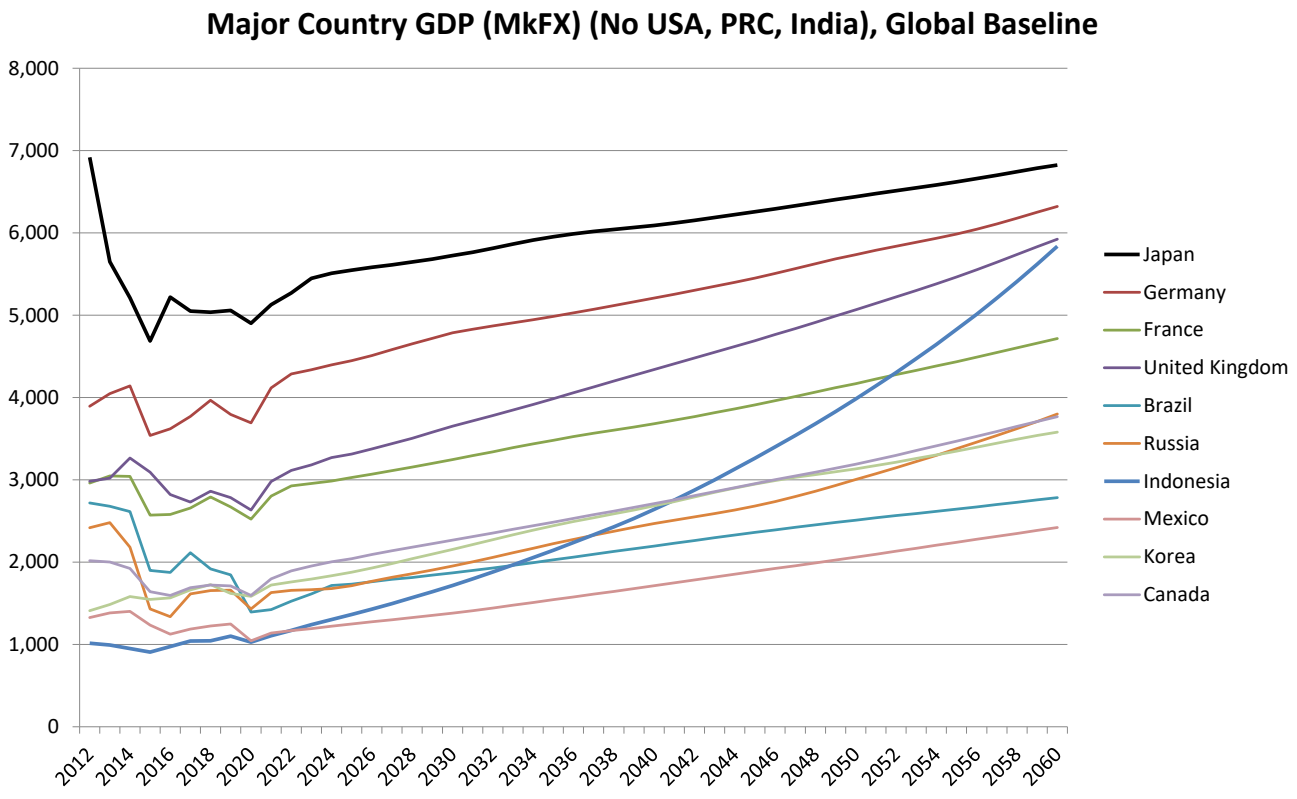
2040 - Baseline	GDP per Capita (PPP)	2040 - Optimistic	GDP per Capita (PPP)	2040 - Pessimistic	GDP per Capita (PPP)
Qatar	113,561.1	Qatar	128,298.6	Qatar	105,416
Luxembourg	125,085.0	Luxembourg	127,104.8	Luxembourg	121,241
Singapore	120,061.5	Singapore	132,985.1	Singapore	112,687
Norway	81,631.8	Norway	91,547.2	Norway	75,858
United States	80,912.8	Saudi Arabia	68,412.2	United States	75,204
Saudi Arabia	58,898.3	Brunei	94,128.1	Brunei	77,379
Brunei	83,290.2	United States	88,329.3	Saudi Arabia	55,272
Hong Kong, China	73,506.7	Hong Kong, China	78,825.5	Hong Kong, China	69,235
Australia	63,956.4	Australia	73,024.5	Australia	59,436
Taiwan (China)	71,307.5	Iceland	84,410.5	Switzerland	76,096
Switzerland	81,351.8	Taiwan (China)	75,804.9	Canada	57,053
Canada	61,386.1	Ireland	142,607.1	Taiwan (China)	65,439
Korea	67,923.6	Sweden	80,893.4	Kuwait	54,797
Ireland	138,704.2	Switzerland	89,964.3	Ireland	128,725
Iceland	74,911.5	Kuwait	70,844.6	Sweden	66,863

