

Are the Poorest Catching Up?

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Abstract

Are global incomes converging or diverging? Despite recent empirical evidence supporting the hypothesis of unconditional beta convergence, this paper argues that such findings overlook the stark reality facing the world's poorest people. Many lower income countries, including those among the so-called "Bottom Billion," continue to slip further behind the rest of the world, while the numbers of those living in extreme poverty are beginning to rise again after decades of decline. The paper explores how these contradictions can coexist and discusses the policy importance of looking beyond global average trends. The paper identifies three confusions that can arise when analyzing trends in income convergence. First, a focus on unconditional convergence can overlook important policy questions, such as whether countries are likely to eradicate extreme poverty or to catch up with the rest of the world. Tests for convergence

may yield only partial answers, especially in light of recent findings that show that *unconditional beta convergence* can coexist with a significant group of countries slipping ever further behind the rest of the world. Meanwhile extreme poverty numbers are increasing rather than decreasing. Second, average trends can both obscure and be distorted by underlying differences in country composition. In the extreme case, while fast-growing China was below global mean incomes between 2000 and 2020, it significantly boosted empirical support for global convergence. Now that China has passed this threshold, the finding will likely reverse in the coming years as more data is available. Third, different levels of availability of time periods and country coverage can distort and even bias empirical findings, especially where limitations to data availability is correlated with lower income or diverging economies.

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1. Introduction

Since 1990 economic growth in Sub-Saharan Africa has averaged just 0.8% annual growth in per capita income. By comparison, global growth rates over the same period were double that, and regions like East Asia scored per capita growth rates of more than 6% per annum.¹ This anemic growth record saw African economies and other slow growing lower income countries' incomes slipping further behind the rest of the world. Meanwhile, the number of Africans living in poverty – measured using the global poverty line – has grown by tens of millions since 1990. In contrast, countries like China have averaged per capita growth of around 7.6%, lifting over 750 million people out of poverty.²

If current trends in economic growth and poverty rates persist, a large group of low income, slow growing or stagnant economies, found mostly in Africa, will never eradicate extreme poverty, nor will they catch up to the rest of the world. Furthermore, the number of those living in extreme poverty globally is set to begin to rise again by 2035 after decades of decline.

What can explain this extraordinary divergence in economic destiny? What might the implications be for the twenty-first century? And why is documenting this divergence so important for informing policy? In this paper we examine these questions and offer reflections on the measurement of economic divergence. We also consider why this finding is not more widely understood. Indeed, various studies over the past two decades have drawn the opposite conclusion – namely that world incomes are converging, and that the evidence supports a finding of 'unconditional convergence' – specifically that the overall result is one of convergence regardless a country's starting point. For example, 'The New Era of Unconditional Convergence' argues that the era of *unconditional divergence* is over, and that developing countries have been growing fast enough to be driving overall global convergence in incomes (Patel et al. 2021).³

This convergence narrative echoes similar recent results from Kremer et. al (2021) who find that there is now evidence in support unconditional convergence at the global level since 1990 and convergence since 2000 due to a faster catch-up growth between the poor and higher income countries. A more sober note is struck by Johnson and Papageorgiou (2020) who argue

¹ For each global region according to PIP data (1990-2019, mean growth): East Asia & Pacific, 6.07, Europe & Central Asia, 1.24, Latin America & Caribbean, 1.93, Middle East & North Africa, 1.27, Other High Income Countries, 1.37, South Asia, 2.85, Sub-Saharan Africa, 0.76, World 1.57.

² <https://www.worldbank.org/en/news/press-release/2022/04/01/lifting-800-million-people-out-of-poverty-new-report-looks-at-lessons-from-china-s-experience>

³ Unconditional convergence here the authors refer to an overall convergence in incomes across the world without controlling for other factors. This terminology originates in earlier work such as from Lucas (1988), King et al. (1988), and Romer (1990), who explored whether controlling for factors such as human capital, investment, financial sector development, foreign aid, trade, etc., could recover conditional convergence (Barro, 1991). Other lines of work focused on non-linearities in the growth process that create convergence clubs (Quah, 1993; Durlauf and Johnson, 1995) and on the cross-country dispersion in the level of income per capita (called σ -convergence).

that as a group, developing countries have not closed the per capita income gap on the rich world of advanced economies, even in more recent years.

The debate around global convergence is not new. Over the past two decades, researchers have been contributing to this debate. In 1997, Pritchett argued that between 1870 and 1990 the income gap between the richest and the poorest increased ten-fold (Pritchett, 1997). A few years later, Baldwin et al. divide the post-industrial revolution era into stages of growth with shifting periods of divergence and convergence (Baldwin et al 2001). Around the same time, Maddison analyzes income growth of several countries and regions concluding that global divergence is evident but that the growth seen in Asian countries during the second half of the twentieth century demonstrates that convergence is feasible. Lakner and Milanovic (2015) have more recently concluded that the world has been in a process of economic convergence pictured in the so-called “Elephant Curve” that has been frequently used in the convergence narrative. The debate around the Elephant Curve continued. Kharas and Seidel (2018) revisited Lakner and Milanovic work and concluding that although the between-country and within-country convergence may be possible, there is still a concern of fragile states where income distribution is shifting to the top. The convergence debate has been also discussed at the Center for Global Development, where Roy et al (2016) argue that after 2000, the world entered into a golden era of convergence but around the same time Patel et al (2018) conclude that there is a “lack of progress in closing the income gap between countries”.

Why this confusion? Many of the standard tests of income convergence, such as the recent finding in support of *unconditional beta convergence*, focus on global averages and trends, but can unintentionally overlook important underlying issues. The first, and arguably most critical of these, is the core policy questions we might care about. Tests finding support for global income convergence do not tell us whether or not those living in extreme poverty will be lifted out of it, nor whether those living in lower income countries will catch up to the rest of the world. Even worse, we argue that both these gloomy predictions can be true alongside the findings of average global convergence. Second, heterogeneity and variation among countries can get lost in the averages, and also distort the picture we see when evaluating aggregate results. This includes, for example, the significant impact of individual fast growing and populous countries on global trends, whereby China was below global mean incomes before 2020, and thus boosted the evidence for ‘catch up’, and now that they lie above global means, will likely boost evidence of divergence once again. This may not show up in empirical results for some years to come, however. Third, valid empirical tests at the global level can be limited and distorted by the availability of data, including country coverage and the time period under consideration, and therefore tell us an incomplete or even biased story around convergence.

We perhaps should not be surprised. Many of the world’s poorest economies have seen meagre growth records since the 1960s. Low growth combined with relatively high population growth has seen some stagnate and even decline in per capita income terms. Similarly, despite impressive performance in bringing down global poverty numbers, much of this success has been regionally concentrated in countries such as India and China. Regions including Sub-

Saharan Africa have seen consistently *rising* numbers living in extreme poverty, despite the impressive global record of bringing down the overall poverty headcount since 1990.

The contribution of this paper is therefore not to challenge or contradict the empirical tests for unconditional beta convergence at a global level, nor indeed to contradict the astounding growth and poverty reductions records of countries such as China. Instead, we intend to offer an alternative perspective, with particular focus on those 'left behind', including those among the bottom billion. We also seek to clarify why convergence results may suffer from data limitations but also why they may be compatible with the ugly fact that a large group of developing countries are expected to continue to slip ever further behind the rest of the world.

We argue that what matters most is how we can use such analysis to help inform policy making – both at the national and international levels. Global unconditional convergence would be both an encouraging trend and a striking empirical finding. However, even if narrowly correct, we argue that it masks important underlying policy challenges faced in those countries increasingly left behind. We cannot rest on our laurels, and indeed we predict the empirical result of unconditional convergence will soon reverse as data collection catches up with the bleak reality on the ground today. We should be prepared, not surprised, when this occurs.

Divergence, big time

Over the past three decades, the world has experienced remarkable economic growth, transforming some of the poorest societies into industrial powerhouses and making significant strides towards eradicating extreme poverty. Countries like China, India, and many East Asian economies are quickly narrowing the gap with early industrialized nations such as Great Britain, Germany, and the United States.⁴ Lant Pritchett's 1997 paper "Divergence, Big Time" has become superseded by the impressively strong economic performance of Asian economies during the 2000s and 2010s.

However, this striking growth record – or 'growth miracle' - has not been distributed equally across the globe. Numerous countries continue to grapple with stagnant prosperity levels since their political independence in the 1960s, and millions of their citizens still live in extreme poverty. These societies have not only failed to catch up but have yet to initiate the structural transformation needed to become modern, diversified economies. For example, the Democratic Republic of Congo and Zimbabwe have experienced little improvement in their citizens' per capita GDP since the 1960s.

The widening disparity between successful emerging markets and the remaining developing nations has become a subject of significant policy interest. These less successful countries often exhibit characteristics of fragility and conflict, which further contributes to their stagnation. Additionally, these nations may experience escalating poverty levels as a result of their lack of economic progress and comparatively higher fertility rates. For example, a World Bank report

⁴ In terms of per capita GDP, some, like Singapore (\$73k in 2021), have even surpassed the UK (\$47k in 2021) and the US (\$70k in 2021).

finds a correlation between lower economic growth rates with conflict deaths and institutional fragility (World Bank 2020), where countries affected by conflict and fragility often have the highest poverty rates in the world.

Moreover, the impending consequences of climate change are expected to disproportionately affect these countries, potentially exacerbating their struggles in the coming decades, and displacing millions of people seeking a better life. For instance, recent literature suggests that in the absence of climate mitigation policies, by 2100, increases in global temperature could reduce global GDP growth around 1 to 3 percent (Newell et al 2021) or even reduce the world's GDP per capita by more than 7 percent (Kahn et al 2017). This climate-driven economic contraction also directly impacts poverty. According to recent estimates, climate change could push an additional 132 million people into extreme poverty by 2030 (Jafino et al 2020).

What can be done about the widening gap? And what are the consequences for the world if these trends continue?

Catching up or falling behind?

At the time of many countries gaining their independence from former imperial nations, around the 1960s, the gap between the richer world of Europe and North America, and the rest of the world was significant. Per capita GDP in the US was around \$19,000 in 1960 and by 2021 had reached almost \$62,000. Countries like China and Botswana were far behind in 1960, but have made rapid progress, from \$240 and \$400 to about \$11,000 and \$6,000 in 2021, respectively. Rapid industrialization has seen many emerging market economies transformed. Catch-up, when it happens, can take place in the space of just four or five decades.

Since 1990, global GDP has exploded. From \$36 trillion, it more than doubled to \$87 trillion by 2021, measured in constant 2015 US\$. This more than doubling has not been evenly distributed though. Average GDP per capita among the already-rich OECD countries rose from just below \$30,000 to almost \$45,000, a 50% increase. Emerging markets on the other hand experienced an average increase in GDP per capita from below \$5,000 to approaching \$15,000 by 2021. Indexed to 1990 values, this is an almost 300% increase.

Meanwhile, a significant minority of countries in the post-independence era have seen incomes per capita barely shift from their starting point. As the rest of the world has continued its economic ascent, the gap has grown much larger than existed in the 1960s.

The left behind

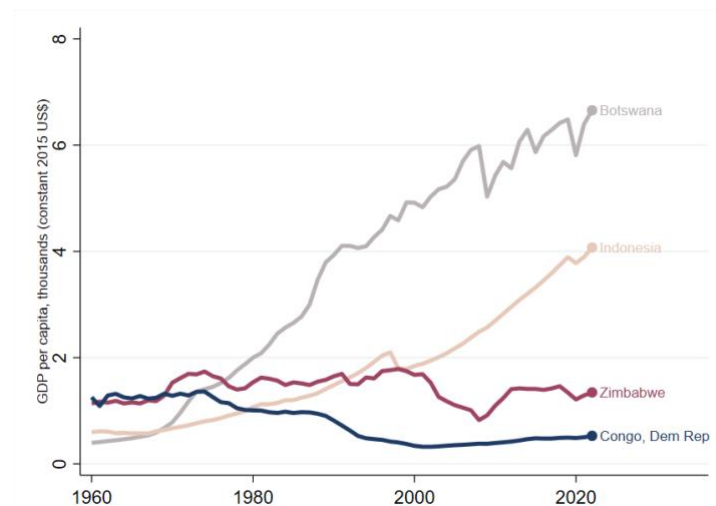
Nearly two decades ago, a group of struggling nations were identified as the "Bottom Billion". This collective term refers to a set of approximately 58 countries across Africa, Asia, and Latin America, which by 2021 had a combined population of about 1.4 billion people (Collier 2009). These nations garnered particular attention due to their shared characteristics, which included being caught in cycles of persistent poverty and low growth, and their inability to replicate the remarkable achievements of their peers and neighboring countries. Factors contributing to

their plight included civil conflict, geographical constraints such as being landlocked and lacking favorable trade opportunities, and the struggle to utilize their natural resources for economic prosperity.

Since the original publication of *The Bottom Billion* in 2007 (Collier, 2007), some of these countries have experienced improvements, however most of them continue to face similar syndromes observed in 2007. Despite two additional decades of transformative economic growth in non-Bottom Billion countries like India and China, those found to be left behind in the early 2000s have, for the most part, continued in this position.

Since the 1960s and 1970s, when many developing countries achieved their independence, the countries we have come to associate with the Bottom Billion failed to create the conditions necessary for economic growth and have subsequently fallen behind. In contrast, other previously low-income nations that managed to sustain high growth rates now enjoy a GDP per capita at least three times higher than that of the Bottom Billion countries. The Democratic Republic of Congo (DRC) and Zimbabwe exemplify the underperformance of the Bottom Billion when compared to their once similarly impoverished peers. Figure 1 illustrates how these two countries have fallen behind Botswana and Indonesia, which in 1960 had only half the GDP per capita of Zimbabwe and the DRC.

Figure 1. Bottom billion countries, such as Zimbabwe and DRC, fell behind their once low-income peers



Source: based on World Bank national accounts data.

The majority of the 58 "Bottom Billion" countries have remained in the low- and lower-middle-income categories,⁵ with a few notable exceptions. Azerbaijan, Equatorial Guinea, Guyana, Kazakhstan, Maldives, and Turkmenistan are the only countries in this group that have achieved upper-middle-income status in the past decade, primarily due to rapid growth which for many was spurred by their burgeoning hydrocarbon industry. Although Bottom Billion countries are

⁵ According to the World Bank income classification.

