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The BRICs 10 Years On: Halfway Through The Great Transformation

- We have updated our long-term growth projections, improving our underlying framework and expanding coverage to over 70 countries.
- The BRICs are still set to join the largest economies in the world.
- The N-11 and other EM should also become significant global players.
- While the rise in the BRICs and EM share of the world economy still has a long way to run...
- ...the biggest changes in their contribution to global growth have largely already occurred.
- The weight of low-income countries in overall spending (part of the world economy's 'Expanding Middle') should continue to increase.
- The next decade may be a peak period for global growth potential...
-but with slower potential growth within the BRICs, much of EM and developed markets over the next decade than in the last one, we may see more tensions between global and national perspectives.

Important disclosures appear at the back of this document

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The BRICs 10 Years On: Halfway Through the Great Transformation

I. The Great Transformation 10 Years On

Ten years ago, Jim O’Neill¹, then our Head of Economic Research, coined the term BRICs and in 2003 we made our first detailed projections of how the rise of the BRICs might shape the world economy. At the time, we described what we thought would be a tectonic shift as the influence of the BRICs and other large emerging economies grew and ultimately outran the major developed countries.

We have conducted a comprehensive review of our BRICs projections...

The changes in the world that we have discussed since 2001 have been a powerful influence on the way we have seen the global economy and global markets over the past 10 years. Over that period, the rise of the BRICs and the emerging world has been one of the defining stories of the era. Their economic weight and growth contributions have risen sharply, and their equity markets have outperformed substantially.

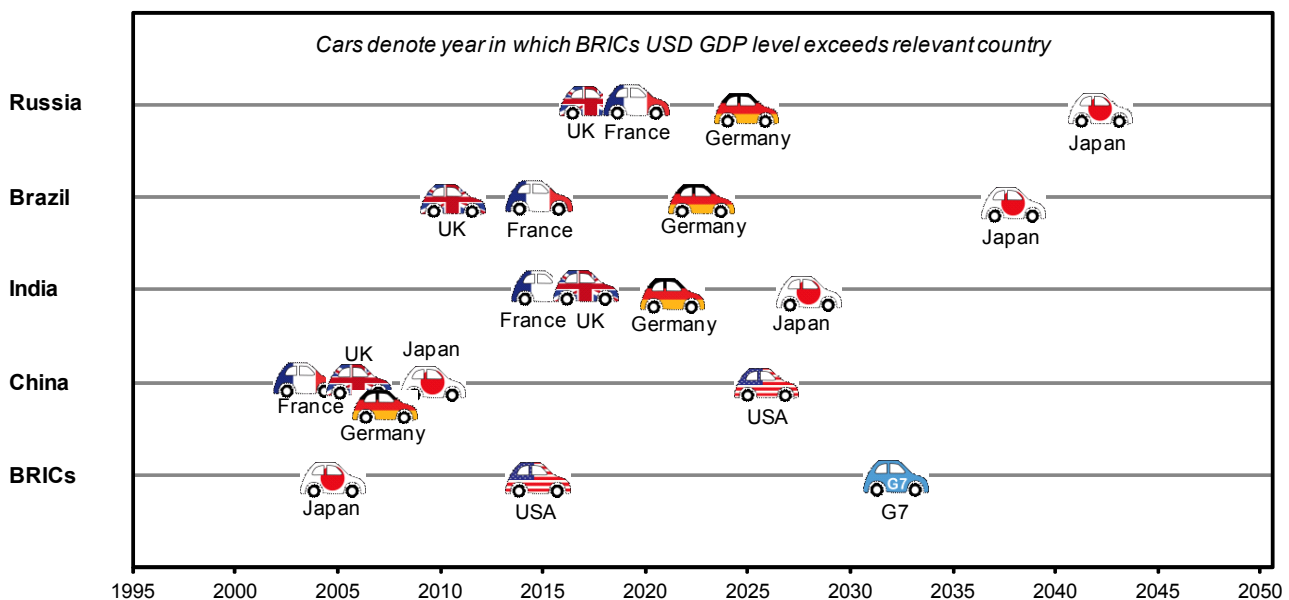
Since then, we have produced a variety of research describing different aspects of this ‘Great Transformation’ of the world economy—a long shift in economic weight and the engines of growth towards the BRICs and the emerging markets (EM). As part of that process, we have regularly updated and upgraded our projections, expanding the number of countries we cover and refining the way in which we model the growth process while preserving its essential elements.

Ten years on, we have conducted a comprehensive review of that procedure, challenging each of the assumptions that have underpinned our basic approach and making important further improvements. Our latest set of projections apply for the first time a completely unified framework across more than 70 countries globally, allowing us to tell an integrated story not just of the BRICs, the N-11 (the next 11 emerging economies) and the major developed economies, but of around 90% of current world GDP.

...extending our framework to include around 90% of current world GDP

Countries

Chart 1: BRICs Overtake Major DMs



Source: GS Global ECS Research

1. Former Head of GS Economic Research Jim O’Neill, who coined the term BRICs 10 years ago, is now Chairman of Goldman Sachs Asset Management.

Looking forward with our new set of projections, the main features of the original BRICs story are still clear to see. We continue to see scope for the BRICs to join the largest economies in the world, rivalled only by the US, the Euro area and perhaps Japan. With many of the N-11 becoming significant global players, the trend of a larger role for other EM economies in global growth and global activity is set to continue as well. In the process, the growing weight of middle-income countries in overall spending (part of the world economy’s ‘Expanding Middle’) is also likely to continue.

We still see scope for the BRICs to join the largest economies in the world

But what also stands out in this new snapshot is the exceptional nature of the past 10 years. The world’s centre of economic gravity will continue to move in favour of the BRICs—and significantly so. But the Great Transformation of the global economy that GS Economics first described a decade ago now appears to be more than halfway complete—and, on some measures, has progressed even further. In particular, while the rise in the BRICs and EM share of the world economy still has a long way to run, the biggest changes in their contribution to *growth* has largely occurred. So investors may need to look deeper under the surface of the macro landscape and discriminate more if they are to earn above-average returns from understanding this dynamic.

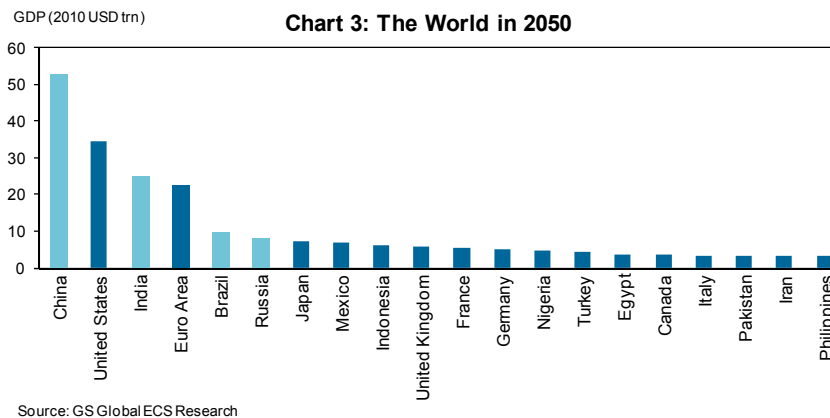
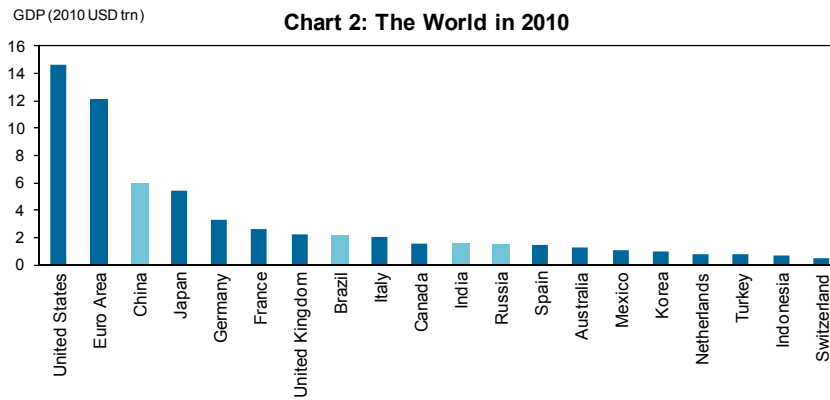
But the Great Transformation of the global economy now appears to be halfway complete

II. Five Big Themes for the Global Landscape

Our initial work on the BRICs aimed to describe a dramatic shift in the world economy’s centre of gravity that we thought was beginning to occur. As we said at the time:

“The relative importance of the BRICs as an engine of new demand growth and spending power may shift more dramatically and quickly than many expect. Higher growth in these economies could offset the impact of graying populations and slower growth in today’s advanced economies.”²

Charts 2-3: BRICs Still Dominate the Global Landscape in 2050



2. ‘Dreaming with BRICs: The Path to 2050’, *Global Economics Paper No. 99*, October 1, 2003.