2050 - Baseline	GDP per Capita (PPP)	2050 - Optimistic	GDP per Capita (PPP)	2050 - Pessimistic	GDP per Capita (PPP)
Qatar	125,869	Qatar	154,083	Qatar	110,909
Singapore	136,157	Singapore	154,873	Singapore	121,369
Luxembourg	127,746	Luxembourg	133,090	Luxembourg	119,607
Norway	92,120	Norway	111,916	Norway	81,222
Saudi Arabia	68,061	Saudi Arabia	83,306	United States	80,932
United States	91,763	Brunei	112,900	Brunei	80,986
Brunei	91,777	United States	105,586	Saudi Arabia	60,626
Australia	71,855	Australia	90,787	Hong Kong, China	75,249
Taiwan (China)	82,762	Iceland	103,770	Australia	63,353
Hong Kong, China	84,082	Taiwan (China)	91,696	Switzerland	80,591
Switzerland	90,727	Hong Kong, China	91,479	Taiwan (China)	70,971
Korea	81,906	Sweden	98,703	Canada	60,657
Canada	68,780	Switzerland	107,308	Kuwait	61,194
Iceland	84,173	Korea	92,475	Sweden	71,250
Sweden	80,796	Canada	87,520	Ireland	141,731

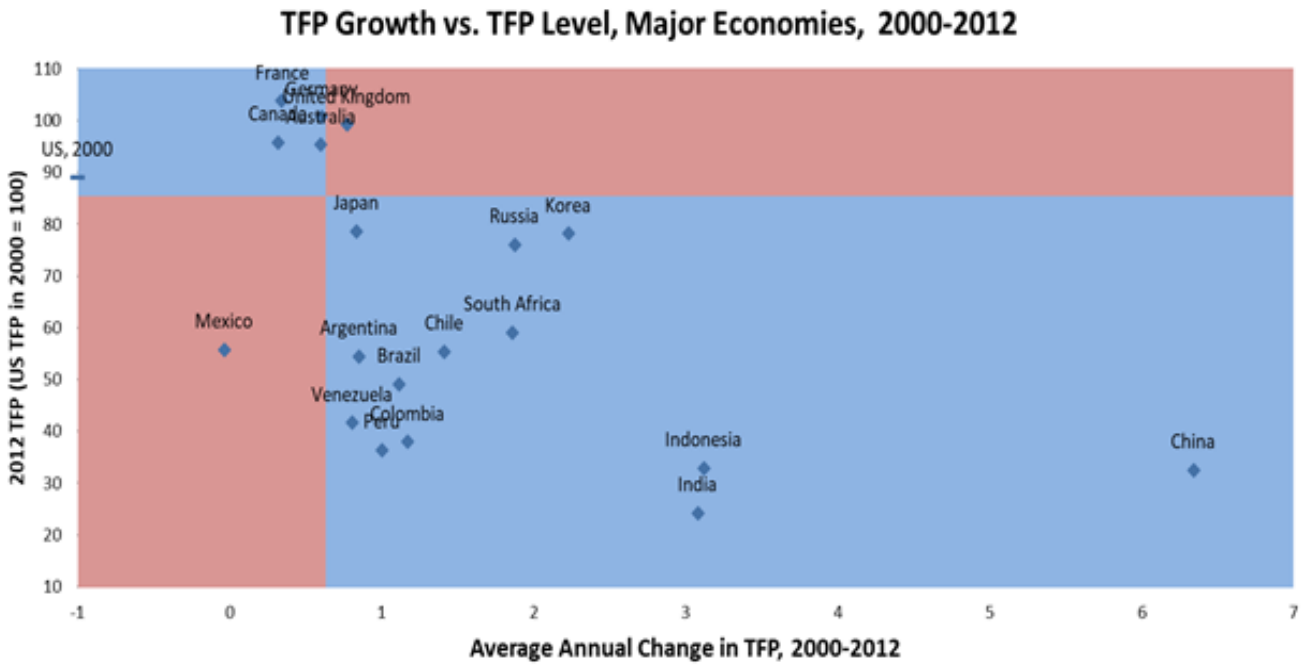
APPENDIX FIGURE 1: MAJOR COUNTRY GDP (MKFX) - GLOABL BASELINE 2012-2015