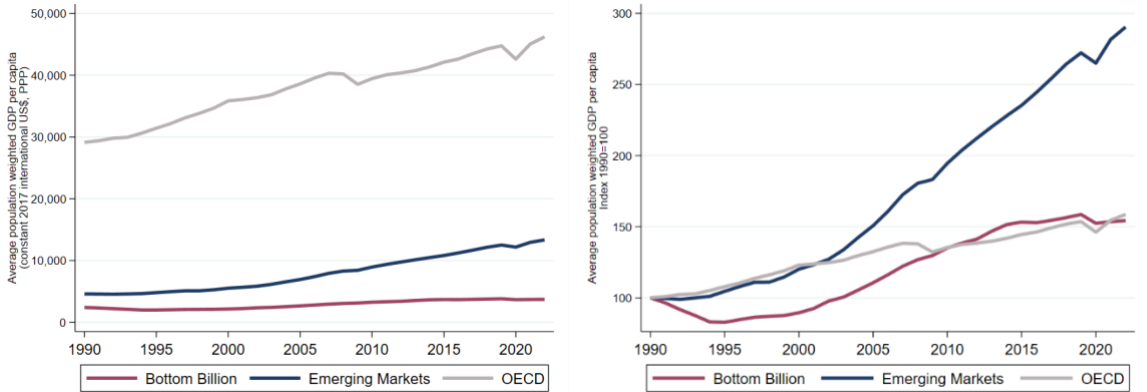
distributed across all regions, about two-thirds (38 of 58) are in Sub-Saharan Africa, accounting for 77 percent of the Bottom Billion population. Over half of these nations possess abundant natural resources, but unlike the aforementioned hydrocarbon success stories, they have been unable to transform their subsoil wealth into economic transformation. For example, in 2012, the IMF classified 34 of the 58 Bottom Billion countries as "resource-rich," with nonrenewable resource exports and revenues often surpassing 20 percent of their total exports and government revenues, respectively (IMF 2012). Despite this, most of these countries continue to experience stagnant or lagging GDP per capita growth.

The Bottom Billion stands in stark contrast to the "Lucky Billion," a term we use to describe the 38 OECD countries that constitute the affluent world. Many of these nations were also once poor but have now achieved at least an upper-middle-income status.

The remaining 5 billion people, who do not belong to either the Bottom Billion or the Lucky Billion, reside in emerging market economies. This diverse third group encompasses large, populous, and rapidly growing economies like India and China, as well as smaller states such as Timor-Leste and the Dominican Republic. It also includes the relatively un-diversified, but petroleum-rich economies of the Gulf states and Equatorial Guinea.

By looking at the paths of these three different groups, we can better understand how economic growth and differences have changed over time. As we see below, the OECD or Lucky Billion were already far ahead of the rest in 1990 and have largely maintained this position. The starkest change has been among the Emerging Markets group, whose economic growth has seen their incomes rise rapidly. A sizeable gap remains overall, but the trend is clearly one of gradually converging with the Lucky Billion. The fate of the Bottom Billion group is much gloomier (figure 2).

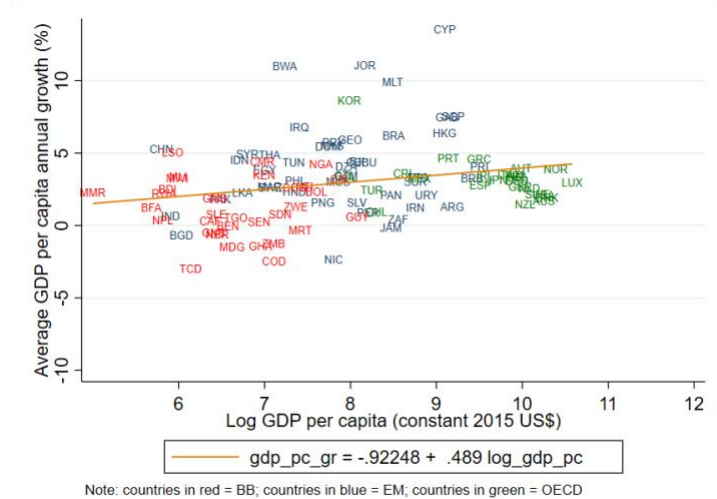
Figure 2 – Path of income per capita among the three global groupings



Source: based on World Bank national accounts data. Note: Average population weighted GDP per capita is calculated by following these steps and formula in footnote 3: (1) GDP per capita by country is calculated as the annual GDP in constant 2017 international US\$ from World Bank’s WDI divided by the country population in that year; (2) country population weights are calculated as the country’s annual share in world’s population; c) average population weighted GDP per capita is the quotient of the sum-product of (1) times (2), divided by (2), arranged by group. The right panel shows the same values indexed to 1990, where 1990=100.

Source: based on World Bank national accounts data. Note: countries in red correspond to Bottom Billion countries, countries in blue to countries classified as Emerging Markets, and countries in green to OECD members. The line corresponds to the regression line equation indicated in the legend, where 'gdp_pc_gr' is the average GDP per capita growth of the decade and 'log_gdp_pc' the GDP per capita in log form in the last year of the corresponding decade.

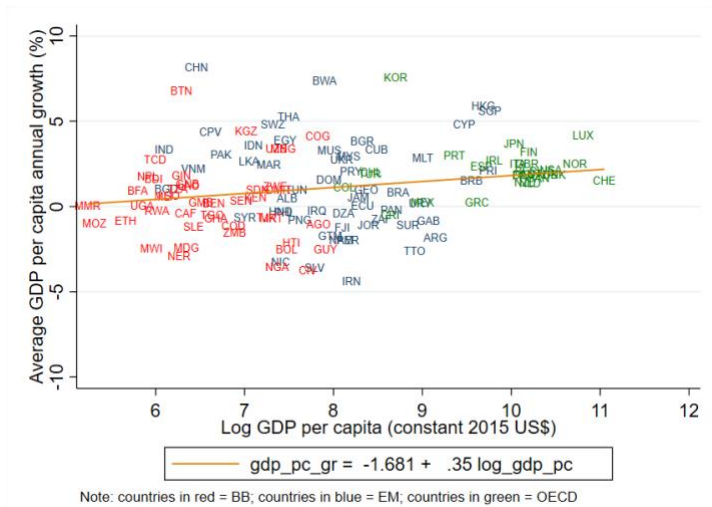
Figure 4. GDP growth convergence 1970-1979



Source: based on World Bank national accounts data. Note: countries in red correspond to Bottom Billion countries, countries in blue to countries classified as Emerging Markets, and countries in green to OECD members. The line corresponds to the regression line equation indicated in the legend, where 'gdp_pc_gr' is the average GDP per capita growth of the decade and 'log_gdp_pc' is the GDP per capita in log form in the decade's last year.

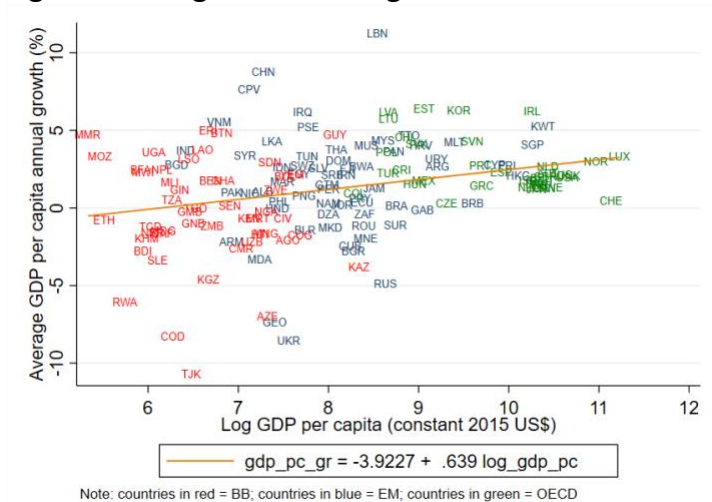
The upward sloping regression line during the 1960-1969 and 1970-1979 periods illustrates the early evidence for divergence (Figure 3, Figure 4). As we move from left to right we go from poorer societies to richer ones, however the upward sloping line indicates those who are richer also have, on average, higher GDP growth in per capita terms. This means that the rich get richer, faster than the poor, implying countries will not catch up but instead become more dispersed over time.

Figure 5. GDP growth convergence 1980-1989



Source: based on World Bank national accounts data. Note: countries in red correspond to Bottom Billion countries, countries in blue to countries classified as Emerging Markets, and countries in green to OECD members. The line corresponds to the regression line equation indicated in the legend, where 'gdp_pc_gr' is the average GDP per capita growth of the decade and 'log_gdp_pc' is the GDP per capita in log form in the decade's last year.

Figure 6. GDP growth convergence 1990-1999

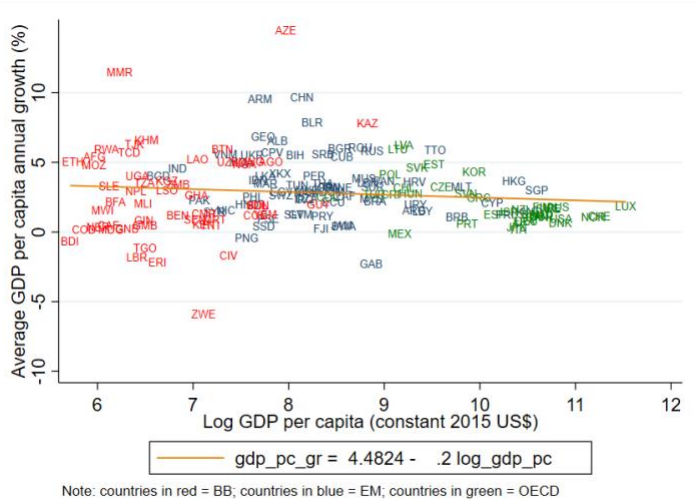


Source: based on World Bank national accounts data. Note: countries in red correspond to Bottom Billion countries, countries in blue to countries classified as Emerging Markets, and countries in green to OECD members. The line corresponds to the regression line equation indicated in the legend, where 'gdp_pc_gr' is the average GDP per capita growth of the decade and 'log_gdp_pc' is the GDP per capita in log form in the decade's last year.

Now as we move to the 1980s and 1990s we continue to observe the upward sloping relationship between income levels and the pace of economic growth (Figure 5, Figure 6). This continues to support the hypothesis of income divergence over time. Visually you can see the Bottom Billion countries falling further behind and forming a more uniform group of the 'left

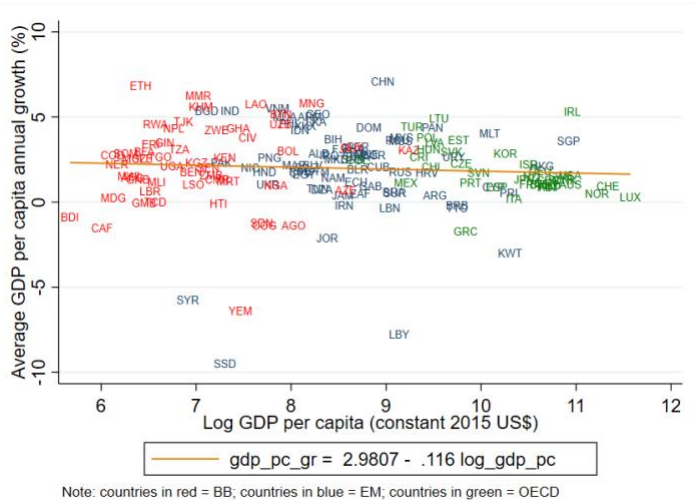
behind'. Several emerging market economies are now joining lead pack alongside their OECD peers.

Figure 7. GDP growth convergence 2000-2009



Source: based on World Bank national accounts data. Note: countries in red correspond to Bottom Billion countries, countries in blue to countries classified as Emerging Markets, and countries in green to OECD members. The line corresponds to the regression line equation indicated in the legend, where 'gdp_pc_gr' is the average GDP per capita growth of the decade and 'log_gdp_pc' is the GDP per capita in log form in the decade's last year.

Figure 8. GDP growth convergence 2010-2019



Source: based on World Bank national accounts data. Note: countries in red correspond to Bottom Billion countries, countries in blue to countries classified as Emerging Markets, and countries in green to OECD members. The line corresponds to the regression line equation indicated in the legend, where 'gdp_pc_gr' is the average GDP per capita growth of the decade and 'log_gdp_pc' is the GDP per capita in log form in the decade's last year.

Finally we reach the 2000s. Here the three distinct groups are clearly evident. The bottom billion are further behind as a group than they were in 1960 (Figure 7, Figure 8).

However, it is important to note that the slope of the line is now downward sloping, from 2000 to 2019. This is good news. It means that, on average, over these two decades there is evidence for income convergence taking place. This downward sloping line even continues in the second decade of the millenia, in the years leading up to the COVID-19 pandemic.

Do we see convergence of the Bottom Billion in the post-2000 era?

The period since 2000 sees a weakly downward sloping line in the relationship between income levels and growth rates – when averaged for all countries globally. Does this mean the Bottom Billion are catching up throughout this period? Not so fast.

Suppose we slice the time period in three: the Old Normal between 1995 and 2003, the so-called Golden Decade between 2004 and 2014 when commodity prices surged, and the New Normal between 2015 and 2019.

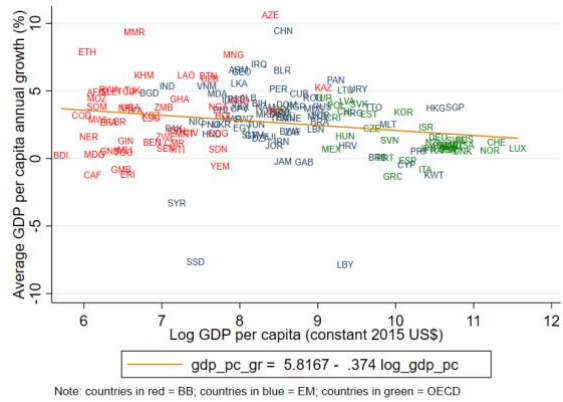
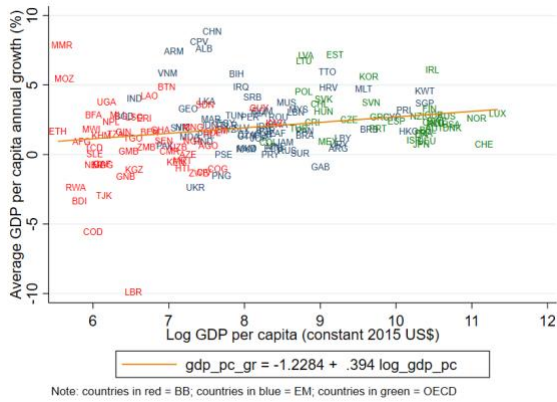
These three periods represent very distinct experiences for the global economy and therefore can provide an alternative lens for our analysis compared to the decade by decade approach. The Old Normal preceded the commodity price super cycle and therefore represented a time of relative economic underperformance in the world's poorest countries but the early emergence of strong Asian growth. The Golden Decade – 2004 to 2014 – is often referred to now as the 'super cycle' due to the length of sustained high commodity prices. This was driven, in part, by the rise of China and the associated import demand that drove accelerating economic prosperity in the resource-rich countries that make up the majority of the Bottom Billion. By 2015 commodity prices came down, crashing down in some cases. Our final period is therefore defined by the end of the super cycle, 2015 and the years leading up to COVID-19, stopping in 2019; we call this the New Normal.