Since then, as we have documented, that shift has not only occurred more dramatically than most people expected, it has occurred even more quickly than we had envisaged in our original projections. The global financial crisis, far from undermining that story, has if anything reinforced it.

We have expanded the initial projections in scope and breadth over the last decade, moving beyond the BRICs to the N-11. We are now at a point where we can offer a consistent set of projections for the bulk of the world economy (approximately 70 countries spanning the DM and EM world, and all the main geographic areas). The dangers of projecting far into the future are as large as they always were. But despite these risks, we remain deeply convinced of the value of pinning down the main drivers of growth, aggregating across countries and following the answers we get to their logical conclusions. We still think of this less as a forecast and more as a method of uncovering broad global dynamics, the likely constraints that they may run up against and their implications.

Given the level of detail we now have, we save some of the specifics of our new global projections for subsequent sections (and the Appendix has even more for the true aficionados). But taken together, they point to five major themes for the global landscape:

■ **Theme #1: At least halfway through the ‘Great Transformation’.** The big story of our initial BRICs analysis was that we were standing on the doorstep of a massive transformation of the importance of the large EM countries to the global economy. In the decade since then, the world has been through a remarkable shift. The BRICs have moved from 11% of GDP (about 30% for broad EM) in 1990 to around 25% (50% for broad EM) currently. By 2050, we expect the BRICs to have reached close to 40% of global GDP and broad EM to reach 73%. So, on that measure, the Great Transformation is only halfway done. In terms of contributions to growth, however, the change has been more rapid. Over the past decade, the BRICs have contributed close to half of the world’s growth and EM more than 70%. This is more than double the BRICs’ contribution in the 1990s (23%) and the 1980s (18%), with a similar shift in the broad EM contribution too. This contribution is likely to hold at high levels for the BRICs and increase somewhat further for EM as a whole. But in terms of growth contributions, or more simply in terms of the role of the BRICs in driving global growth, the most dramatic change is behind us.

We see five major themes for the global landscape

Theme 1: The most dramatic change is behind us in terms of the role of the BRICs in driving global growth

Chart 4: The Share of BRICs in Global Output Poised to Double from Here...

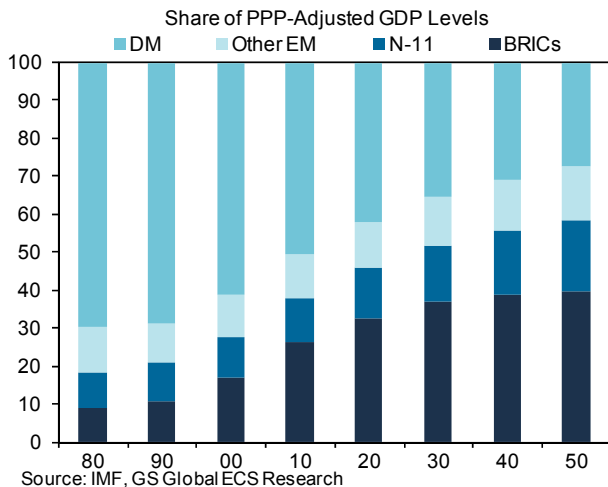
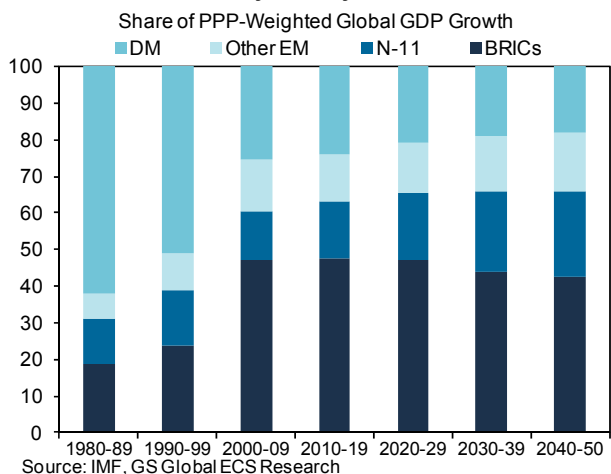
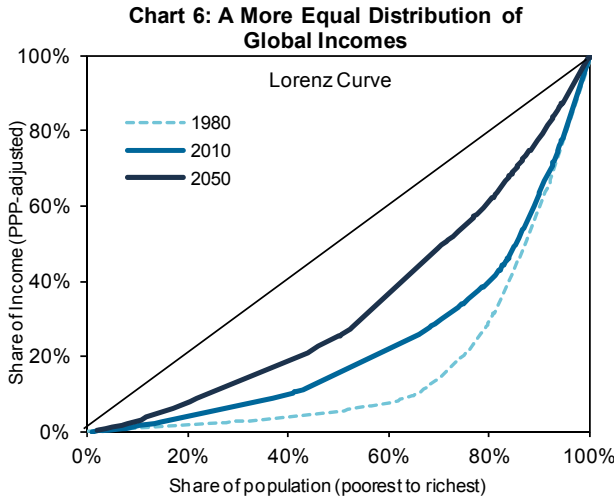
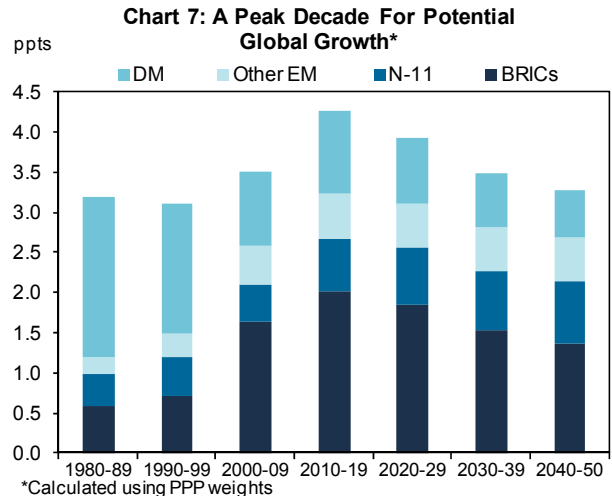


Chart 5: ...But Their Contribution to Global Growth May Already Have Peaked





Source: GS Global ECS Research



Source: IMF, GS Global ECS Research

■ **Theme #2: The increasing importance of EM outside the BRICs.** The BRICs are still set on our new projections to be among the very largest of the world’s economies: our 2050 projections still see all four potentially among the top five economies in the world. But in terms of contributions to growth, the bigger changes may now occur elsewhere. While the shift in the BRICs’ contribution to global growth is unlikely to increase much further, there is more potential for other EM economies—the N-11 and beyond—to increase their role. Further progress there will depend on sustaining improvements in their growth conditions, but our projections show the scope for the growth contribution of non-BRICs EM economies rising from 27% over the recent decade to about 40% by 2050.

Theme 2: More potential for other EM economies

■ **Theme #3: A further rise in the ‘Expanding Middle’.** Linked to the increasing importance of the BRICs and broad EM, in 2008 we showed that despite the rise in inequality *within* some countries, income inequality *between* countries has been declining, and the spread of income across countries was also becoming more equal as the number of people entering the global middle class expanded rapidly. This story of the ‘Expanding Middle’ is likely to continue and remains firmly intact in the new projections. As a result of the continued shift in the economic weight of the BRICs and other EM economies, we see a steady rise in the share of income of the middle-income economies. Understanding changing global spending patterns from the ‘Expanding Middle’ will thus remain a critical issue.