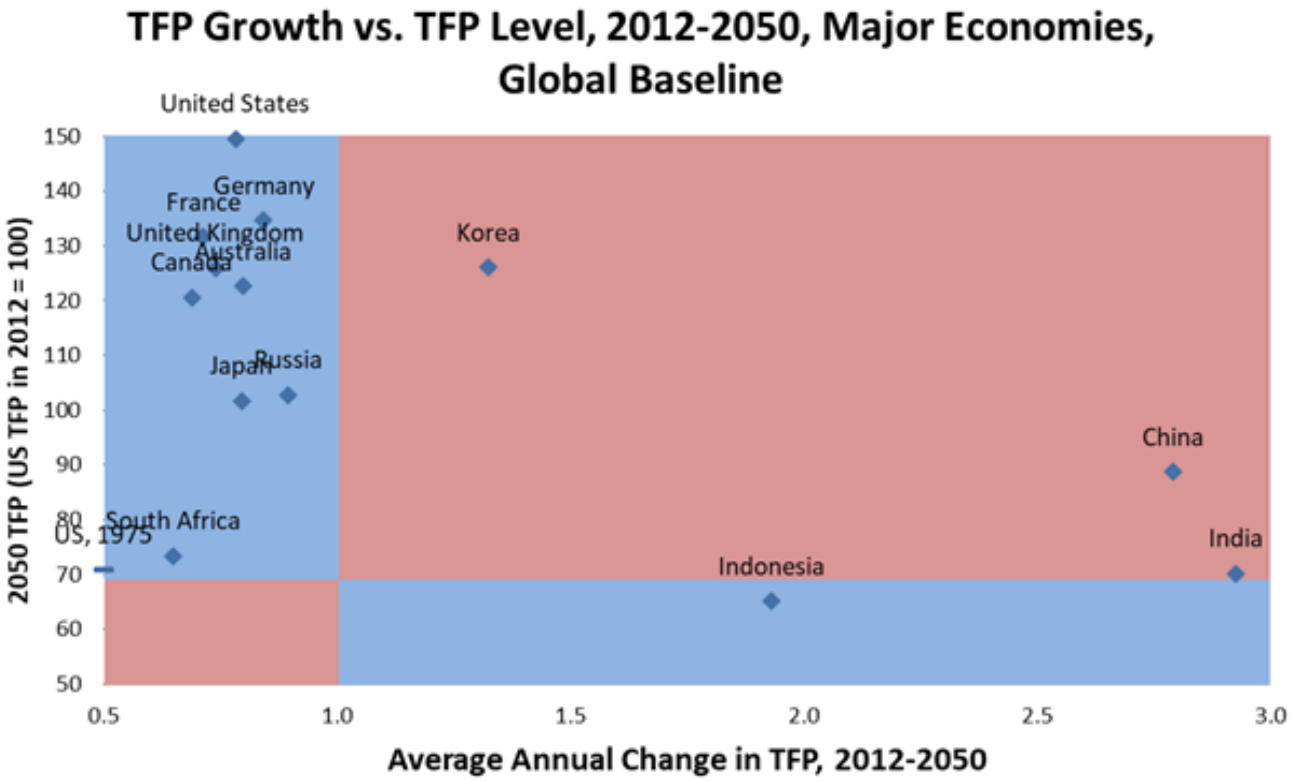
APPENDIX FIGURE 2: MAJOR COUNTRY, EXCLUDING USA, PRC, AND INDIA GDP (MKFX) 2012-2050