Here again, show in Figure 9 below, we can replicate the downward sloping line of convergence in the period 2004-2014. However in the periods both preceding and succeeding this Golden Decade, we revert to the upward sloping lines of income divergence. And this upward sloping trend occurs before we even consider the years of pandemic from 2020 onwards.

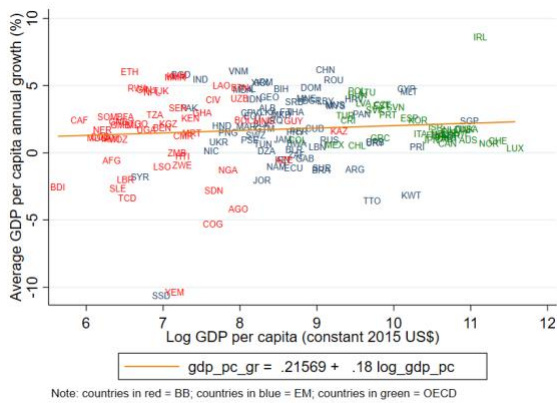
Figure 9 – Convergence by period: Old Normal, Golden Decade and New Normal

Panel A. Old Normal (1995-2003)

Panel B. Golden Decade (2004-2014)



Panel C. New Normal (2015-2019)



Source: based on World Bank national accounts data. Note: dots in red correspond to Bottom Billion countries, dots in blue to countries classified as Emerging Markets, and dots in green to OECD members. The line corresponds to the regression line equation indicated in the legend, where 'gdp_pc_gr' is the average GDP per capita growth of the decade and 'log_gdp_pc' is the GDP per capita in log form in the decade's last year.

What happened during the Golden Decade?

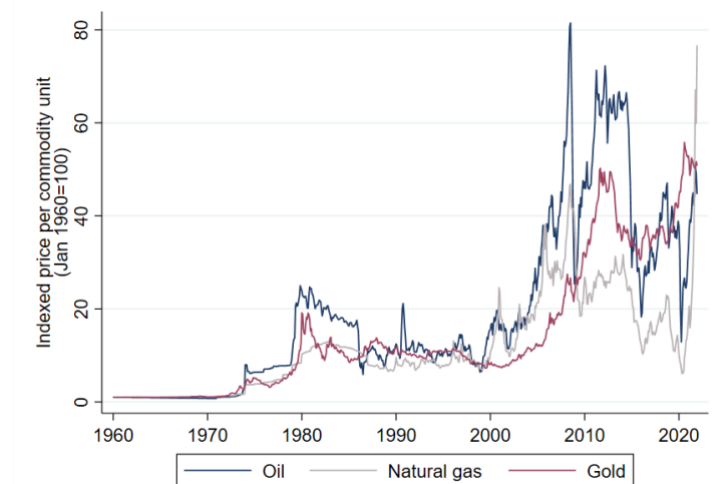
During the golden decade, from 2004 to 2014, the Bottom Billion and the world experienced an unprecedented economic boom, driven by China's growth and its insatiable demand for raw materials. This led to high prices and a sustained surge in natural resource exports. Growth even among the bottom billion surged.

This period provided the Bottom Billion with an exceptional opportunity to accelerate growth through commodity exports and increased capital market liquidity. These favorable conditions offered lower-income countries the chance to finally embark on economic transformation. This Golden Decade marked a departure from the Old Normal.

During the Golden Decade, commodity prices, such as those for oil and gas, reached historical highs (Figure 10), and government revenues from natural resources in resource-rich countries

like Angola and the Republic of Congo soared to 40 percent of GDP, compared to averages of 22 and 19 percent, respectively, during the Old Normal.

Figure 10. The 2004-2014 commodity boom brought a Golden Decade with unprecedented high prices of natural resources that could help finance growth.



Source: based on World Bank Commodities data.

Government coffers swelled, foreign currency – the payments for resource exports – flowed in, and investment followed. Bottom Billion countries saw their investment rates jump from an average of 2% by 2000, to above 6% during the last years of the Golden Decade. The material impact of citizens was also impressive. Incomes rose - with growth per capita jumping by around 2.6 percent per annum, and poverty rates falling from roughly 30% in 2004 to an estimated 20% in 2014 in the Bottom Billion.

However, despite the significant inflows that could have laid the foundation of economic transformation, growth slumped once prices came back down. Collapsing commodity prices, particularly oil and gas, saw exports plummet, and the brakes applied to foreign-sourced investment and consumption.

For example, Angola's oil production and exports fueled the economy during the Golden Decade with an average growth rate of 8 percent. They were a rapidly growing oil-based developing economy. However, once the New Normal appeared, and oil prices tumbled, the economy suffered an average annual contraction of -1 percent. A devastating oil-induced recession.

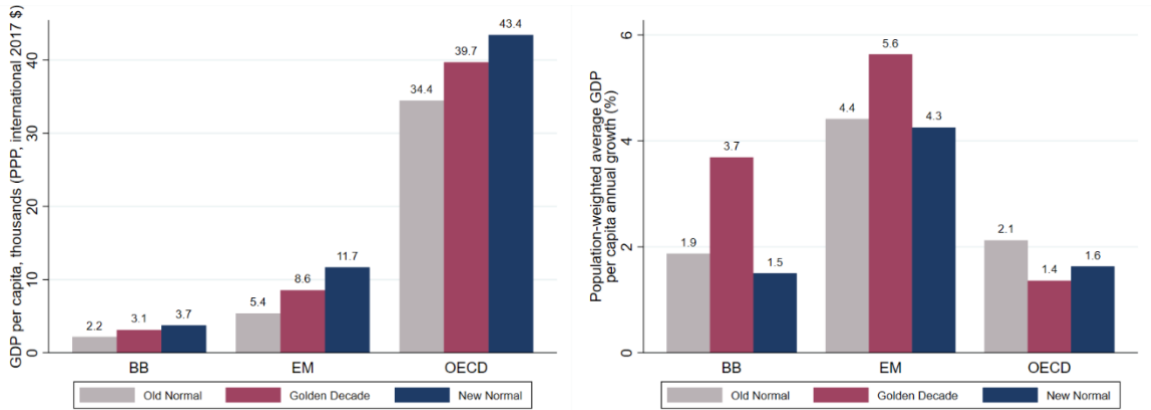
Similarly, the Republic of Congo – a persistently sluggish performing Bottom Billion country – achieved an impressive average annual growth rate of 5 percent during the Golden Decade. However, it has been suffering an average contraction of -5 percent each year since. By contrast, Indonesia – another developing resource-rich country but not part of the bottom billion – reached an average annual growth rate of 5 percent during the boom which continued after the Golden Decade ended.

What is notable about these stories is not the ability to grow when times are good. That certainly is a necessary condition of catching up with their richer peers. Rather, what is decisive is what happened when booms times ended. The underperformers saw growth collapse – this lack of resilience in growth rates during the lean times is a key driver of economic divergence.

The unsustainable nature of this growth, and the New Normal

When the Golden Decade came to an end with a sudden drop in commodity prices between 2014-2015, these tailwinds ceased, and the world entered what we are calling the New Normal period. During these years, average GDP growth in the bottom billion countries fell to even more disappointing rates distancing them even further from the rest of the world. The average 2015-2019 GDP growth rates of the bottom billion fell below both the emerging markets and the OECD group averages, making convergence between bottom billion and the others an unfeasible outcome (Figure 11).

Figure 11. The Golden Decade established convergence conditions for the bottom billion; the New Normal has seen those conditions evaporate.



Source: based on World Bank national accounts data. Note: population-weighted averages by group.

The New Normal is the time that once again puts an end to the previous decade’s progress towards convergence between the poor and the rich. Highly indebted economies, reduced revenues from natural resources, rapid population growth, and increasing poor headcount exemplified the situation of the countries of the bottom billion and underscored the illusory prosperity of the Golden Decade for many of them.

The wasted opportunity for economic transformation during the Golden Decade and the difficult years of the New Normal left the bottom billion less prepared to face the COVID-19 crisis and left them continuing to diverge as they had done before the Golden Decade. Some extreme examples include the Central African Republic and Niger, where GDP per capita has declined to the point that its 2021 value is almost one half the value in the 1970s. Cust and

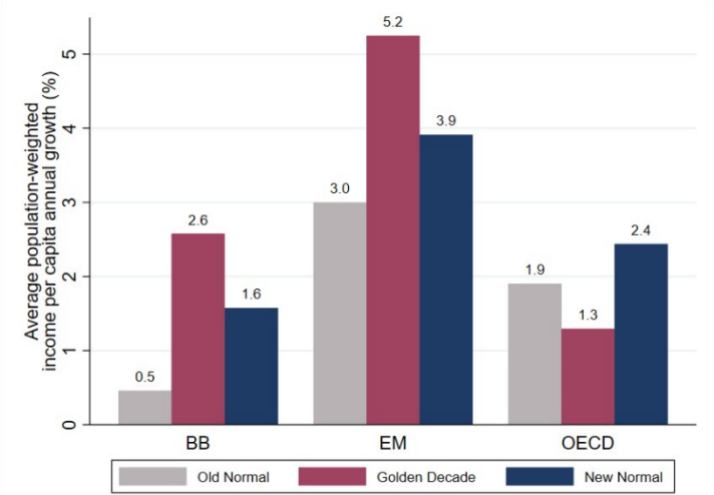
Zeufack review the missed opportunity among African countries from the commodity price boom (Cust and Zeufack, 2023).

Household income in the bottom billion

To consider the question of convergence and divergence, household income data provides an alternative to GDP growth. The World Bank’s Global Poverty Working Group uses selected household surveys to estimate consumption or income and to monitor poverty in most countries. They estimate welfare aggregates to harmonize data across countries and over time to produce a global homogeneous panel dataset. The average income per capita annual growth shows a similar pattern of the GDP per capita figure and wealth per capita.

During the Old Normal the Bottom Billion was growing annually at 0.5 percent, much less than what OECD and emerging market countries were growing. During the Golden Decade, the Bottom Billion’s average annual income growth increased to double the OECD group’s rate, showing promising signs towards income convergence. But this ended with the emergence of the New Normal since 2014, where income growth of the Bottom Billion fell back to a rate of 1.6 percent, below the rates in the emerging markets group (Figure 12). Under the New Normal circumstances, it may be even harder for Bottom Billion countries to catch up with the Emerging Markets or OECD averages, where income per capita could be 8 times higher.

Figure 12. The golden decade saw Bottom Billion income growth surge above the OECD, supporting convergence, but slumped during the new normal. Emerging Markets saw the most robust income growth.



Source: based on World Bank’s Poverty and Inequality Platform database in 2011 PPP. Note: estimates show population-weighted annual income per capita growth.⁶

⁶ Population-weighted annual income per capita growth estimates are based on the Poverty and Inequality Platform (PIP) income data, and we calculate them following these steps: first, we calculate the compound growth rate for each country and decade (Old Normal, Golden Decade and New Normal). We use the [formula](#) $CAGR = ((EV/BV)^{(1/n)} - 1) \times 100$ where *BV* is the first available PIP mean income per capita value of the period and *EV* is the last available PIP mean income per capita value for the period in each country. *n* is the number of years

Recent scholarly work has considered the question of income convergence between poor and rich countries, when measured in household terms. Lakner and Milanovic (2013) track the evolution of individual country-deciles to find what is driving the changes in the global income distribution. They find that the fastest growing deciles were country-deciles that in 1988 were around the median of the global income distribution – mostly located in Asia, while the country-deciles that in 1988 were around the 85th percentile – mostly population in mature economies – had a sluggish growth. While this improving situation for the groups close to the median is encouraging, it is the poorest deciles where lack of progress is most evident.

3. Implications of divergence for the future

Poverty projections

The world has seen a remarkable decline in extreme poverty, from around 1.9 billion in 1990, to around 690 million by 2017.⁷ However, the COVID-19 crisis, inflationary pressures, and the Ukraine conflict have pushed more than 100 million people back into extreme poverty around the globe since 2020, compared to pre-pandemic projections.⁸ This marks remarkable success over this 30-year period, with the reversal of fortunes hoped to be a short-term blip. Extending the projections forwards, by 2030, 8 in 10 of the extreme poor will reside in Sub-Saharan Africa (World Bank 2023b) and similarly 8 in 10 in the Bottom Billion (Figure 13).

This situation, when combined with relatively high rates of population growth in the bottom billion, means that the headcount of those in extreme poverty will actually begin to rise again by 2035.

It is worth noting the conservative nature of extreme poverty measures. While an important marker of wellbeing and basic survival, living just above the extreme poverty line tells us little about people's ability to participate in global prosperity. There is a shift towards broader and more relatively defined poverty measures, including measures referring to within-country inequities, as more relevant to the policy stakes – are people being left behind by global economic growth, or made able to meaningfully participate and benefit from it?

between the first and last income per capita value for each period and country. This value is multiplied by the country population weight. The country population weight is the result of dividing the country population of the year when the first available income per capita data point by the world's total population. We obtain the sum of the weighted CAGR of each country and period and the sum of the weights by group (BB, EM, OECD). Finally, we obtain the average population-weighted annual income per capita growth by dividing the sum of the weighted CAGR by the sum of the weights.