Theme 3: A steady rise in the share of income of the middle-income economies

■ **Theme #4: A peak decade ahead for global growth potential.** Our global projections show that the next decade is likely to be a peak period for global growth, as long as actual demand tracks *potential*. As the faster-growing BRICs and N-11 continue to increase their share of global activity, our projections are for world growth to average around 4.3%, well above the average of the last decade or the previous one. Beyond that, global growth should slow gradually by decade as demographics and diminishing returns outweigh the continuing rise in the EM share of overall activity. Strong underlying potential for global growth means that commodity pressures are also unlikely to disappear soon.

Theme 4: Next decade likely to see a peak in global growth

■ **Theme #5: More tension between global and national perspectives.** Part of the difficult arithmetic of a rising weight for the large EM economies is that the global picture may on some fronts look better than the national pictures that make up the whole. The story of global inequality is one version of that tension. Inequality has been rising *within* many countries—both in the developed and emerging world—even as the rise in average incomes in the EM narrows inequality *globally*. The strength of global

growth over the next decade is also largely the result of the increasing weight of the high-growth economies, *not* because of higher growth within any of the major groups. In fact, our projections envisage that potential growth within the BRICs, broad EM and developed markets will likely be constant or slower over the next decade than in the last one. This means that those who have a global perspective or the ability to benefit from shifting sources of global growth are likely to see the outlook as more positive than those who do not. And because politics is primarily nationally determined, the tensions from the ongoing transformation of global growth are likely to be larger than the aggregates might suggest.

Theme 5: Tensions from the ongoing transformation are likely to be larger than the aggregates suggest

III. A (More) Unified Framework for Projecting Growth

We continue to use the same simple but powerful model for economic growth in our projections that we first introduced in 2003. In this model, GDP growth is a function of growth in the labour force, the accumulation of capital through investment and technical progress (or total-factor productivity growth). In addition to this growth process, we project that less developed countries can grow richer in part as their exchange rates appreciate towards purchasing power parity (PPP) levels.

Over time, we have refined the details of each of these channels, without changing the basic elements. As part of our new projections, we have made some important further changes to the modelling of the individual components, which we believe make the model more internally consistent, and the projections more intuitive and empirically plausible. We have also applied the full model for the first time to *all* countries, both developed and developing (where before we had used a simplified model for the DM universe). This introduces more country-specific variation in the DM projections and increases the internal consistency of the model. The Appendix provides further detail, including our country-level projections, but the main components are:

More country-specific variation in our DM projections increases the internal consistency of our model

- **Labour Force Growth.** We continue to use the United Nations' projections for growth in the working age population (those aged 15-64) as an approximation for labour force growth. This implicitly assumes that participation rates remain constant over time. We investigated alternative assumptions but found no compelling reason to change.
- **Capital Accumulation.** Previously, we assumed that each country began with a capital stock proportional to output and that each country invested at a constant rate over time. Now we explicitly calculate country-specific initial capital stock levels and model each country's investment rate as a function of demographics and its own history, which—more realistically—allows for investment rates to vary over time.
- **Technical Progress.** We model technical progress (or total-factor productivity (TFP) growth) as a process of catch-up or convergence to the technological frontier, which we assume to be the US. For each country, the convergence process is modelled as a combination of *potential* and *conditions*. The *potential* for catch-up growth is a decreasing function of income levels, while the *conditions* necessary for achieving this potential are captured by our Growth Environment Score (GES) framework, which incorporates the economic, political and social factors empirically linked to growth performance. We implement this framework in a more systematic way than before and, by linking the GES to its past relationship with income, we calculate a more consistent path for each country's convergence speed.
- **Exchange Rate Trends.** We continue to model real exchange rates as a function of relative productivity growth differentials (the Balassa-Samuelson effect) but we now also take account of a country's deviation from PPP at the starting point. In our updated model, a country's real exchange rate path is

determined by two processes: (1) convergence towards its PPP equilibrium rate as it grows richer and (2) convergence towards the ‘normal’ deviation from PPP for a given relative income level (based on the historical and cross-sectional data). This modification limits the possibility that our exchange rate projections substantially overshoot PPP and shifts the projections further in the direction of having more of the growth in USD-denominated GDP stem from real growth and less from real currency appreciation.

IV. The Great Transformation in ‘Levels’: Halfway House

The main message from our revamped growth projections, even with all the methodological improvements, is still largely the same as the original—the BRICs (but also the larger EM economies) are on their way to becoming a dramatically larger force in the global economy. The first BRIC projections envisaged a long process by which the share of global GDP would move steadily towards the BRICs and the other large EM; their incomes would converge slowly on the major markets; and the distribution of global income would shift towards this growing group of ‘middle-income’ economies and away from the most developed countries. Those main features are still intact.

Main features of our original BRICs projections are still intact...

GDP levels: The same story of ‘overtaking’

In level terms, the results of our projections are as striking as when we presented them around a decade ago. The BRICs economies are projected to make up four of the five largest economies in the world by 2050 when measured in US Dollar terms, joined only by the US in second place. China was already in second place in 2010, but Brazil is projected to move from 7th place in 2010 to 4th place in 2050, Russia from 11th to 5th place and India from 10th place to 3rd place. On these revised projections, we would expect the Chinese economy to surpass the US in 2026, and the BRICs together to surpass the US in 2015 and the G7 in 2032.

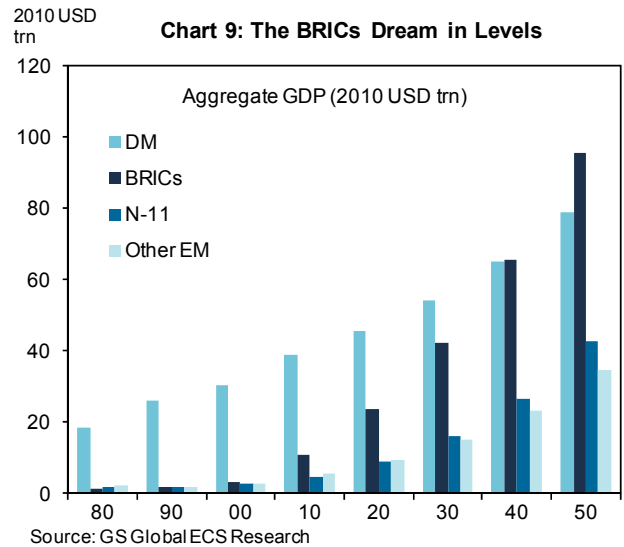
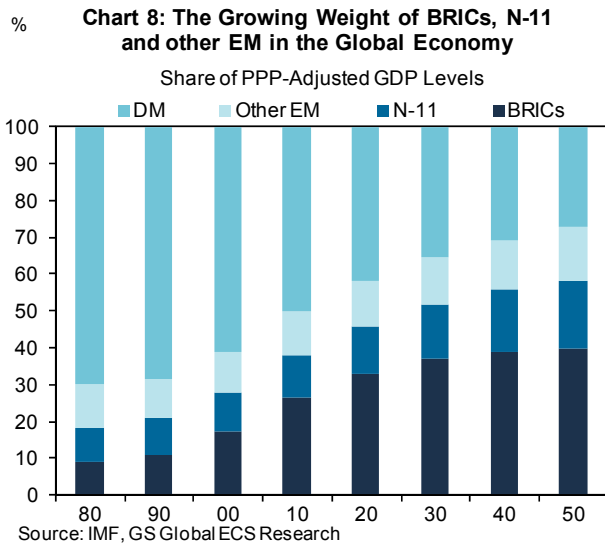
...with a continued shift in the share of global activity towards the BRICs and EM

This trajectory implies a continuation of the shift in the share of global activity towards the BRICs and the EM universe that began in earnest a little more than 10 years ago. The BRICs economies accounted for about 10% of global GDP (PPP-weighted) in the 1980s and 1990s. This has risen to around 25% of global activity by 2010, and by 2050 we project this share to nearly double to about 40%. From this perspective, our projections imply that the Great Transformation in terms of GDP levels is more than halfway done (*Theme 1* above).