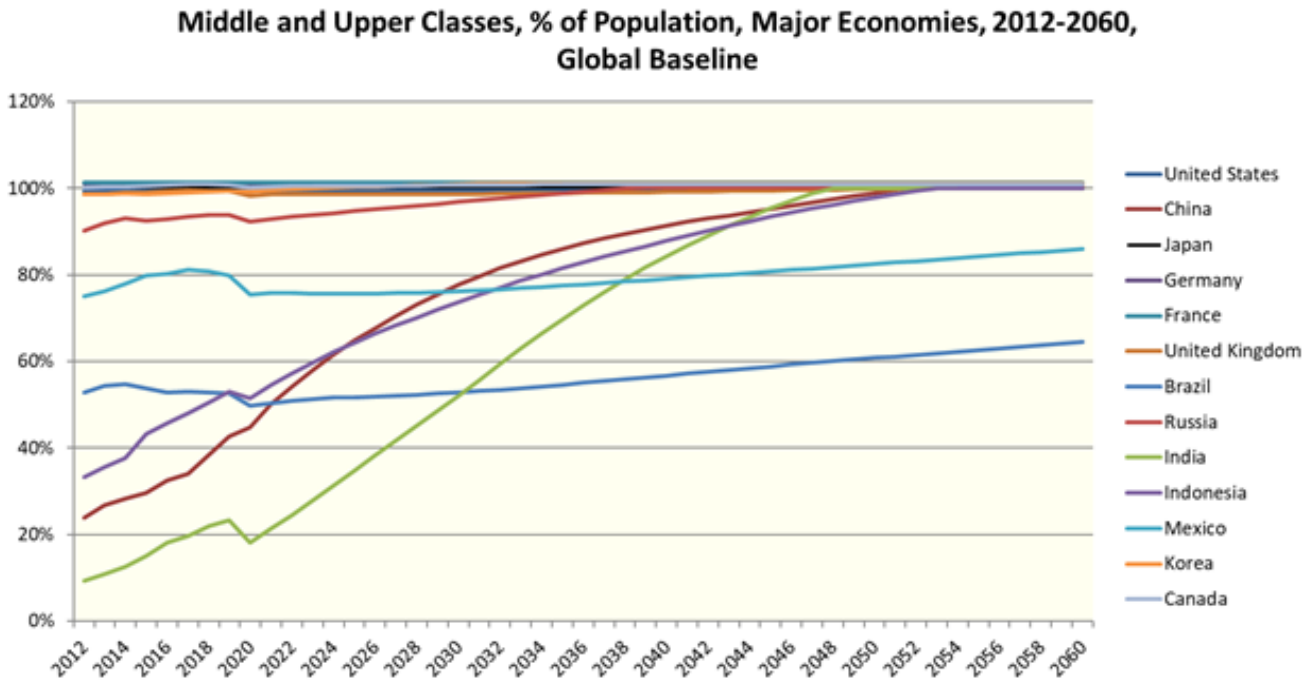
APPENDIX FIGURE 3: TFP GROWTH VS. TFP LEVEL MAJOR ECONOMIES, 2000-2012