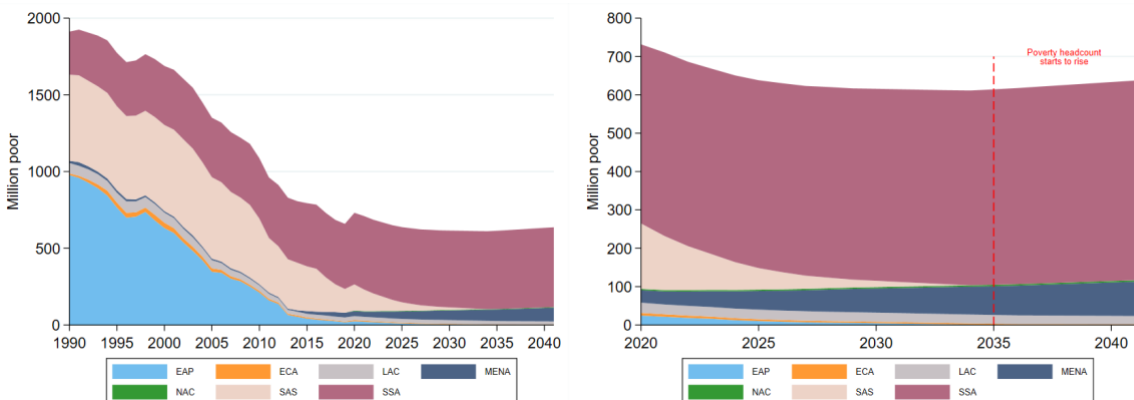
⁷ As reported in World Bank's September 2020 PovcalNet update:

<https://blogs.worldbank.org/opendata/september-2020-global-poverty-update-world-bank-new-annual-poverty-estimates-using-revised>

⁸ Calculations based on Mahler et al (2021) updated poverty estimates accounting for the impact of COVID-19 but without including the effect of the 2022 global high inflation and the Ukraine conflict:

<https://blogs.worldbank.org/opendata/updated-estimates-impact-covid-19-global-poverty-turning-corner-pandemic-2021>

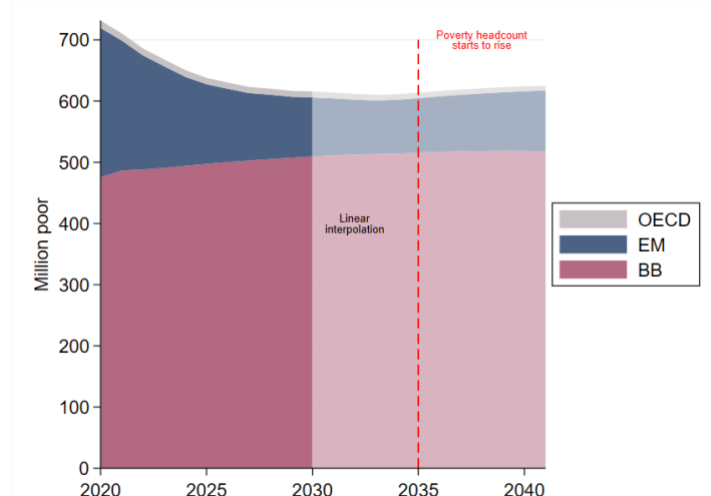
Figure 13. Poverty is concentrating in sub-Saharan Africa and may be worse in the future.



Source: based on Mahler et al (2021) and World Bank staff estimates. Note: number of poor below the \$1.90 (2011 PPP) poverty line. Historical data are obtained from World Bank’s Poverty and Equality Platform (PIP). 2020-2030 estimates are obtained from Mahler et al (2021). 2031-2040 estimates calculated with linear extrapolation using 2020-2030 data.

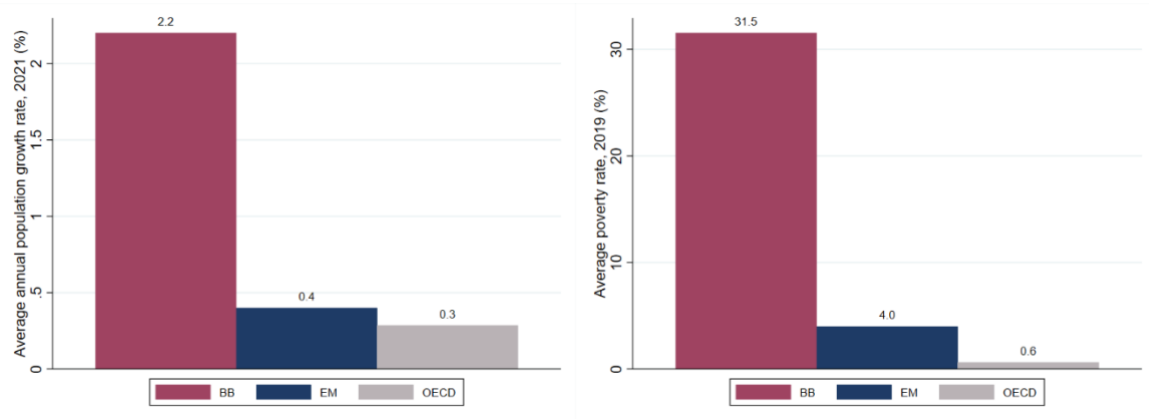
By 2020, 6 in 10 of the extreme poor lived in Bottom Billion countries. However, according to recent projections, these countries will be home to 8 in 10 of the world’s extreme poor by 2030 (Figure 14). In 2021, Bottom Billion countries population grew on average 2.2 percent, more than twice than in emerging markets and the OECD groups. High poverty rates in countries with higher population growth (Figure 15), not only could lead to a concentration of the poor in this group, but also, an increase in the absolute number of world’s extreme poor during the next decade.

Figure 14. With most recent projections, global poverty headcount may start growing once again driven by the increase of poor in the bottom billion



Source: based on Mahler et al (2021) and World Bank staff estimates. Note: number of poor below the \$1.90 (2011 PPP) poverty line. 2020-2030 estimates are obtained from Mahler et al (2021). 2031-2040 estimates calculated with linear extrapolation using 2020-2030 data.

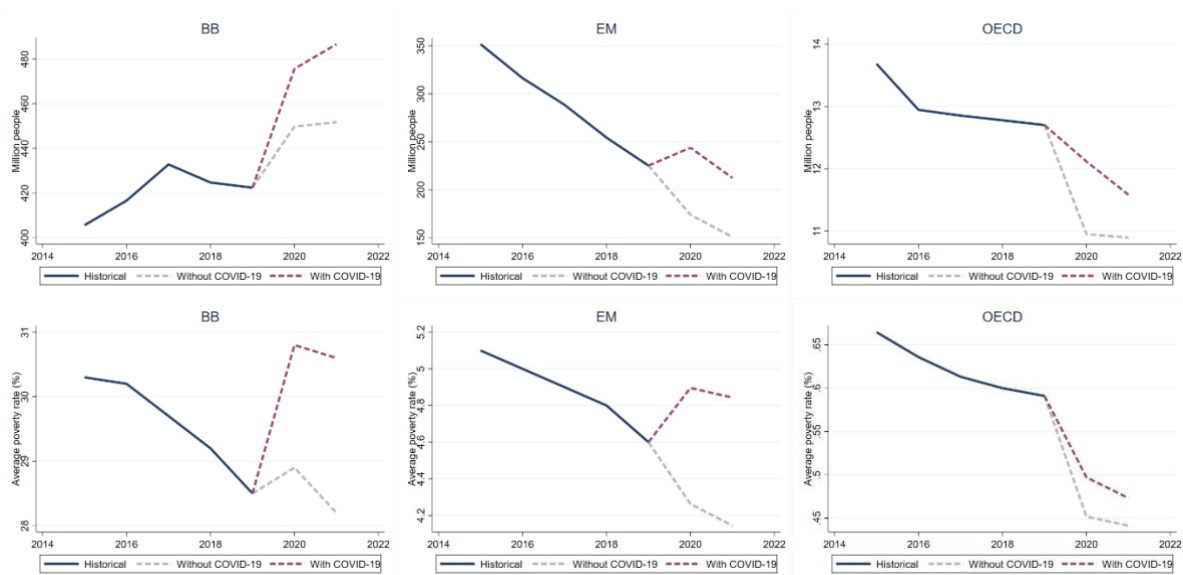
Figure 15. Population is growing faster in the bottom billion, where average poverty rate is higher



Source: based on Mahler et al (2021) and World Bank staff estimates. Note: number of poor below the \$1.90 (2011 PPP) poverty line

The COVID-19 crisis made this poverty situation worse for the bottom billion group. Based on updated poverty estimates, the pandemic may have pushed 30 million more poor living in this group of countries, reaching almost 100 million more than in 2015, when the Golden Decade ended (Figure 16).

Figure 16. Post-COVID-19 poverty headcount projections estimate an increase in the number of poor



Source: based on Mahler et al (2021) and World Bank staff estimates. Note: poverty rate defined by the number of poor below the \$1.90 (2011 PPP) poverty line.

4. Measuring divergence and convergence – three confusions in the data

While the pattern of divergence among the countries of the bottom billion is source for serious policy concern, the average global picture paints a more sanguine picture, suggesting a degree of convergence overall, and some studies demonstrate *unconditional convergence* is now present.

The last decade has seen pendulum swing away from the previous consensus around diverging economic destinies (Pritchett 1997), to the more recent findings that global incomes and GDP levels are converging overall (Kremer et al 2021, Lakner and Milanovic, 2015, and Patel et al 2021).⁹

Kremer et al (2021) revisit empirical tests of the 1990s that show no evidence of unconditional convergence since the 1960s and extend the analysis for the subsequent 25 years. They find that there is now evidence in support unconditional convergence at the global level since 1990 and convergence since 2000 due to a faster catch-up growth between the poor and higher income countries. Patel et al (2021) also argue in favor of convergence, showing that middle-income countries have experienced accelerated growth rates that have facilitated catching up with richer ones. They call into question the previous claim of unconditional *divergence*, and the so-called “middle-income trap”. Indeed, rather than being driven by a moderation of growth in richer countries, this is instead supported by accelerating growth in developing countries, especially those found among emerging markets and middle-income countries.

Should we breathe a sigh of relief? Not quite yet. Although each new study typically benefits from additional years of data, consensus is yet to be reached. In a recent survey of cross-country evidence, Johnson and Papageorgiou (2020) argue that as a group, developing countries have not closed the per capita income gap on the rich world of advanced economies, even in more recent years.

Recent arguments favoring global income convergence tend to emphasize – and their statistical findings are often driven by - the evidence in the years since 2000 that growth has been accelerating among an important subset of developing countries. This recency bias in the newer findings also explains the shift away from the earlier divergence consensus.

The debate around convergence or divergence is often boiled down to this binary question – is convergence (or so-called unconditional beta-convergence) happening at the global level or not? However, underlying this question and the broad trends it depends upon are many different countries of different sizes on quite different economic paths. Furthermore, differences in data availability by income groups or disproportionate impacts of populous

⁹ See also: <https://www.cgdev.org/blog/everything-you-know-about-cross-country-convergence-now-wrong>

countries – such as China – can distort the picture by making an average result dominate rather than measuring whether all countries are in fact not catching up after all.

One troubling implication is that there could exist strong empirical support for an average result of global convergence, meanwhile a sizable group of people or countries are left out of this process entirely. One such group could include the Bottom Billion.

We argue there exist three common confusions emerging from the data used in the convergence-divergence debate that can lead to an incomplete story when we examine global trends:

1. Policy questions versus indicators of convergence
2. Country and group heterogeneity
3. Skewed samples of countries, years and time periods

First, a focus on unconditional convergence tests can overlook important policy questions such as are countries likely to eradicate extreme poverty and catch up with the rest of the world or not? We may not learn as much as we think from tests for convergence, not least since we argue recent findings in favor of *unconditional beta convergence* can co-exist with the fact a significant group of countries are slipping ever further behind the rest of the world, and extreme poverty numbers are increasing rather than decreasing. Second, we find that average trends can both obscure and be distorted by underlying differences in country composition. In the extreme case, while fast-growing China was below global mean incomes between 2000 to 2020, it has significantly boosted evidence for global convergence. Now that it has passed this threshold, the finding will likely reverse. Third, different availability of time periods and country coverage can distort and even bias empirical findings, especially where limited data availability is correlated with lower income and lower growth economies.

1. Policy considerations

What do we learn from tests for global trends towards convergence or divergence? Less than might be apparent. Embedded in such empirical tests is a concern for how the world's poorer and poorest may be faring, and whether – if current trends persist – we might be hopeful or otherwise about overall global income convergence or not.

Both domestic and internal policy makers consider such questions of primary importance. Are we on track or not to achieve shared prosperity around the world and eradicate extreme poverty? These are the twin goals of the World Bank for example.

However, it is unfortunately the case that a positive result for global unconditional convergence can coexist alongside much more concerning economic performance among the world's poorest economies. As previously discussed, many countries among the so-called bottom billion, including a concentration of countries in fragile and conflict affected states, resource-

dependent states and sub-Saharan African states, continue to slip further behind in GDP per capita terms.

In poverty terms, too, the picture is striking. While the world has made astonishing progress overall to bring down rates of extreme poverty since 1990, the number of those living in extreme poverty in Sub-Saharan Africa has continued to rise steadily. As more countries exist the group of those hosting large numbers of impoverished people, the remaining group, dominated by bottom billion states, will see global poverty headcount numbers rising by 2030.

If extreme poverty is rising again, and the world's poorest societies continue to slip further behind the rest of the world, how much policy insight can we draw from simple findings at the global level? We argue we should consequently treat such findings with policy caution.

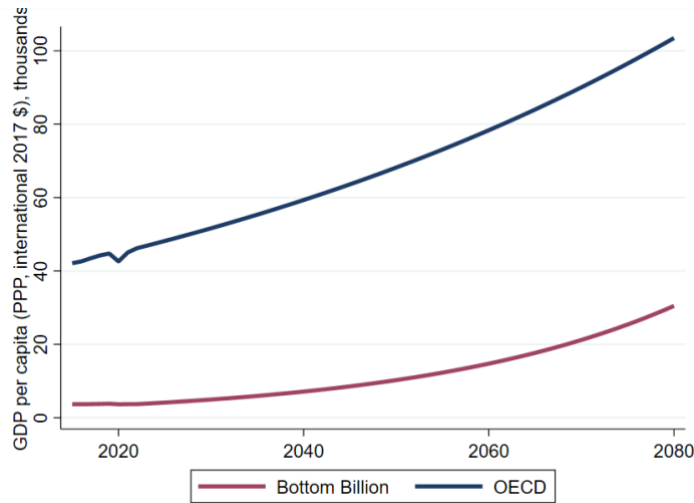
To underscore the potential confusion arising from findings of global convergence, one might also consider the speed of convergence.

During the commodity price boom period, the Bottom Billion achieved higher growth rates than the OECD, 3.7% versus 1.4%, respectively. However, even during this striking decade of economic boom for lower income, resource-rich and bottom billion countries, the gap between them and the rich world remains striking.