Table 1: BRICs Move Up USD-denominated GDP Rankings

	1980	2000	2010	2050*
1	United States	United States	United States	China
2	Japan	Japan	China	United States
3	Germany	Germany	Japan	India
4	France	United Kingdom	Germany	Brazil
5	United Kingdom	France	France	Russia
6	Italy	China	United Kingdom	Japan
7	Canada	Italy	Brazil	Mexico
8	Mexico	Canada	Italy	Indonesia
9	Spain	Mexico	Canada	United Kingdom
10	Argentina	Brazil	India	France
11	China	Spain	Russia	Germany
12	India	Korea	Spain	Nigeria
13	Netherlands	India	Australia	Turkey
14	Australia	Australia	Mexico	Egypt
15	Saudi Arabia	Netherlands	Korea	Canada
16	Brazil	Argentina	Netherlands	Italy
17	Sweden	Turkey	Turkey	Pakistan
18	Belgium	Russia	Indonesia	Iran
19	Switzerland	Switzerland	Switzerland	Philippines
20	Indonesia	Sweden	Poland	Spain

*projections; Source: GS Global ECS Research



One of the advantages of constructing a consistent set of long-term projections for the bulk of the global economy is that it highlights the growing role of EM countries beyond the BRICs. This includes the N-11 countries and many others, such as South Africa, Argentina, Thailand, Malaysia, Poland, Colombia and Saudi Arabia. While the BRICs, the N-11 and other EM each accounted for a similar proportion of global GDP back in 1990, the past two decades have been primarily a BRICs story, with the other two groups seeing their shares increase only marginally. But looking ahead to 2050, our new projections imply a larger role for the N-11 and other EM, whose share could rise significantly. At around 30% of the global economy combined in 2050, they would be shy of the BRICs but roughly equal to the developed markets (*Theme 2* above).

But our new projections imply a larger role for the N-11 and other EM

Incomes: Slow, but steady progress

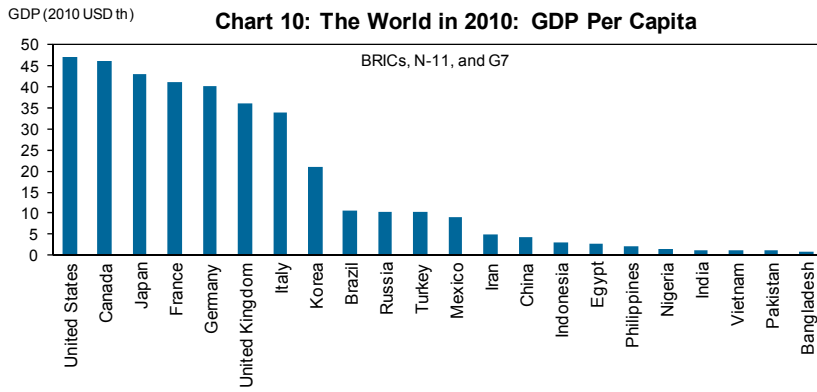
While the BRICs economies dominate rankings by absolute GDP levels and growth rates as we look ahead in the decades to 2050, we expect them to continue to lag behind in GDP per capita terms. Income per capita is expected to rise significantly across the BRICs. For example, according to our projections, by 2050 USD-denominated per capita GDP in Russia and Brazil could increase sixfold and fourfold, respectively, from 2010 levels; in China and India, the increase is nine times and 12 times, respectively. But despite these large increases, per capita GDP in these economies will remain just a fraction of US per capita GDP in 2050, whether measured in USD or PPP terms. This underscores the point we also emphasised in our very first BRICs projections: the process of income convergence takes a long time.

BRICs economies to continue to lag the advanced economies in GDP per capita terms

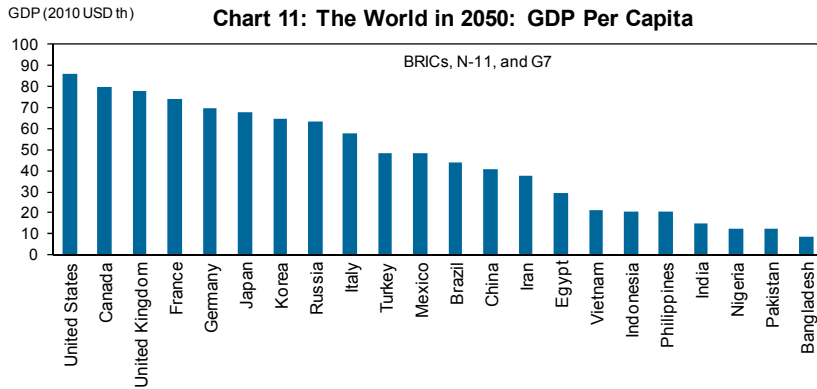
It also speaks to the imperative for the BRICs and the broader EM world to sustain their recent better growth experience. After all, from the perspective of the wellbeing of local population, increases in income per capita are more relevant than the aggregate income level, since it tends to be correlated with standards of living across a broad set of dimensions—health, education, individual freedoms and so on.

The ‘Expanding Middle’ begins to takes shape

The notion that the largest economies will no longer be the richest economies has also been a central part of our BRICs projections from the beginning. As we elaborated in 2008, one of the big stories from a consistent set of global income projections is that of convergence and narrowing inequality *across* the world, even as inequality has been rising *within* countries. This is part of a broader phenomenon that we have called the ‘Expanding Middle’: the notion that the global distribution of income is becoming narrower both across



Source: IMF, GS Global ECS Research



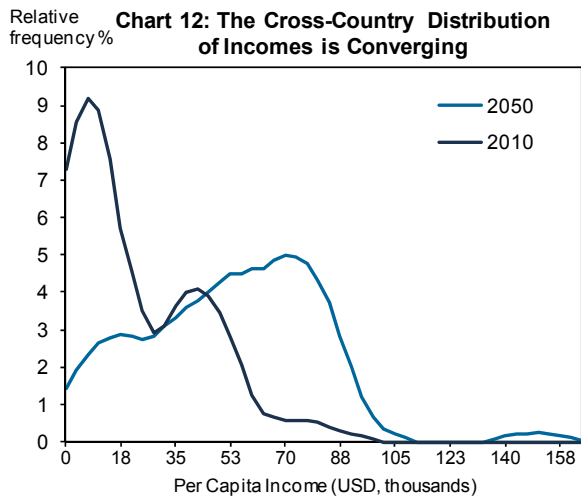
Source: GS Global ECS Research

countries and across people because some of the large-population countries are moving from low-income to middle-income status.

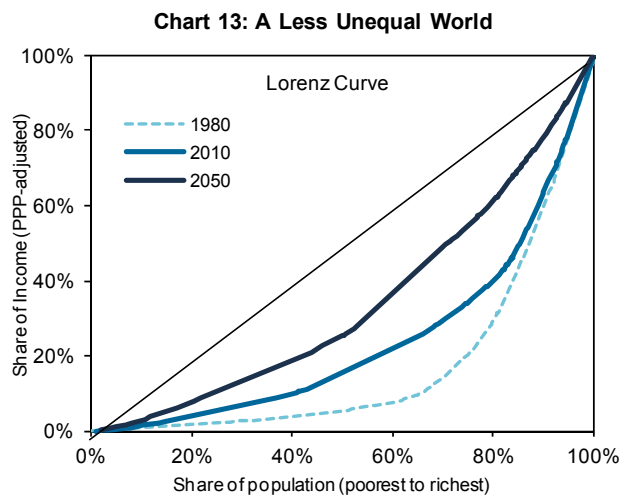
That story also remains firmly intact in the new projections (*Theme 3* above). Measured across countries, the world is likely to move from a twin-peaked-style distribution, with countries clustered around high and low per capita GDP levels, to a more single-peaked distribution, as not only the BRICs but also the N-11 and other emerging markets move up the income scale (Chart 12).