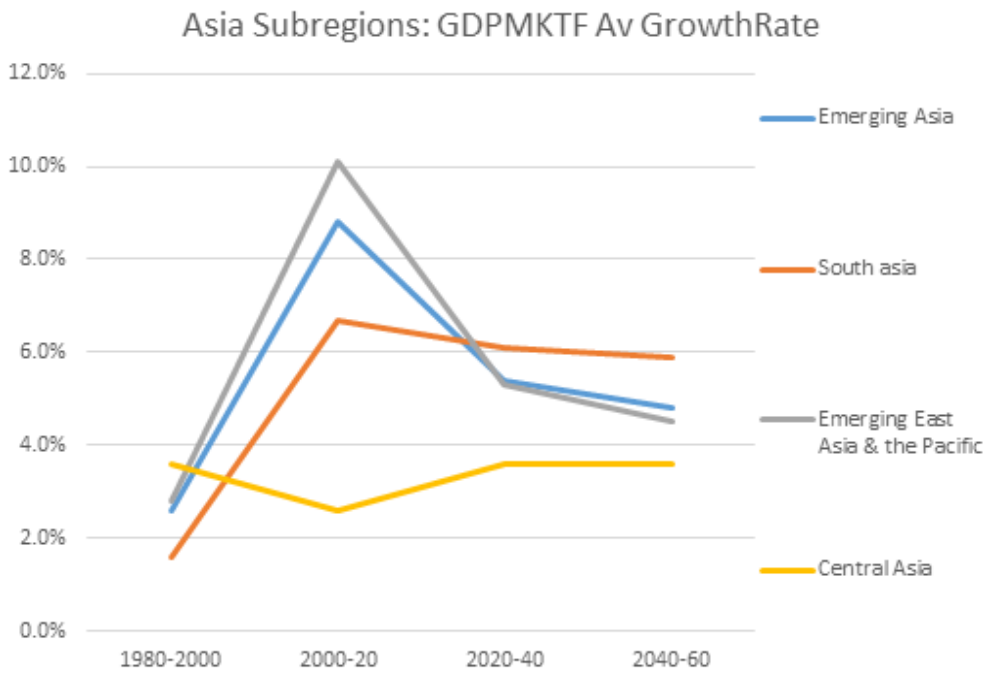
APPENDIX FIGURE 4: TFP GROWTH VS. TFP LEVEL MAJOR ECONOMIES, 2012-2050 GLOBAL BASELINE