Even taking this best-case of economic growth performance, Figure 17 shows that even if all countries in the world would have been able to maintain the Golden Decade GDP growth rates in perpetuity, the Bottom Billion would require more than a century to catch up with the OECD group. The New Normal period showed that this sustained growth would not last forever. Subsequent growth performance has slumped in the bottom billion countries, implying no possibility of catching up without significant changes in economic performance.

Even a positive result for global average economic convergence, the policy relevance of such a finding should be treated with caution if the time periods involved far exceed any reasonable policy planning horizon.

Figure 17. Projected GDP per capita under the Golden Decade growth rates and



Source: based on World Bank national accounts and World Bank staff estimates. Note: the start point is the average GDP per capita during the Golden Decade and projections are based on population-weighted average GDP per capita growth rates during the Golden Decade after 2015. The emerging market economies group GDP per capita line is not shown but it would have reached 4,100 thousand dollars in 2125 when the bottom billion-OECD convergence would have occurred. Source: based on World Bank national accounts data.

2. Heterogeneity across countries and groups of countries

Average trends struggle to reveal underlying variation and complexity among different groups, countries and people. The bottom billion, as a group, have not been converging. However, as long as there have been big countries like China *below the global mean*, their rapid progress contributes to a stronger result for *Beta convergence*. As they cross this threshold (for China this happened around 2020), they will begin to drag on beta convergence if they sustain higher than average income growth, which appears likely. This will make the lack of Bottom Billion convergence *more evident*, despite its existence always being there.

It gets worse once we consider certain time periods have been extraordinarily good for countries, including those below the global mean income level. The high commodity prices during the Golden Decade meant even many of the poorest countries in the world, dependent on primary exports, also benefitted from unprecedented global prosperity. While most recent convergence studies include this decade – and lean towards conclusions of global convergence – few fully capture the devastating years since then. Even before COVID-19 struck, the collapse in commodity prices, and the lack of resilience in growth among Bottom Billion countries, we saw a sharp deceleration in growth from 2015 onwards. We argue that as the data from 2015 and beyond 2023 becomes more widely available and used in convergence analysis, the reversal of fortune experience by the Bottom Billion countries will reflect in more disappointing conclusions of global *divergence* reemerging. This is not only a prediction, however. Our argument is that these facts already exist, but the nature of the timing of some studies, their

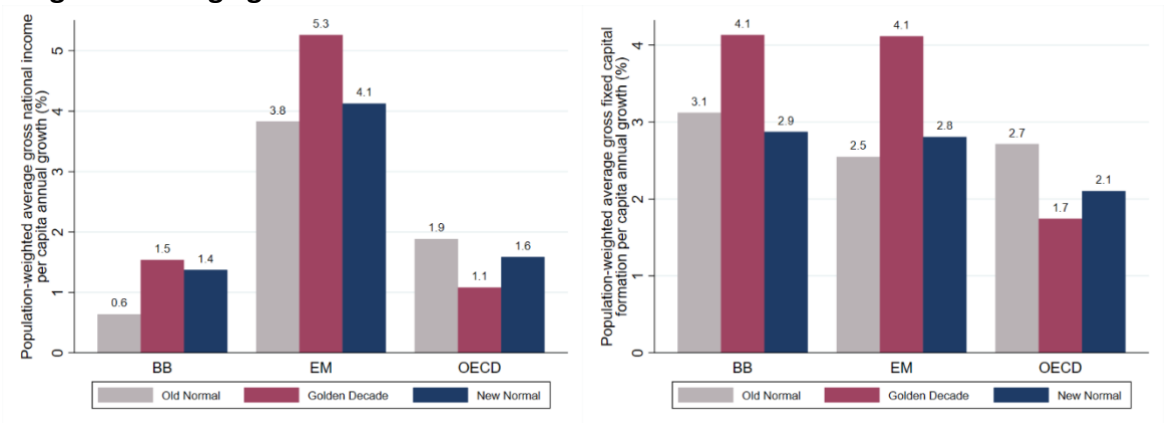
choice of time period, or the limitations of data availability, mean that their conclusions may not yet reflect these trends.

Furthermore, average unconditional convergence does not mean that past performance is an indication of future success. On the contrary, we argue that a group of countries have been left behind and continue to underperform. As China and India exit lower income categories, the average performance of those categories deteriorates since it is no longer being lifted by their outsized impacts. As such, the paradox this creates is that as we get closer to convergence of global incomes, the unattainability of that goal – as with the elimination of extreme poverty - among the poorest countries of the world becomes increasingly apparent.

Indicators matter

Growth development in the bottom billion and the rest of the world can be analyzed from multiple angles. There could be a convergence or divergence trajectory depending on which indicator is used and how it is transformed. Production indicators could show different growth estimates than income surveyed data. For example, average Gross National Income per capita average growth shows a slightly different picture than GDP per capita or PIP income per capita data. There are alternative ways to measure convergence. For instance, gross fixed capital formation is another indicator that could give some clues on how effectively countries are building up their productive capital, which will support increased economic output in the future. It shows that the bottom billion had the highest average growth during the Golden Decade compared to the other group of countries. The needs for productive capital accumulation are largest among the bottom billion countries and form a key foundation for sustained growth. Although it declined during the Old Normal times, the growth rate is not far from the emerging market economies average and higher than OECD countries, consistent with Panel A (Figure 18).

Figure 18. Gross Fixed Capital Formation and Gross National Income per capita population-weighted average growth rates.



Source: based on World Bank national accounts data.

Heterogeneous country groups

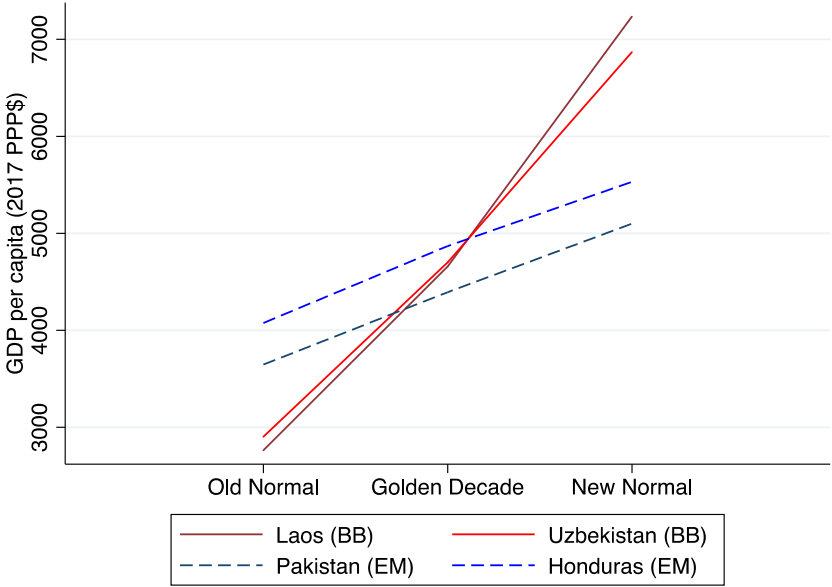
Global estimates of different groups’ economic performance, whether countries or household income deciles, can provide a useful viewpoint on key global trends. However, the strength of these metrics is the general nature of the estimates they generate, while a major weakness derives from their general nature, namely overlooking high degrees of heterogeneity that may exist across countries or groups for which the trend estimates are derived.

Although there are standard methodologies to categorize countries according to their income level or their economic performance, it is hard to say that each country in each group is the same or that it grows at the same rate. Therefore, global estimates and trends tend to be reduced to single directional conclusions and struggle to capture the shifting patterns beneath aggregates of the data. They therefore face limitations for addressing policy questions. For example, a result in support of global beta convergence since 1960 or 1990 sounds fantastic but does not imply business-as-usual will finish the job of economic catch-up. We argue that it does not.

The devil in the details

As previously discussed, there are some bottom billion economies that are growing faster than their peers, and these might be catching up faster with other slow growing economies outside of this group. For example, the Lao People’s Democratic Republic and Uzbekistan – both bottom billion countries – have achieved higher GDP levels compared to other non-bottom billion countries, such as Pakistan and Honduras (Figure 19).

Figure 19. Average GDP growth rates by decade, bottom billion vs emerging market selected countries



Source: based on World Bank national accounts data.

Heterogeneous trends matter

If a group of countries find themselves on a fundamentally different development trajectory than the rest, as we argue is the case of countries of the bottom billion, then global aggregate analysis may struggle to discern this policy-relevant pattern. Indeed, when highlight populous countries such as China are not in such a group, they may get statistically ‘drowned out’ from such global analysis. The problem is especially acute when major economies such as China are below key averages, such as median income. This is due to the way global aggregates and trends are calculated; fast-growing China when below the average contributes to a better score for catch-up, meanwhile once they cross this important threshold, which is only occurring recently, the divergence picture will suddenly begin to look much gloomier.

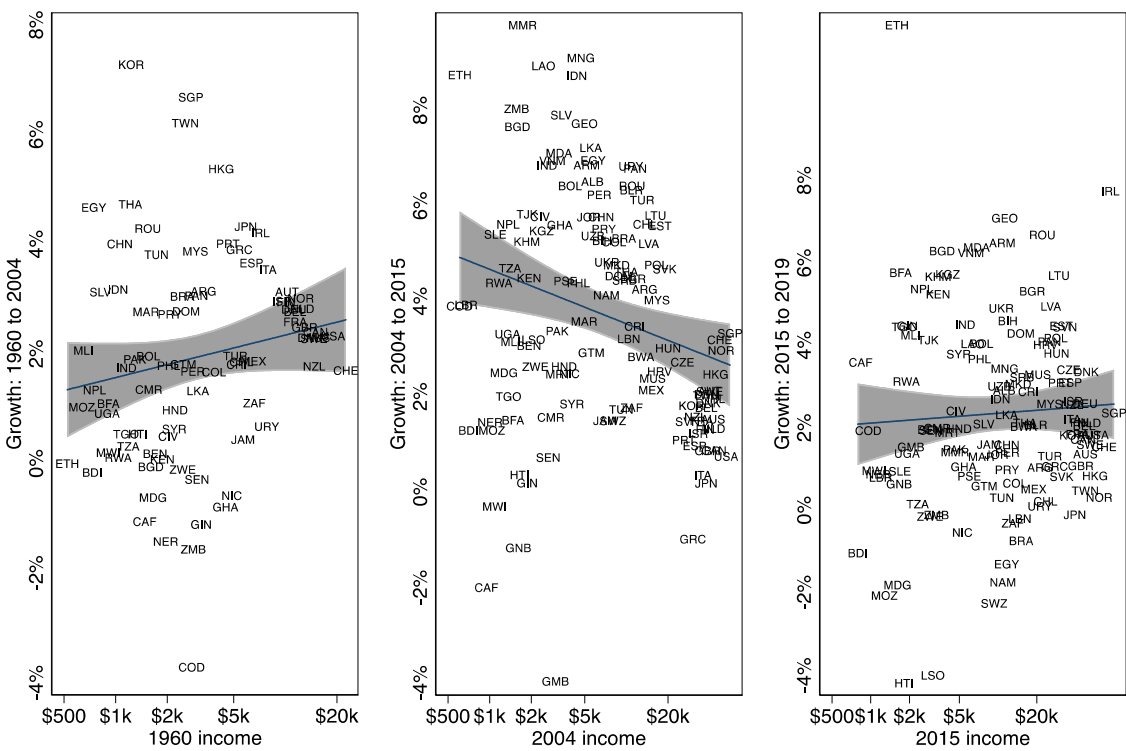
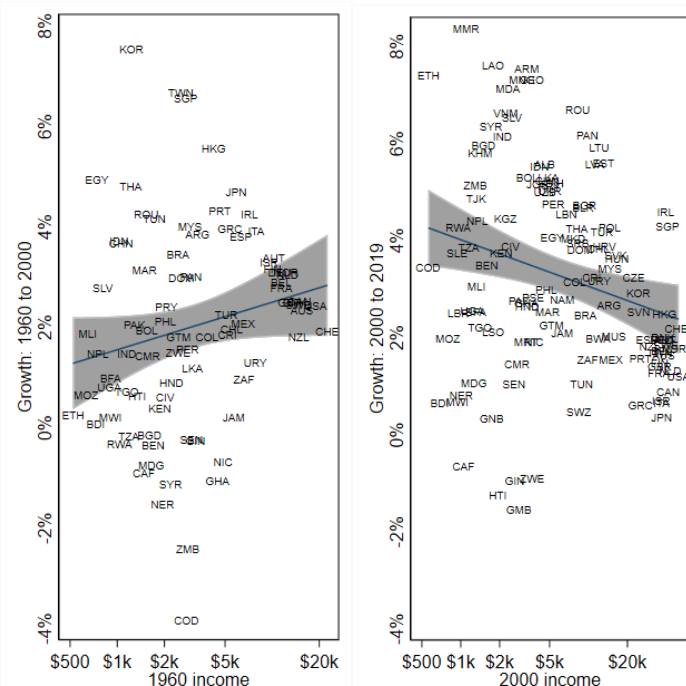
We argue this outcome is arbitrary and one that researchers and policy makers can anticipate. We therefore favor heterogeneity analysis alongside global trend analysis to draw out these important distinctions. Even under global results of unconditional converge many counties continue to fall behind. Such average results risk being misinterpreted to imply these countries will catch up on current trends; we argue that on the contrary, without significant changes in policy approaches these countries will not just languish but fall ever further behind.

3. Variation in the availability of data on countries, years and time periods

GDP per capita data can typically be tracked for a large sample of countries since 1960. Most convergence analysis begins here for this reason. Since that year, the world has gone through economic booms, crises, and recessions that have impacted growth rates. For example, after the early 1990 recession, when the global GDP per capita suffered a contraction of -0.2 percent, the world lived in a decade of growth until a new recession came in the early 2000s. A few years later, as the Golden Decade evolved, several countries, especially those relatively more dependent on natural resources, started seeing unprecedented growth rates.

But these years of abundance ended in 2015 and were followed instead by a period of slower growth rates that have prevailed until the present post-COVID-19 era. Patel et al (2021) show unconditional convergence after 2000 when low-income countries’ growth rates were faster than the richer. However, the heterogeneity in the following years comprising the Golden Decade and the New Normal show contrasting trends. The Golden Decade shows a period of indisputable convergence that ends with the prelude of the New Normal when the relationship between income and growth shifts positive (Figure 20).