The story of an ‘Expanding Middle’ also remains intact

The same is true in terms of the distribution of *people* not just *countries*. Based on our projections, we can rank countries by their per capita GDP and the share of actual GDP that they account for, mapping out the share of global GDP accounted for by the share of population of countries as we move from poorest to richest. Economists call this a ‘Lorenz curve’, and the more ‘bowed’ the



Source: GS Global ECS Research



Source: GS Global ECS Research

curve is, the more unequal the distribution. At 2010 levels, the Lorenz curve is bowed outwards as a group of rich countries account for a major part of global GDP. But our projections continue to show this distribution changing substantially over time, with the curve becoming significantly less arched in 2050 on our projections, as a growing group of middle-income countries account for a much larger share of global GDP. Again, the chart shows that there has been significant progress in this direction already in the last decade or two. So the distribution of average per capita incomes across countries has become more equal and, as we showed in *Global Economics Paper 170: The Expanding Middle: The Exploding World Middle Class and Falling Global Inequality*, July 2008, this narrowing of average per capita incomes across countries has dominated any increase in income inequality within countries, so the global distribution of income across people has become more equal too.

A growing group of middle-income countries account for a much larger share of global GDP

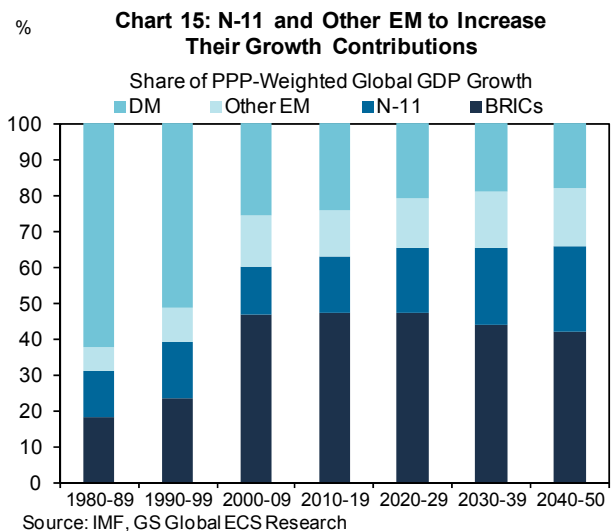
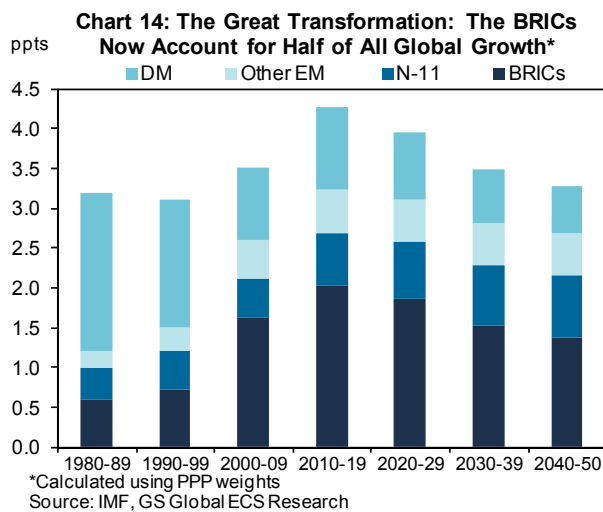
V. The Great Transformation in Growth: More Past than Future

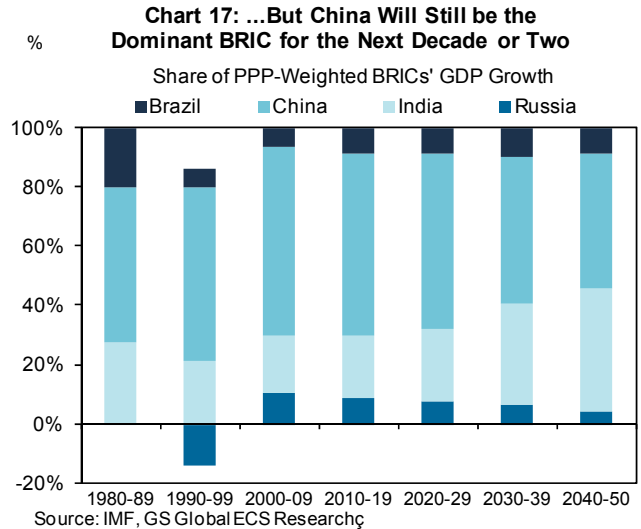
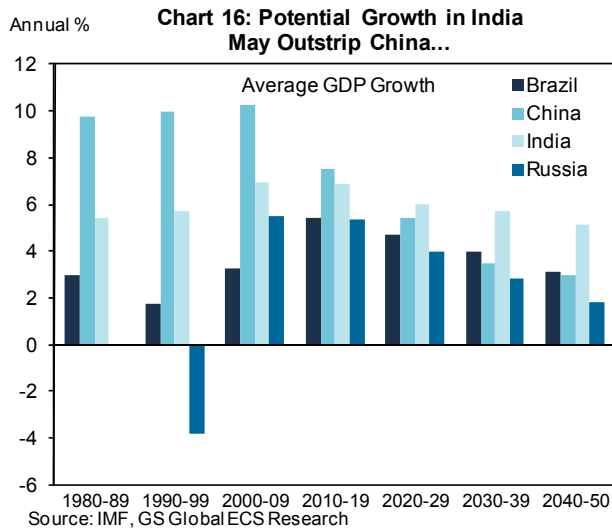
Our BRICs projections from the start emphasised that while the rise in the share of global GDP coming from the BRICs and other large EM economies would be a long and gradual process, the rise in their contribution to global *growth* would be much quicker and more dramatic. It is the importance of these countries to new activity that has pushed companies and investors towards the BRICs and EM. Because the shifts here began earlier and have moved faster, we have moved much further through the Great Transformation on this front than originally expected.

Shift in BRIC growth contributions: More behind than ahead

From contributing just one-fifth of global growth or less until the 1990s, the BRICs have contributed nearly half of overall global growth in the past decade, a dramatic increase that surpassed our initial expectations. Even as the BRIC economies continue to increase steadily their share of global GDP, their contribution to global *growth* is unlikely to rise much further. Our projections show this contribution consolidating at current levels over the next two decades, before gradually stabilising at around 40%. In this sense, one aspect of the Great Transformation—the BRICs taking over from the developed economies as the dominant source of global growth—is a long way towards completion (*Theme 1* again). This aggregate story disguises a sharp shift in India’s contribution to global growth, which could double from 9% to around 18% from 2040-2050. China’s contribution is likely to stay steady at around 30% for another decade or so before slowly drifting down towards India’s level.

The BRICs have surpassed our initial projections but their contribution to global GDP growth is unlikely to rise much further





More to come from non-BRIC EM

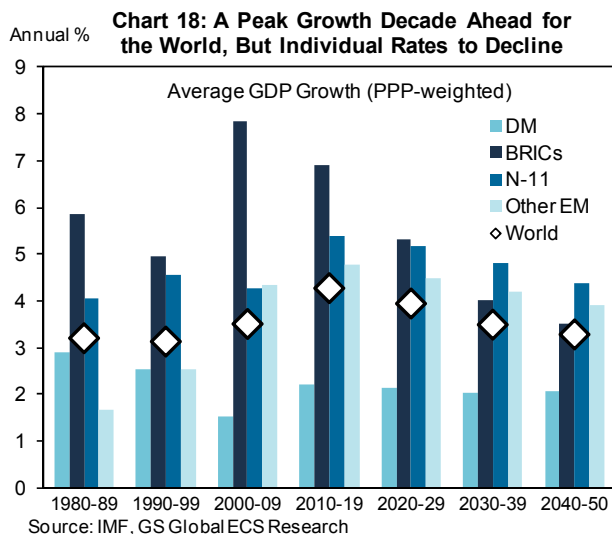
The broader EM contribution to growth has also seen its largest shifts already, rising from a little over 35% in the 1980s to more than 70% in the last decade. Our projections do see this contribution climbing slowly but steadily higher to around 80% for the decade between 2040 and 2050 (Charts 14 and 15). Part of that process is the larger role for the non-BRICs EM economies (*Theme 2* again). As these countries grow larger and their weight in the global economy increases, they may also become more important contributors to global growth. Of course, this depends on the continued ability of a broad group of EM economies to maintain the kind of growth conditions that would allow that shift (something we will discuss in the next section). But the important story here is that there may be more room for non-BRIC EM economies to increase their global growth contributions than for the BRICs themselves. Within the BRICs, India may eventually take China's leading role after a couple of decades (Charts 16 and 17).