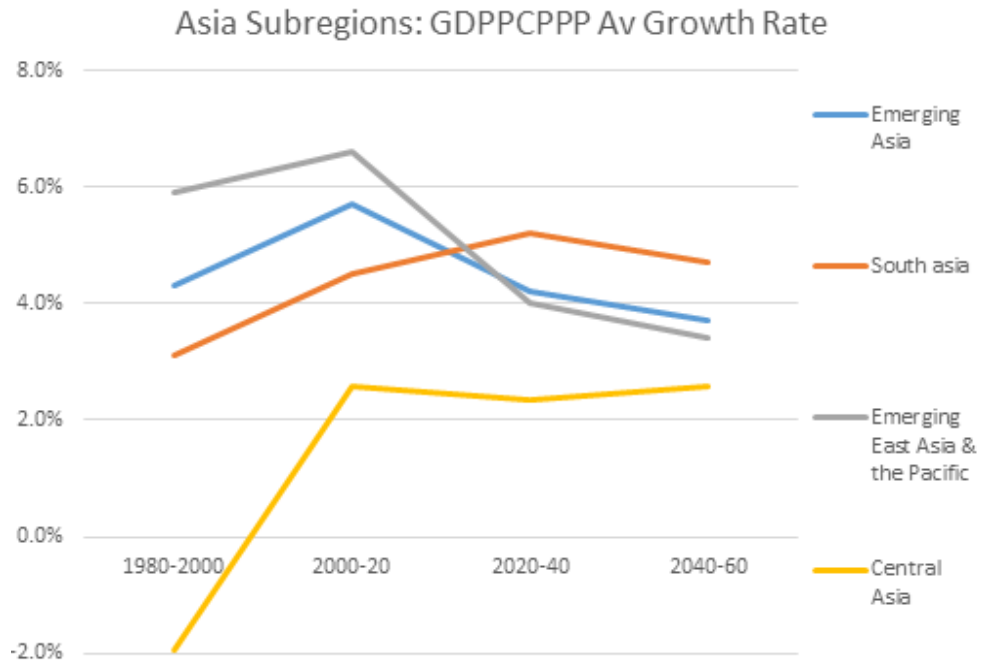


APPENDIX FIGURE 5: MIDDLE AND UPPER CLASSES % OF POPULATION MAJOR ECONOMIES 2012-2060

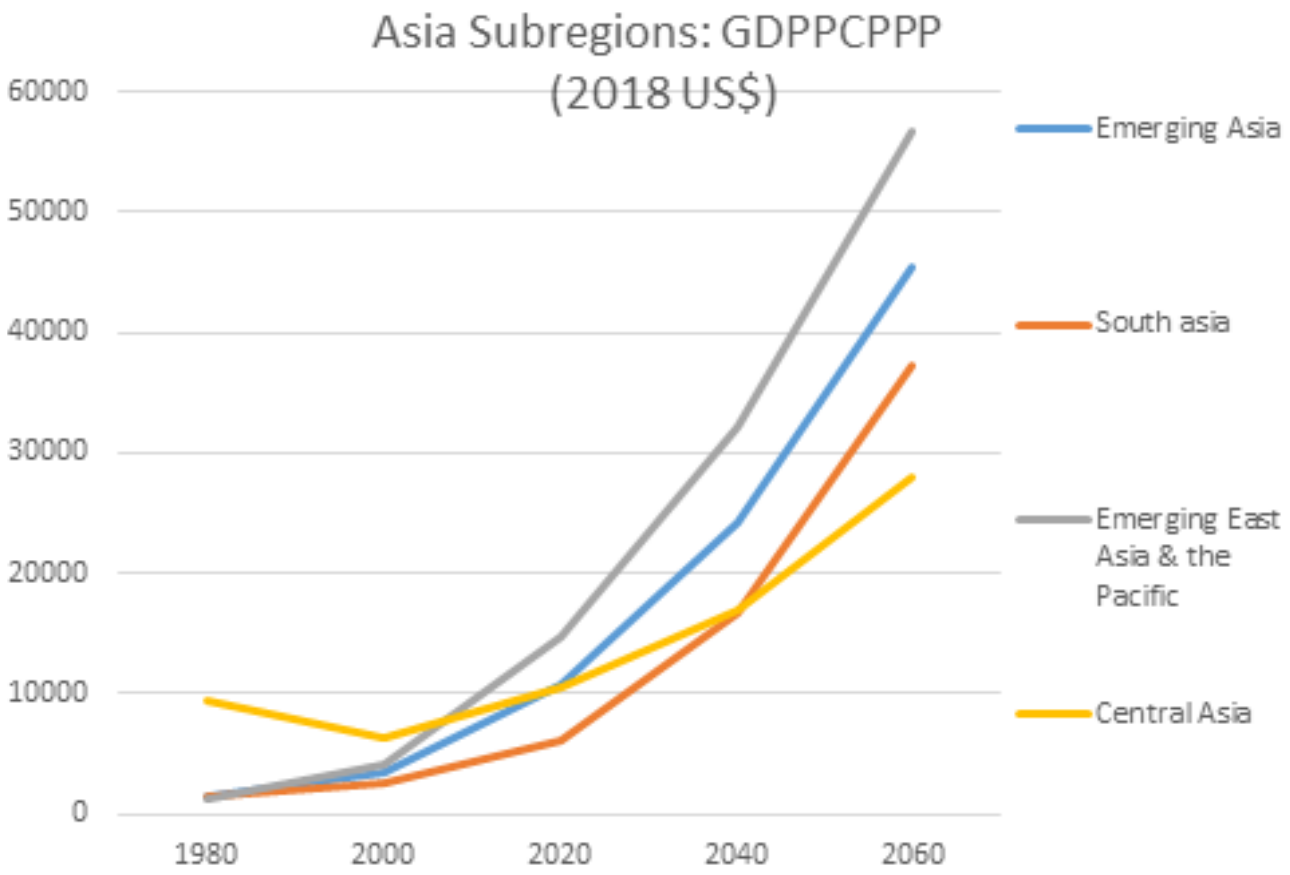


APPENDIX FIGURE 6: ASIAN SUBREGIONS AVERAGE GROWTH RATE - GDPMKTFX & GDP PER CAPITA (PPP)





APPENDIX FIGURE 7: ASIAN SUBREGIONS GDP PER CAPITA (USD 2018)



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The Watergate Office Building, 2600 Virginia Avenue, NW, Suite 201
Washington, DC 20037, USA
Tel: (1) 202 393 6663 Fax: (1) 202 393 6556
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