Figure 20. The divergence pattern shifted during the Golden Decade until the New Normal took place.

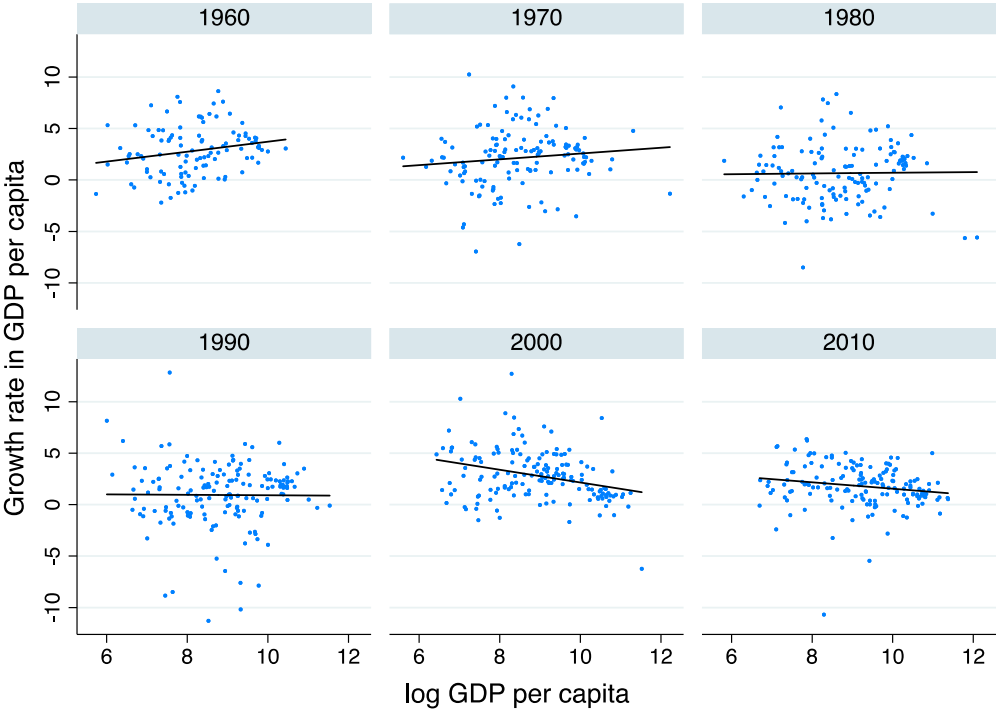


Source: based on Penn World Table version 10.0 data and Patel et al (2021) methodology. Note: The horizontal axis shows the natural log of real per capita GDP, and the vertical axis shows average annual real growth over the period listed. Shaded area represents a 95% confidence interval around the regression line. The sample excludes oil exporters and countries with populations under 1 million.

Kremer et al (2021) run a similar analysis that compares log GDP per capita and growth rate in GDP per capita by decade using the output-side real GDP at chained PPPs (2017 USD) from the

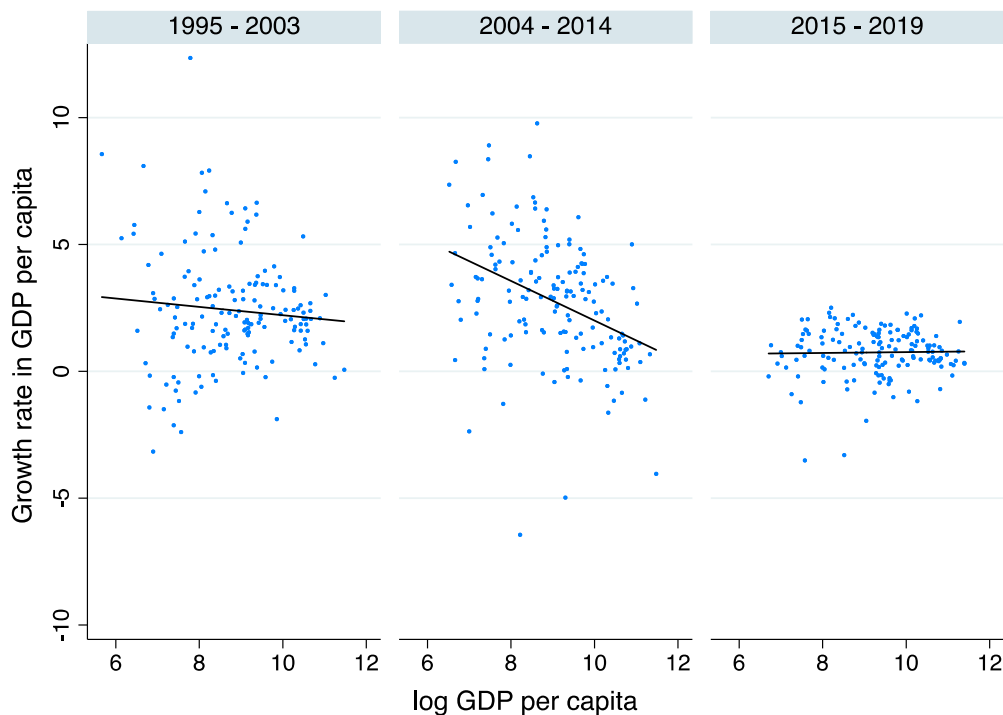
Penn World Table. The results are comparable with the methodology used in Patel et al (2021) suggesting that the steep negative slope of the regression line during the Golden Decade has an important impact on the interpretation of convergence, especially in the post-2000 era (Figure 21).

Figure 21. The selection of time periods to analyze growth impacts the convergence path: most convergence trend of the 2000s and 2010s comes from the Golden Decade. Based on Kremer 2021.



Source: based on Kremer et al (2021) Note: The horizontal axis shows the natural log of real per capita GDP, and the vertical axis shows average growth of GDP per capita.

Figure 22 Replicating the Kremer analysis for our three eras approach. The Golden Decade drove convergence but The New Normal suggests a reversal of fortune.



Source: based on Kremer et al (2021) Note: The horizontal axis shows the natural log of real per capita GDP, and the vertical axis shows average growth of GDP per capita.

As can be seen in Figure 22, the reversal of fortune is far more evident using the end of the commodity price boom – the end of the Golden Decade – as the final era. From a steeply negative slope indicating strong convergence, and slope now is flat and may even flip to be upward sloping.

Would such a post-1995 trend continue, then countries of the bottom billion would never catch up with the rest of the world. This is because the post-Golden Decade undercuts the impressive result during the Golden Decade. For policy, this result matters. Business-as-usual will not get us there, even with a positive result for Beta Convergence found by Kremer et al. (2021).

Country data coverage and sample selection

Availability of data is a recurring issue, especially in countries with limited local statistical capacity, which unfortunately often correlates to the world's lowest income countries.

Macroeconomic indicators such as GDP are widely available for most countries although with some exceptions. For example, Somalia – a country that has largely suffered from extreme poverty and poor growth – has limited GDP data. While the World Bank has been tracking it since 2013, GDP data is unavailable before that year, and therefore it is hard to observe its economic performance in previous years. São Tomé and Príncipe is another African country that while the PWT data goes back to 1970, the World Bank has only tracked it after 2001, and therefore, we are unable to run comparable analysis with this country. Other countries are

new, like South Sudan, and therefore are not included in older decades' averages but could influence the estimated averages of recent periods.

Data sourced by surveys also present coverage and completeness issues. While this data is useful to understand better the reality the limited country-year information could result in a sample-selection bias. For example, the World Bank's PovcalNet database (now PIP), that provides poverty and income data with an outstanding coverage, has not reported data in six Bottom Billion countries – such as Afghanistan or Myanmar. In nine other cases, household income data is only available for one year, which limits the possibility of estimating growth rates within a period. These include several African low-income countries – such as Chad, Sierra Leone, and Togo. Meanwhile, household income data has better temporal coverage in other Bottom Billion countries that have been more prosper, including Nigeria, Ghana, and Côte d'Ivoire. The same occurs with OECD countries, where household income data has full coverage and a consistent temporal availability. For instance, if we would use the dataset and the benchmark years used in Lakner and Milanovic (2015) we find that one-fourth of the countries have no data or just one year of income data. On the contrary, income data is available for all OECD countries and for 83 percent of the emerging markets.

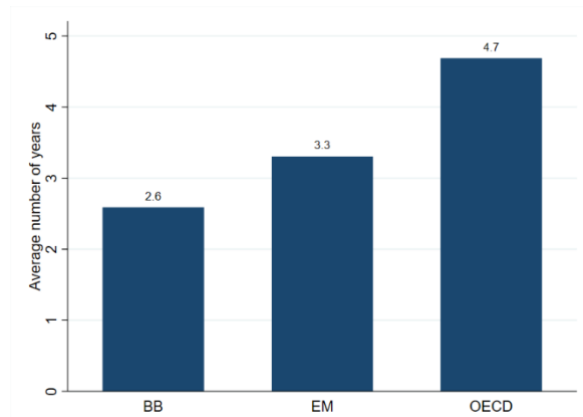
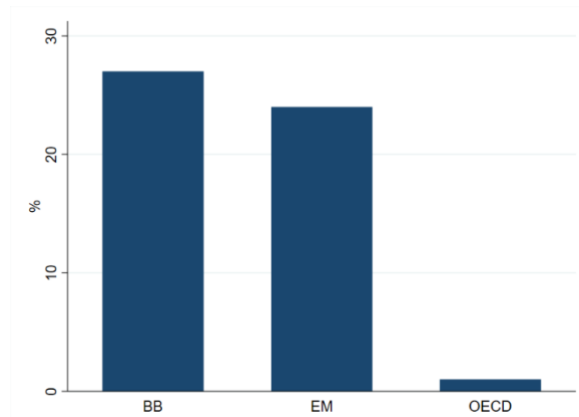
Limited temporal availability of data in Bottom Billion countries also reduces the possibility of including the full sample for all benchmark years. For instance, the Bottom Billion have on average 2.6 years of benchmark data, compared to 3.3 in the Emerging Markets group and 4.7 in the OECD group. (Figure 23). Therefore, if we reproduce Figures 11 with a sample that excludes countries where income data is not available in the Lakner an Milanovic (2015) dataset, we observe that average GDP growth of the bottom billion group during the New Normal is revised upwards by 0.1 (Figure 24).

The implication of this is that limitations on country coverage may *bias upwards* the result for the world's poorest countries – and therefore lead us to be more sanguine, and less concerned about their economic plight. By using wider country coverage, we revise downwards the estimates. If such data limitations systematically bias availability away from the poorest and slowest growing countries, we are likely over-estimating convergence and overlooking the important policy questions posed by continued divergence.

Figure 23. Cross-country and temporal data availability

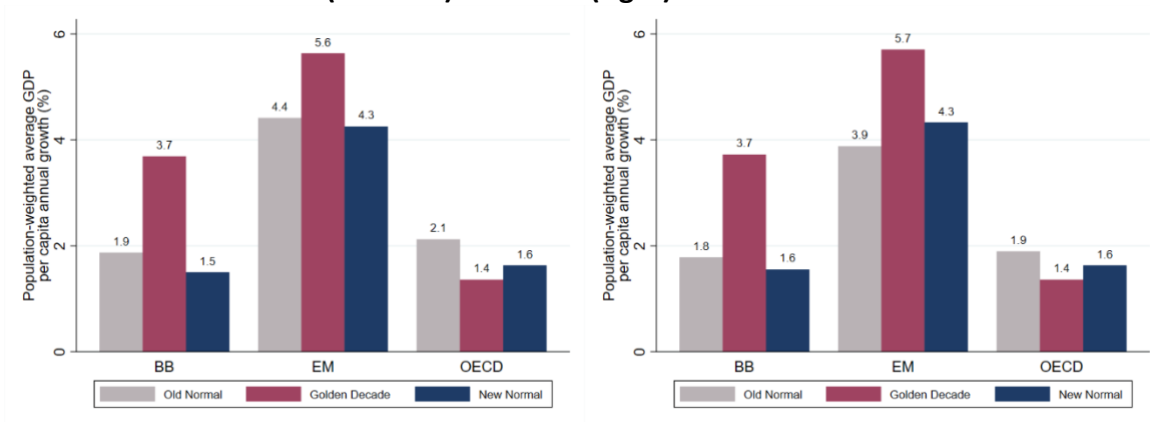
Panel a. Share of countries with less than 2 benchmark years of data

Panel b. Average benchmark years with non-missing data



Source: based on Lakner and Milanovic (2015) data.

Figure 24. GDP growth rates by decade, full global sample (left) and excluding countries not available in PovcalNet’s (now PIP) database (right)



Source: based on World Bank national accounts data.

5. Conclusions

Is there a convergence or divergence in global incomes? This question has sparked a heated debate among economists and carries significant implications for the world's poorest communities. If convergence is occurring, it suggests progress is being made, albeit with a potentially long journey ahead. In the extreme, a flurry of studies finding strong evidence for beta convergence can create a sense that policy *business-as-usual* will be sufficient.

We argue that this view is dangerously misguided. There are a significant number of countries, for shorthand The Bottom Billion, most of which remain in the ‘falling behind’ group. The reality in these countries, some of which have barely progressed in income per capita terms since the 1960s, is stark. Despite significant progress in economic transformation and poverty eradication among emerging market economies, particularly in Asia, a large group of lower income

countries continue to slip further behind and see the numbers of people living in extreme poverty rise.

Meanwhile global measures of income convergence paint a far rosier picture. Several studies have confirmed empirical evidence for unconditional economic convergence at the global level. We argue that such findings risk overshadowing the real story of persistent divergence faced by many of the world's poorest countries. We identify three common confusions emerging from the data when examining questions of convergence.

First, a focus on unconditional convergence tests can overlook important policy questions such as are countries likely to eradicate extreme poverty and catch up with the rest of the world or not? We may not learn as much as we think from tests for convergence, not least since we argue recent findings in favor of *unconditional beta convergence* can co-exist with the fact a significant group of countries are slipping ever further behind the rest of the world, and extreme poverty numbers are increasing rather than decreasing. Second, we find that average trends can both obscure and be distorted by underlying differences in country composition. In the extreme case, while fast-growing China was below global mean incomes between 2000 to 2020, it significantly boosted evidence for global convergence. Now that it has passed this threshold, the finding will likely reverse. Third, different availability of time periods and country coverage can distort and even bias empirical findings, especially where limited data availability is correlated with lower income and lower growth economies.