More room for non-BRIC EM economies to increase their share of global growth

A peak decade ahead for global growth potential...

With a broader set of consistent projections, we can draw firmer conclusions about the global growth picture than at any point before. A striking feature of those projections is that the world as a whole could grow at faster rates over the next two decades than it has over the previous three, with the ongoing decade likely to represent the peak decade in potential global growth (*Theme 4* above). Even with the very sharp recession in developed countries in 2008 and 2009,

India may take China's leading growth role after a couple of decades



the last decade’s global growth rate of 3.5% (on a PPP-weighted basis) was higher than in the 1980s and the 1990s. Our projections imply that over the next decade, the global growth rate has the capacity to move above 4%, but should then slow moderately thereafter, reaching around 3.3% by 2050.

Of course, as the last decade shows, these kinds of projections abstract from the cycle. So if growth undershoots potential and recoveries continue to be sluggish in the developed world, that potential may not be realised. But the rising weight of the faster-growing EM economies could continue to be a source of upward pressure on *global* growth numbers for a while longer.

Rising weight of faster-growing EM could remain a source of upward pressure on global growth numbers

...but individual growth rates set to decline

Although our projections imply that global growth could remain strong, this effect comes largely from the fact that more of the world’s ‘weight’ is being transferred to high-growth economies such as the BRICs, rather than because many of the large economies themselves are set to see accelerating growth (a tension highlighted by *Theme 5*). In fact, our new projections suggest that we have likely seen the peak in potential growth for the BRICs as a group, and that within the next decade we will probably see the peak in underlying growth rates for each of the BRIC countries individually too. Of the four BRIC economies, only India demonstrates the potential to sustain high growth rates (around the 5% level) over the next few decades. DM economies may be able to grow faster than in the last decade, but only because recent performance was dragged down by the Great Recession.

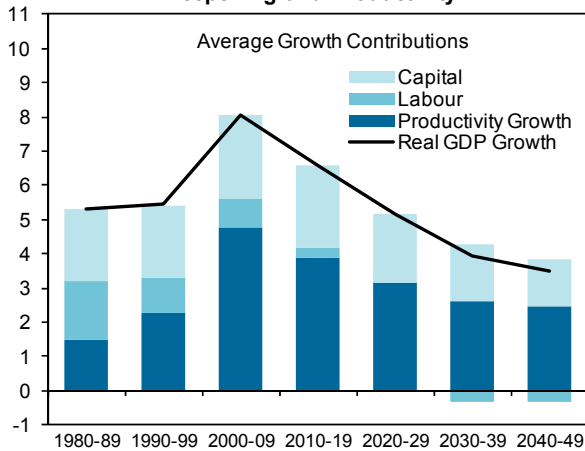
Of the BRICs, only India shows the potential to sustain high growth rates

Bucking that trend, at least for a while longer, are the non-BRIC EM economies. Our projections imply that growth rates in the N-11 could increase from 4.3% in the recent decade to 5.4% in the next decade, although this coming decade represents their peak potential too. Beyond that, as both the BRICs and N-11 economies move up the development curve, undergo their demographic transition and continue to converge to advanced economy levels, average growth rates are likely to decline steadily.

BRICs growth story likely to be dominated by continued capital deepening and productivity growth

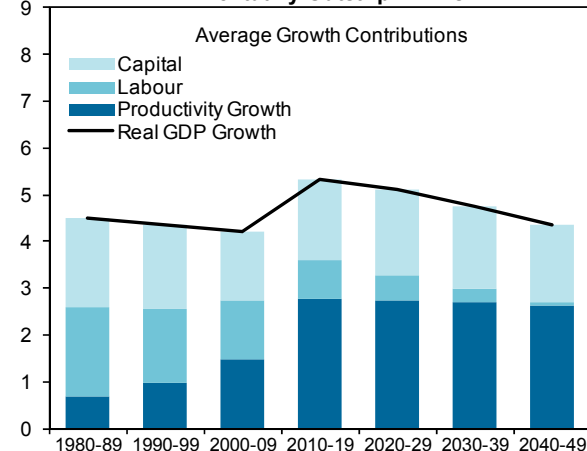
This process can be seen clearly if we decompose the projected growth rates for the BRICs and N-11 economies into their constituent factors. All three factors—capital deepening, growth in the labour force and productivity improvement—have pushed GDP growth rates higher in the BRIC economies (Chart 19). In coming years, as labour force growth first slows and then in coming decades actually starts to shrink and detract from growth, the overall BRIC GDP growth rates decline. And, increasingly, the BRICs growth story is likely to be dominated by continued capital deepening and productivity growth.

Chart 19: BRICs Growth to Depend on Capital Deepening and Productivity



Source: GS Global ECS Research

Chart 20: Growth in N-11 Countries May Eventually Outstrip BRICs



Source: GS Global ECS Research

Box 1: Growth by Regions: A Peak in Asia in Sight, Acceleration in LatAm and Africa

The fuller set of country projections in this issue allows us to examine how potential growth is likely to evolve regionally within the large EM world. On our estimates, Asia’s growth rates have peaked over the last decade, and should remain at this level over the next decade, falling steadily after that. Their growth contribution (driven by China and India to a large extent) rose sharply between the 1990s and 2000s, and is expected to increase a little more on our projections over the next decade, but it should decline thereafter (although as a share of overall growth, it will remain pretty much steady at about 50%). Their USD GDP level share continues to rise steadily through 2050.

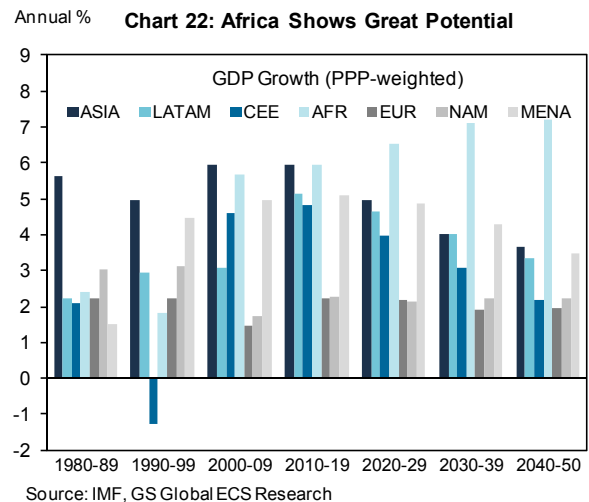
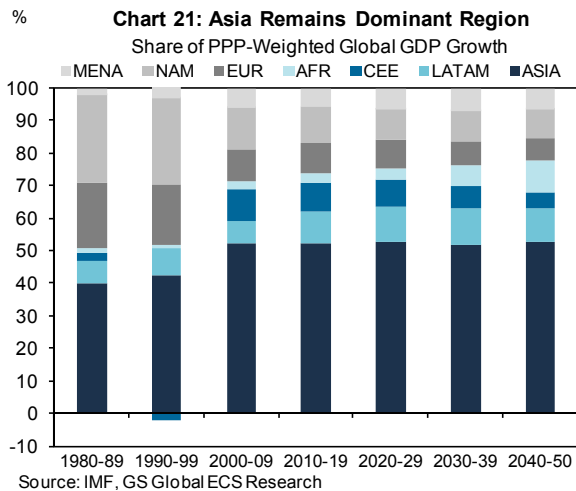
By contrast, the LatAm region sees the most sizeable acceleration in growth in the next decade between 2010 and 2019, and subsequently maintains rates close to the Asian average over subsequent decades. As a result, its contribution to global growth and its share in USD GDP levels both increase over the next decade, although they remain much smaller than Asia’s.

Growth rose rapidly between the 1990s and 2000s in Central and Eastern Europe (CEE), leading to a large increase in its contribution to global growth. This principally reflected the end of the transition crises in many former Soviet countries. Going forward, growth

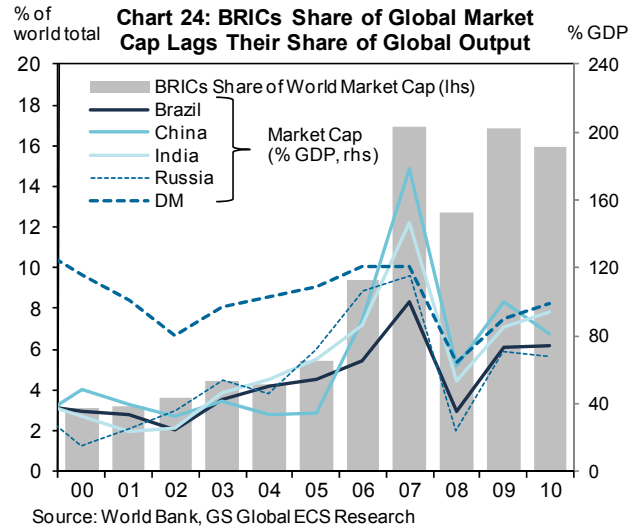
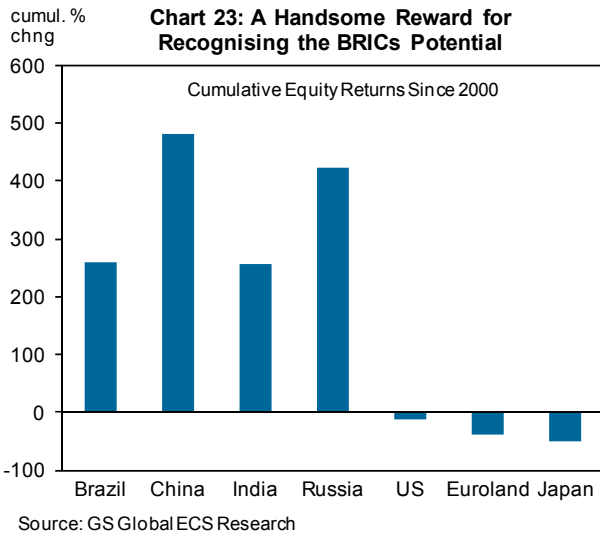
rates are likely to lag behind those in Asia and LatAm slightly, but nevertheless remain much higher than their own historical averages.

The countries of the Middle East and North Africa (MENA) saw a sizeable acceleration in growth in the 1990s and have maintained these high rates over the past decade. Our projections imply that the region will maintain its rapid pace of growth over the next 10 years, before seeing a gradual decline in subsequent decades.

Our projections include just seven Sub-Saharan African countries, although between them they represent around two-thirds of current African GDP and nearly 60% of its population. Those countries that we do include saw growth accelerate significantly between the 1990s and 2000s, and our projections suggest that this trend should continue through 2050. As a result, the contribution of African growth to global growth and its share in USD GDP levels will also rise. By 2050, our projections imply that our seven-country African grouping will be responsible for more global growth than most other regions (the exceptions are Asia and—just barely—LatAm).



The same process plays out in the N-11 countries also, as shifts in the demographic structure of their populations markedly lower the contribution to growth from labour force expansion. But with the BRICs further ahead in this process, the N-11 may record faster average growth rates than the BRICs economies in the final two decades of our projections. The same potential for acceleration is visible in Africa and in Latin America (as Box 1 describes), although this depends heavily on the necessary growth environments being maintained.

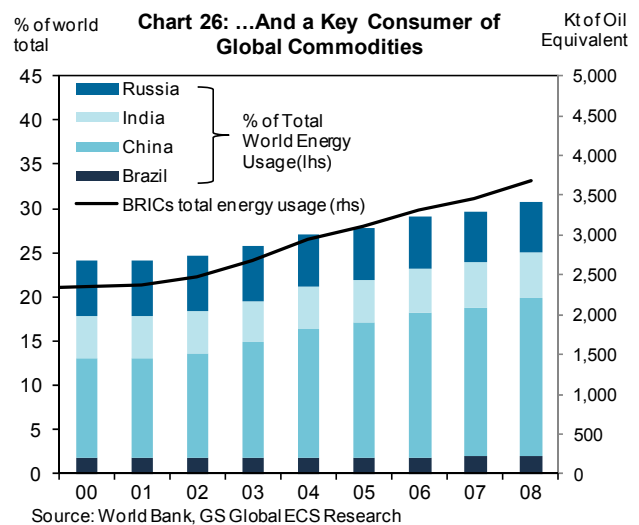
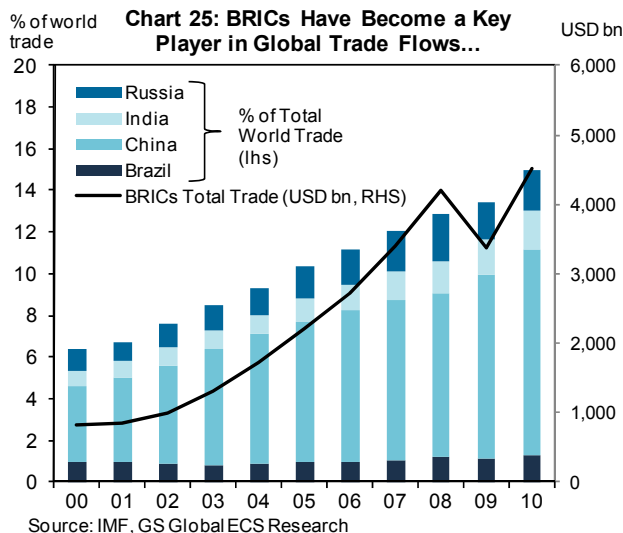


VI. Assessing Risks: A Look Back and A Look Forward

Making projections over a 50-year time span for around 70 countries inevitably involves making some heroic assumptions, analytic judgments and data adjustments along the way. Here, we outline what we have learnt 10 years after the initial projections, and what we think are the main substantive and ongoing risks to these projections.

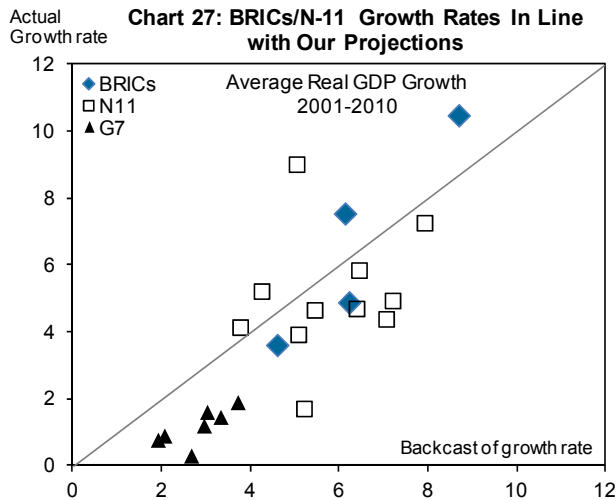
Very much a BRICs decade

In big picture terms, the broad message of the original BRIC projections—the emergence of the BRIC countries and their transformational impact on the global economy—has largely been borne out. On many dimensions the progress has been little short of stunning. China’s growth rate for the past decade has exceeded 10% on average, a truly remarkable historical achievement and, in level terms, it has now surpassed all the G7 economies bar the US earlier than we originally expected. The BRICs’ share of global GDP and global growth has risen sharply. Their contribution to global trade, and their share of global energy demand (and imports) and global auto sales—all areas we have analysed over the last decade³—have also risen sharply. And the equity market returns from the BRIC economies over the past decade have handsomely trumped anything the developed markets have had to offer, alongside a quadrupling in their market cap.⁴



3. See ‘The BRICs and Global Markets: Crude, Cars and Capital’, *Global Economics Paper No. 118*, October 14, 2004.

4. Over the next few decades, emerging equity market capitalisation could increase even more substantially as a result of capital deepening and economic growth. See ‘EM Equity in Two Decades: A Changing Landscape’, *Global Economics Paper No. 204*, September 8, 2010.