If incomes for many of the world's poorest countries and people are diverging, more drastic policy changes may be required. The situation could not be worse in 2023. On top of the commodity-price driven slowdown since 2015, the COVID-19 pandemic and now the Ukraine invasion cement the world into one of polycrisis. The countries of the Bottom Billion are not entering this period well-equipped to deal with the challenges and debt sustainability is once again top of policy makers' agendas.

The mismatch between the stark policy realities and the celebratory convergence estimates must be reconciled or else we risk slipping further into complacency, and the Bottom Billion slipping further behind the rest. Instead of using this insight to move the international development policy goalposts – such as revising the World Bank's twin goals, we argue it instead suggests that we should be focusing our efforts on those countries being left behind, in place of financing those that have escaped extreme poverty and have secured full access to international capital markets.

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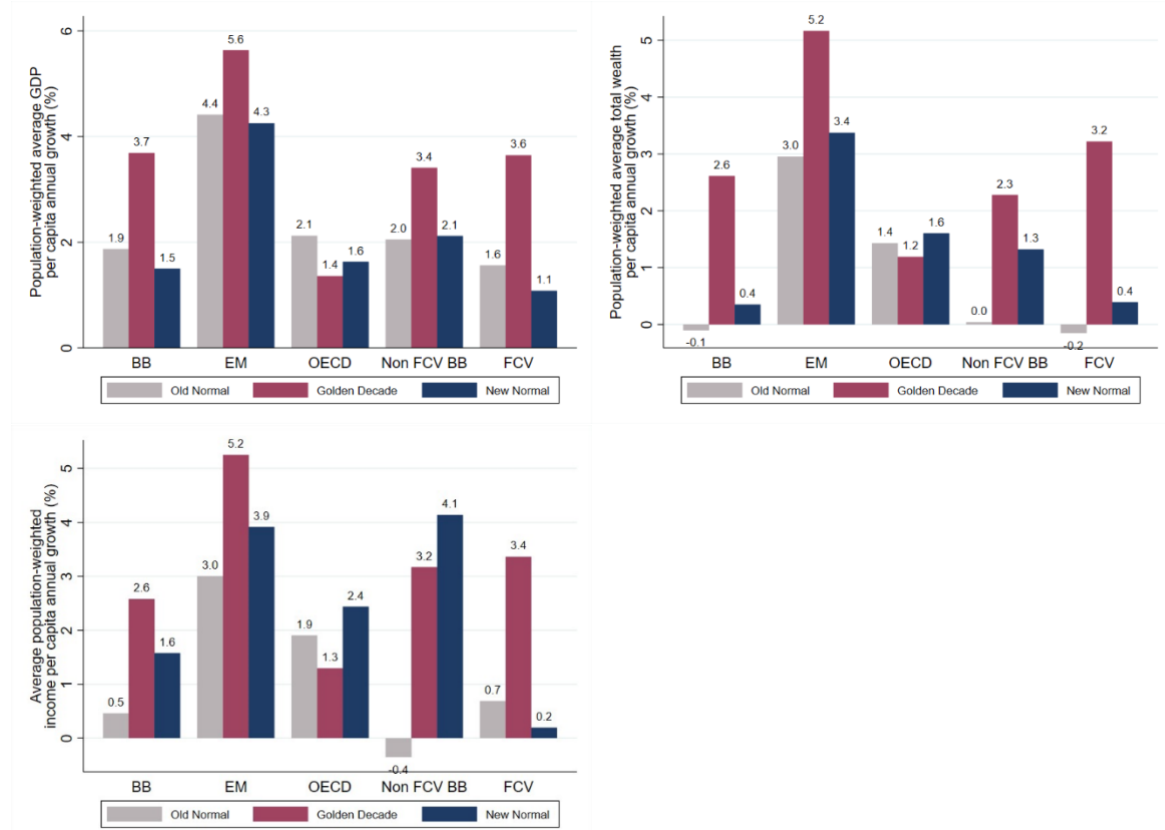
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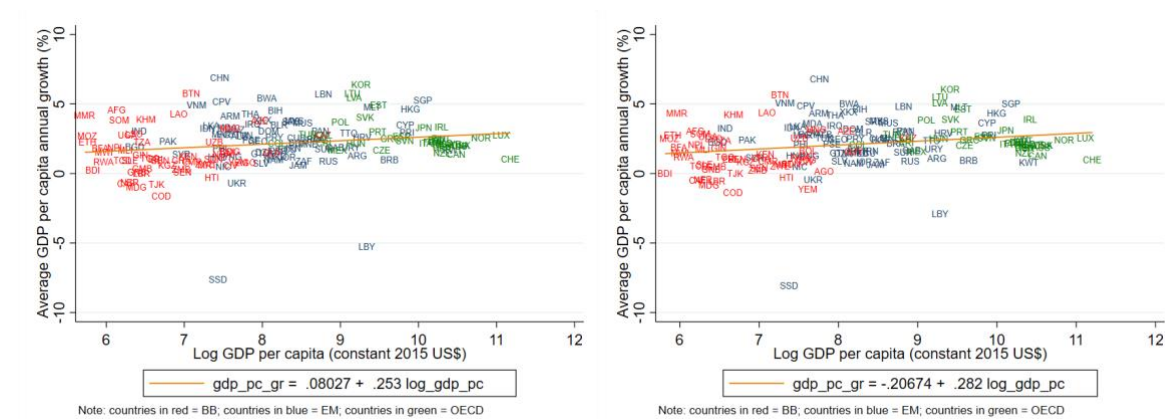
Appendix A – Extra Figures and Tables

Figure A.1. Population-weighted GDP, total wealth and income per capita growth including countries that are part of the World Bank's Fragility, Conflict and Violence (FCV) group.



Note: Income per capita is not available for all countries for the three periods. For example: the Old Normal income per capita growth estimates use only 13 of the 33 nonFCV-BB countries that have nonmissing data, where Kyrgyz Republic and Uzbekistan's income per capita had an estimated annual drop of -7 and -8 percent, respectively. Likewise, the New Normal income per capita growth estimates use only 10 of the 33 nonFCV-BB countries with nonmissing data, where Cote d'Ivoire, Benin and Togo had annual income per capita growth rates above 10 percent.

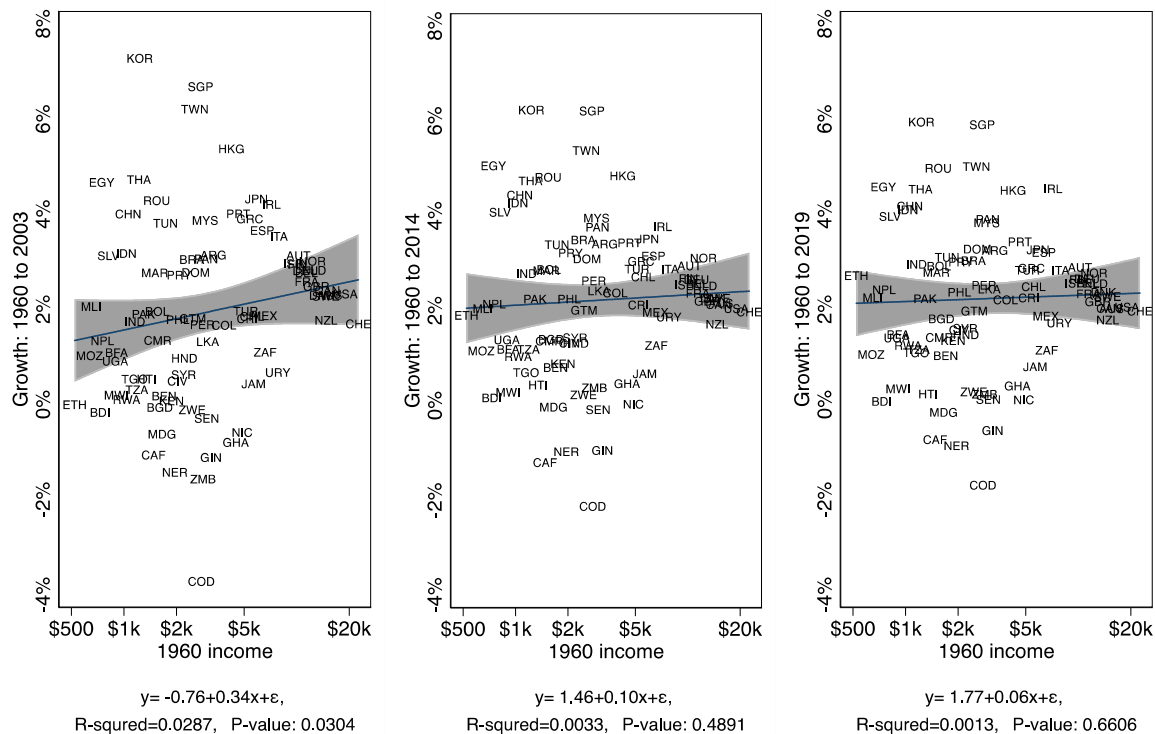
Figure A.2. GDP growth convergence 1960-2014 and 1960-2019



Note: the sample excludes countries with population less than 200,000, countries that ever-had natural resource rents above 75 percent of GDP, and years with growth rates above +/- 50 percent reported for Lebanon in 1989,

Bosnia and Herzegovina in the late 1990s, Equatorial Guinea in the late 1990s, Iraq in 1990 and 2004, and Libya in 2012. Source: based on World Bank national accounts data.

Figure A.3. The effect of growth during the Golden Decade offsets the divergence trend between 1960-2003

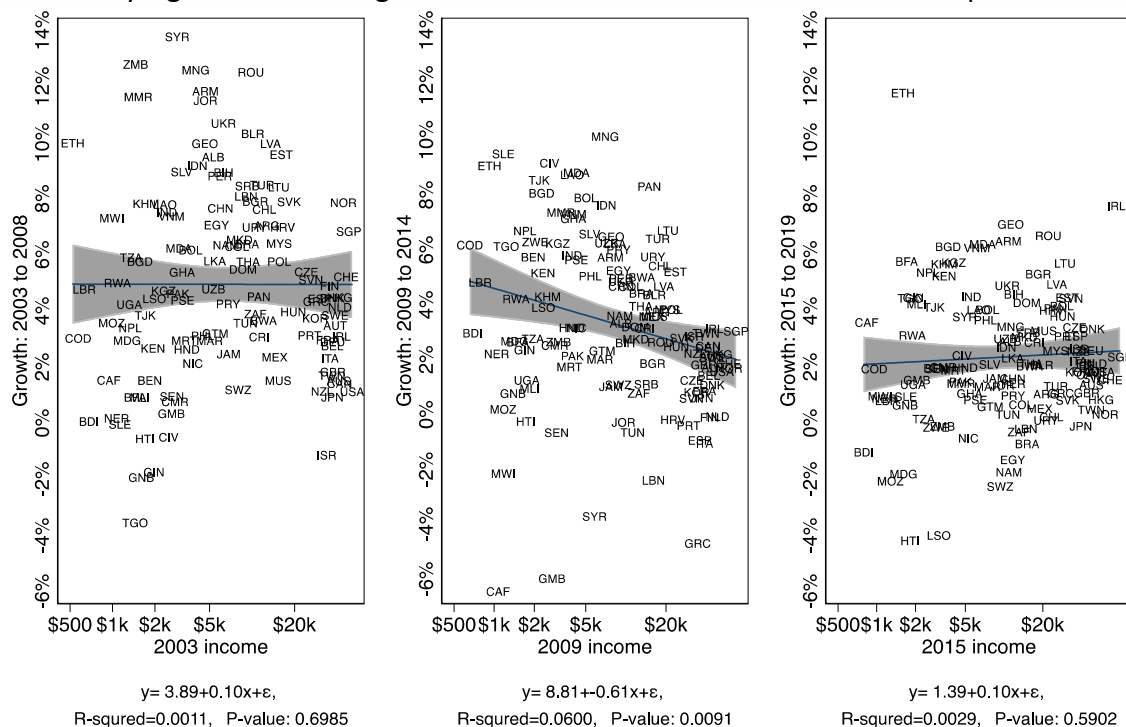


Source: based on Penn World Table version 10.0 data and Patel et al (2021) methodology. Note: The horizontal axis shows the natural log of real per capita GDP, and the vertical axis shows average annual real growth over the period listed. Shaded area represents a 95% confidence interval around the regression line. The sample excludes oil exporters and countries with populations under 1 million.

Figure A.3 compares beta convergence coefficients for growth periods that include the Old Normal, the Golden Decade and the New Normal. A negative beta convergence coefficient indicates that growth rates in poor countries are faster than in rich countries. A positive beta convergence coefficient indicates the opposite. Before the Golden Decade, for every 1 percent increase in world economies' income, we would have expected an increase of 0.34 percent of annual growth, statistically significant at 95 percent level. This was a signal of a diverging world economy, until the Golden Decade halted this trend of a positive long-term historical beta convergence coefficient since 1960, reducing it to about one third. However, this impetus was short-lived lasting only a few years, particularly between the 2008 financial crisis and the 2014 oil price crash. These five years are the only time since 1960 where we were able to see real statistically significant convergence between the rich and the poor. During this time the beta convergence coefficient reached a value of -0.6, which contrasts with the value of +0.1 during the years that preceded and followed the Golden Decade. Figure A.4 divides the post-Old

Normal times in periods of five years to show the years that pull the beta convergence coefficient down to a negative value.

Figure A.4. The Golden Decade was strong but short-lived: the beta convergence was statistically significant and negative between the financial crisis and the oil price crash.



Source: based on Penn World Table version 10.0 data and Patel et al (2021) methodology. Note: The horizontal axis shows the natural log of real per capita GDP, and the vertical axis shows average annual real growth over the period listed. Shaded area represents a 95% confidence interval around the regression line. The sample excludes oil exporters and countries with populations under 1 million.

Table A.1 BB countries and FCV classification

COUNTRY NAME	REGION NAME	INCOME LEVEL	POPULATION (MILLIONS)	SHARE IN WORLD'S POP	BB?	FCV?
MYANMAR	East Asia and Pacific	Lower middle income	54.2	0.683	BB	FCV
KOREA, DEM PEOPLE'S REP	East Asia and Pacific	Low income	26.1	0.329	BB	Non FCV
CAMBODIA	East Asia and Pacific	Lower middle income	16.8	0.212	BB	Non FCV
LAO PDR	East Asia and Pacific	Lower middle income	7.5	0.095	BB	FCV
MONGOLIA	East Asia and Pacific	Lower middle income	3.4	0.043	BB	Non FCV
UZBEKISTAN	Europe and Central Asia	Lower middle income	35.6	0.450	BB	Non FCV
KAZAKHSTAN	Europe and Central Asia	Upper middle income	19.6	0.248	BB	Non FCV
AZERBAIJAN	Europe and Central Asia	Upper middle income	10.1	0.128	BB	Non FCV

TAJIKISTAN	Europe and Central Asia	Lower middle income	10.0	0.126	BB	Non FCV
KYRGYZ REPUBLIC	Europe and Central Asia	Lower middle income	7.0	0.088	BB	Non FCV
TURKMENISTAN	Europe and Central Asia	Upper middle income	6.4	0.081	BB	Non FCV
BOLIVIA	Latin America and Caribbean	Lower middle income	12.2	0.154	BB	Non FCV
HAITI	Latin America and Caribbean	Lower middle income	11.6	0.146	BB	FCV
GUYANA	Latin America and Caribbean	High income	0.8	0.010	BB	Non FCV
YEMEN, REP	Middle East and North Africa	Low income	33.7	0.425	BB	FCV
DJIBOUTI	Middle East and North Africa	Lower middle income	1.1	0.014	BB	Non FCV
AFGHANISTAN	South Asia	Low income	41.1	0.519	BB	FCV
NEPAL	South Asia	Lower middle income	30.5	0.385	BB	Non FCV
BHUTAN	South Asia	Lower middle income	0.8	0.010	BB	Non FCV
MALDIVES	South Asia	Upper middle income	0.5	0.007	BB	Non FCV
NIGERIA	Sub-Saharan Africa	Lower middle income	218.5	2.757	BB	FCV
ETHIOPIA	Sub-Saharan Africa	Low income	123.4	1.556	BB	FCV
CONGO, DEM REP	Sub-Saharan Africa	Low income	99.0	1.249	BB	FCV
TANZANIA	Sub-Saharan Africa	Lower middle income	65.5	0.826	BB	Non FCV
KENYA	Sub-Saharan Africa	Lower middle income	54.0	0.681	BB	Non FCV
UGANDA	Sub-Saharan Africa	Low income	47.2	0.596	BB	Non FCV
SUDAN	Sub-Saharan Africa	Low income	46.9	0.591	BB	FCV
ANGOLA	Sub-Saharan Africa	Lower middle income	35.6	0.449	BB	Non FCV
GHANA	Sub-Saharan Africa	Lower middle income	33.5	0.422	BB	Non FCV
MOZAMBIQUE	Sub-Saharan Africa	Low income	33.0	0.416	BB	FCV
MADAGASCAR	Sub-Saharan Africa	Low income	29.6	0.374	BB	Non FCV
COTE D'IVOIRE	Sub-Saharan Africa	Lower middle income	28.2	0.355	BB	Non FCV
CAMEROON	Sub-Saharan Africa	Lower middle income	27.9	0.352	BB	FCV
NIGER	Sub-Saharan Africa	Low income	26.2	0.331	BB	FCV
BURKINA FASO	Sub-Saharan Africa	Low income	22.7	0.286	BB	FCV
MALI	Sub-Saharan Africa	Low income	22.6	0.285	BB	FCV
MALAWI	Sub-Saharan Africa	Low income	20.4	0.257	BB	Non FCV
ZAMBIA	Sub-Saharan Africa	Lower middle income	20.0	0.253	BB	Non FCV
CHAD	Sub-Saharan Africa	Low income	17.7	0.224	BB	FCV
SOMALIA	Sub-Saharan Africa	Low income	17.6	0.222	BB	FCV
SENEGAL	Sub-Saharan Africa	Lower middle income	17.3	0.218	BB	Non FCV
ZIMBABWE	Sub-Saharan Africa	Lower middle income	16.3	0.206	BB	FCV
GUINEA	Sub-Saharan Africa	Lower middle income	13.9	0.175	BB	Non FCV
RWANDA	Sub-Saharan Africa	Low income	13.8	0.174	BB	Non FCV
BENIN	Sub-Saharan Africa	Lower middle income	13.4	0.168	BB	Non FCV
BURUNDI	Sub-Saharan Africa	Low income	12.9	0.163	BB	FCV
TOGO	Sub-Saharan Africa	Low income	8.8	0.112	BB	Non FCV
SIERRA LEONE	Sub-Saharan Africa	Low income	8.6	0.109	BB	Non FCV
CONGO, REP	Sub-Saharan Africa	Lower middle income	6.0	0.075	BB	FCV
CENTRAL AFRICAN REPUBLIC	Sub-Saharan Africa	Low income	5.6	0.070	BB	FCV
LIBERIA	Sub-Saharan Africa	Low income	5.3	0.067	BB	FCV

MAURITANIA	Sub-Saharan Africa	Lower middle income	4.7	0.060	BB	Non FCV
ERITREA	Sub-Saharan Africa	Low income	3.7	0.046	BB	FCV
GAMBIA, THE	Sub-Saharan Africa	Low income	2.7	0.034	BB	FCV
LESOTHO	Sub-Saharan Africa	Lower middle income	2.3	0.029	BB	Non FCV
GUINEA-BISSAU	Sub-Saharan Africa	Low income	2.1	0.027	BB	FCV
EQUATORIAL GUINEA	Sub-Saharan Africa	Upper middle income	1.7	0.021	BB	Non FCV
COMOROS	Sub-Saharan Africa	Lower middle income	0.8	0.011	BB	FCV

Table A.2. FCV countries that are not BB countries

COUNTRY NAME	REGION NAME	INCOME LEVEL	POPULATION (MILLIONS)	SHARE IN WORLD'S POP	BB?	FCV?
PAPUA NEW GUINEA	East Asia and Pacific	Lower middle income	10.1	0.128	NO	FCV
TIMOR-LESTE	East Asia and Pacific	Lower middle income	1.3	0.017	NO	FCV
SOLOMON ISLANDS	East Asia and Pacific	Lower middle income	0.7	0.009	NO	FCV
MICRONESIA, FED STS	East Asia and Pacific	Lower middle income	0.1	0.001	NO	FCV
MARSHALL ISLANDS	East Asia and Pacific	Upper middle income	0.0	0.001	NO	FCV
TUVALU	East Asia and Pacific	Upper middle income	0.0	0.000	NO	FCV
KOSOVO	Europe and Central Asia	Upper middle income	1.8	0.022	NO	FCV
VENEZUELA, RB	Latin America and Caribbean	Not classified	28.3	0.357	NO	FCV
IRAQ	Middle East and North Africa	Upper middle income	44.5	0.561	NO	FCV
SYRIAN ARAB REPUBLIC	Middle East and North Africa	Low income	22.1	0.279	NO	FCV
LIBYA	Middle East and North Africa	Upper middle income	6.8	0.086	NO	FCV
LEBANON	Middle East and North Africa	Lower middle income	5.5	0.069	NO	FCV
SOUTH SUDAN	Sub-Saharan Africa	Low income	10.9	0.138	NO	FCV

Appendix B Asset accumulation and depletion

Differences in rates of economic growth between the bottom billion countries and faster growing peers can clearly illustrate the continued divergence once we account for the most recent post-2014 period. However, GDP per capita is not the whole story. While GDP is a great indicator for tracking year-to-year changes, and as a flow measure it can be sensitive to annual economic dynamics, any household knows it is not just the annual income that matters but also the durable assets, or wealth, they hold. For households this might span housing, vehicles, livestock, life savings and even the training and skills they possess that drive their future earning potential. For a country it similarly spans the stock of building, education and health of the population encapsulated by human capital, plus the agricultural and natural capital potential of the country, including its fish, forests and even tourism value of its nature.

The Changing Wealth of Nations 2021 report provides a measure of the stock of national wealth that will enable economies to maintain and increase their growth in the long run. In addition to GDP, the measure of change in wealth per capita over time is an important indicator to consider, because it provides an actionable way to track sustainability (World Bank 2021).

When we consider stocks rather than flows, wealth rather than income, the picture is even more stark. Consider, for example, the value of the bottom billion countries' assets that generate income and support of well-being.

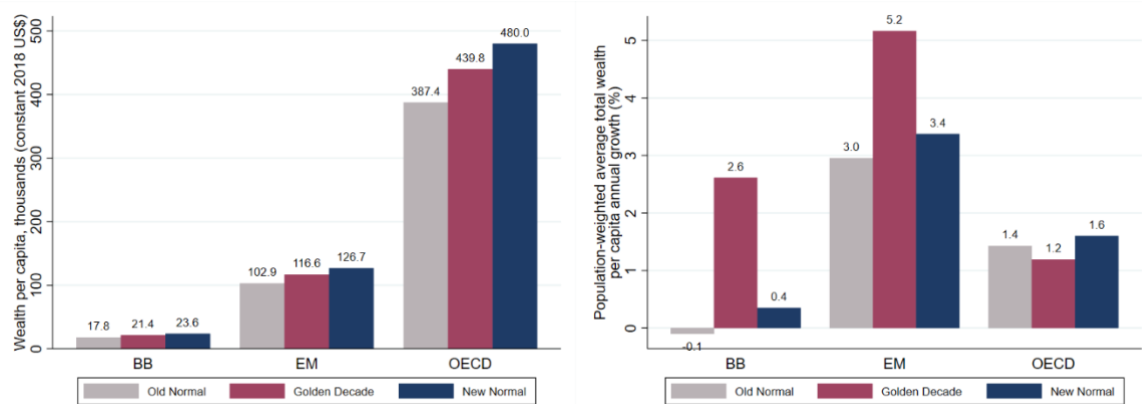
The report's estimates show that although global total wealth per capita increased between 1995 and 2018, there are many countries where one or more of its main wealth components – natural, produced, or human capital – have declined. This has created an unsustainable development path that compromises these countries' future growth. This decline has been driven by a lack of investment in their productive and human capital, often accompanied by rapid depletion of natural capital stocks such as oil and minerals. For example, in the past two decades, Burundi and Zimbabwe's total wealth per capita has dropped by about 31 and 20 percent, respectively, mainly driven by the depletion of their natural assets. They have lost about 66 and 32 percent of their 1995 natural capital value, despite having more than doubled the value of their natural resource exports during the Golden Decade.

During the Old Normal, the bottom billion was losing on average 0.1% of their total wealth each year, while the OECD countries and emerging markets were growing at positive rates. But during the Golden Decade, the trend in the bottom billion shifted and its average wealth per capita grew even faster than the OECD group average. However, this was not enough to reach the average wealth accumulation rate that was occurring in the rest of the world (Figure B.1).

Some countries, especially resource-rich ones like Azerbaijan, saw an impressive average annual total wealth growth of 8 percent during this decade. For others the same acceleration failed to materialize. Despite the mineral and hydrocarbon abundance of Côte d'Ivoire, its total wealth grew each year on average less than 1 percent during the Golden Decade.

Unfortunately, when the Golden Decade came to an end, the bottom billion fell back to almost zero wealth per capita average growth during the New Normal, a minuscule growth rate compared to the OECD and emerging markets averages of 1.6 and 3.4 percent, respectively. And far from the rates needed to secure convergence in wealth. Lack of convergence is therefore seen clearly not just in the GDP rates but also in the collapse in wealth growth after the end of the Golden Decade.

Figure B.1. Rapid wealth accumulation during the Golden Decade ended in the New Normal, ceasing the catching up trend from previous years.



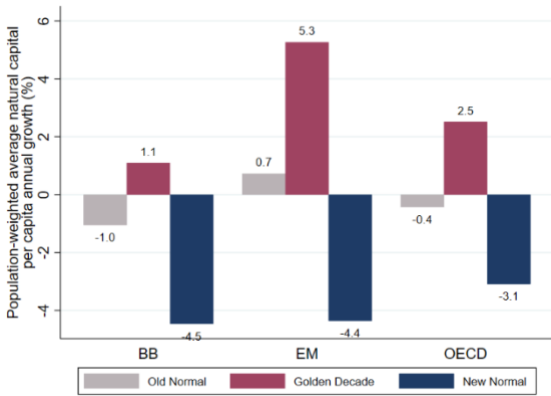
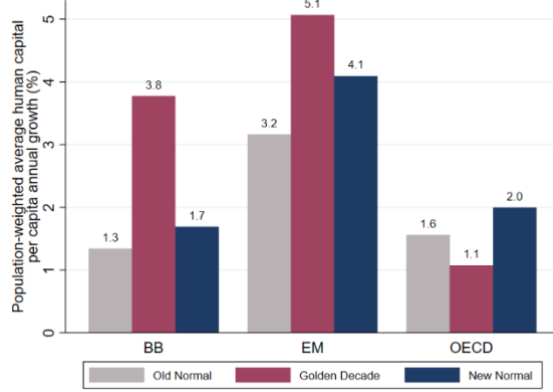
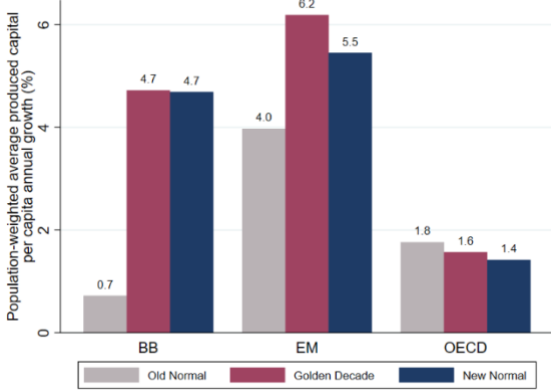
Source: based on The Changing Wealth of Nations 2021

To better understand what is driving the headline changes in total wealth per capita for each group, we need to examine the performance of its main wealth components – human, produced and natural capital.

Human capital, measured as the expected value of a person’s lifetime earnings and that increases in value with quality jobs, good salaries, education, and health infrastructure, takes the largest share of the global total wealth. More abundant revenues, inward investment and improving terms of trade all helped the bottom billion to build its human capital per capita faster during the Golden Decade but fell back to Old Normal rates and below the other groups’ growth rates when this decade ended. Physical capital growth also accelerated during the Golden Decade which endured even during the New Normal.

However, the main impact to total wealth during the New Normal derived from the collapse of the value of natural capital, which is largely the result of the deterioration in commodity prices and in some cases mismanagement or degradation of their fertile land, fisheries, and forests. This impact was hardest felt in countries that heavily rely on revenues from these commodities, of which a disproportionate share is found in the bottom billion. Figure B.2 shows the different annual growth rates of human, physical, and natural capital per capita across these decades.

Figure B.2 The bottom billion has prioritized the accumulation of produced capital, but at the expense of the growth of its human and natural capital.



Source: based on The Changing Wealth of Nations 2021