Back-testing the projections: More confidence in growth than FX

Given these dramatic shifts, one way of assessing our current projections, especially in light of the substantial methodological revamp in this version, is to ask the question: what would our current methodology have led us to project back in 2000, and how did the world actually turn out relative to those projections? This is not intended to be a test of accuracy—long-term projections of this nature are different from forecasts and cannot control for events like the ‘Great Recession’. But this exercise should show whether the current methodology is likely to produce a plausible set of numbers and what the uncertainties around such numbers are likely to be; this is similar to an exercise we conducted when we released our first detailed projections in 2003.

Over the past decade, BRICs growth rates within 1-1.5ppt of our projected growth rates

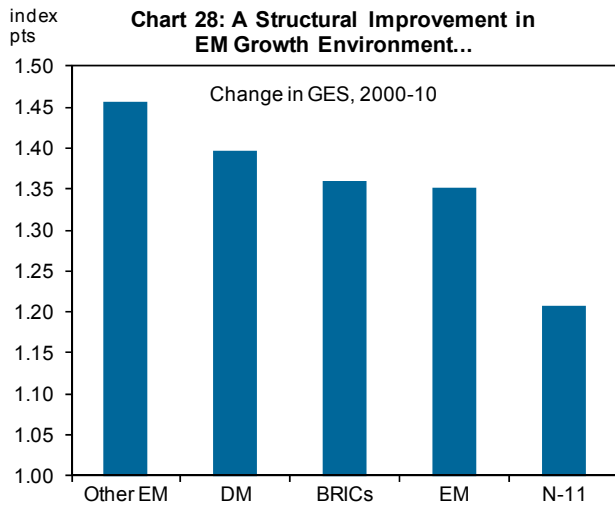
Projecting average real GDP growth rates between 2001 and 2010 in this way, we find in general the average growth rates delivered by the BRICs over this period were within 1-1.5ppt of our projected growth rates, with China and India outperforming, and Brazil and Russia underperforming our original expectations. All countries in the G7 ended up growing by less than our projections would have estimated, although that is largely due to the cyclical shortfall from the financial crisis.

In terms of USD GDP levels, most EM ended up with lower values than would have been projected by our model, primarily (and in some cases only) because they have seen less appreciation in their Dollar exchange rate. The main conclusion from this back-casting exercise is that our methodology would have produced sensible and plausible results back in 2000, but with more uncertainty around the exchange rate projections (and so estimates of Dollar values of GDP levels), than around the projections for GDP growth rates. For that reason, it is comforting that our new projections put more weight on GDP growth and less on FX appreciation than before.

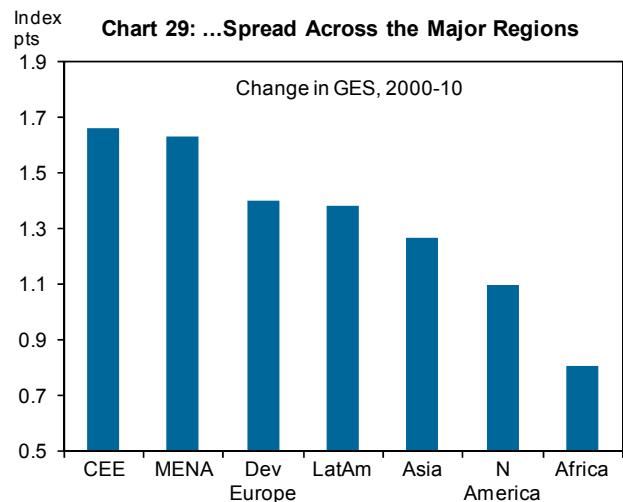
But it is still the case that turning the BRICs dream into reality is not automatic

Maintaining ‘growth environments’—tougher work ahead

As we highlighted in the original BRICs paper, turning the BRICs dream into reality was not automatic, and this remains the case. Our projections essentially provide a path for the *potential* growth of each country. But translating that potential into actual growth is hard. Over the years, growth economists have tried to identify the factors that sustain growth—including good educational outcomes, credible and stable institutions, sound macro and microeconomic policies, openness, and so on.



Source: GS Global ECS Research



Source: GS Global ECS Research

We include most of these factors in our Growth Environment Scores (GES), and we use the GES explicitly to determine a country’s convergence speed and so its productivity growth. This allows us to control, to a degree, for some of the known risks. But it does not account for everything. As a recent paper by Dani Rodrik (2011)⁵ highlights, there are several examples of emerging economies that perform well on these measures, but have still struggled to effect a structural shift towards high-productivity industries, and so have ultimately failed to sustain high rates of growth. As Rodrik points out, sustaining high growth rates for a period of three decades or more is historically exceptional, achieved by only a few Asian economies, some oil exporters and southern Europe after World War II. From that perspective, the growth performance of the BRICs and many of the N-11 economies over the past two decades has been remarkable. So simple history would say that the chances of sustaining this kind of path into the next few decades are lower than before.

It is always tempting to believe that this time will be different. And in some respects, it already is. Importantly, emerging markets as a group have made substantial improvements in their growth environments in the past decade, as our GES results show (Charts 28 and 29). The global financial crisis of 2008/09 provided an important ‘stress-test’ for many of these economies and their resilience attests to this structural improvement. However, much of this improvement reflects improvements in macroeconomic policy in emerging economies. And while it is clearly important to sustain these improvements on an ongoing basis, the rewards from the successful macro stabilisations of the last decade in many places may not be easily repeatable. And macro imbalances have begun to emerge in some of the EM economies for the first time in many years, which could also raise risks to growth.

The BRICs and broader EM passed the ‘stress-test’ provided by the global financial crisis of 2008-09

But successful macro stabilisations may not be easily repeatable

A less supportive external environment in the near term

Despite the structural improvement in most EM in recent years, the current cyclical environment—with the risk of a renewed recession in many developed economies—means that a cyclical demand shortfall may hold back countries from achieving the growth potential that is described in these projections. Even if a renewed significant contraction is averted, there is still a risk of a long period of stagnation in large parts of the developed world, as we described recently.⁶ Trends in Europe and the US after the 2008 financial crisis are following growth paths that are typical of the historical experience of staginations, making for a tougher cyclical environment in the near and medium term.

5. *The Future of Economic Convergence*, Dani Rodrik, Paper delivered at the 2011 Jackson Hole Symposium of the Federal Reserve Bank of Kansas City, August 25-27, 2011.

6. See ‘From the ‘Great Recession’ to the ‘Great Stagnation’’, *Global Economics Weekly* 11/30, September 29, 2011.

In addition, this is likely to present important new challenges for EM policymakers. Many policy choices—currency undervaluation is an important example—will face a less tolerant external environment in a world where advanced economies grapple with high unemployment and stagnant growth. Consequently, it may be difficult for other large EM to replicate specific growth-supportive interventionist policies that have allowed some of Asia’s major exporting economies to flourish in recent decades.

Global constraints from slowing growth, commodity supply

Beyond these challenges to national growth conditions, there may also be risks from global dynamics. Added political tensions are likely to surface from the problem of aggregation that we identified earlier (*Theme 5*), since most politicians will likely have to deal with lower growth rates and higher domestic inequality even as global inequality diminishes and potential growth for the world as a whole rises. Additionally, one of the chief implications of our projection of high potential global GDP growth in the next decade is that pressure on commodity prices is unlikely to alleviate. As we have discussed before, a key constraint for the global economy stems from the fact that commodity production capacity is having a hard time keeping pace with the growth of demand spurred by this rapid global growth. Somewhat paradoxically, below-trend growth in the developed world (discussed in the point above) might actually provide more room for growth in the broad EM world by pushing further out the point at which commodity constraints begin to bite. But as long as this commodity constraint exists, it is likely to pose a material risk in translating the high potential for global growth in the coming decade and next into actual global growth.

Commodity constraint poses a material risk for global growth in the next decade

VII. A More Subtle Investment Story

In thinking about the implications of these shifts for policymakers, companies and investors, we are drawn back to our five themes.

The Great Transformation of global spending power is still firmly underway (*Theme 1*). In terms of the distribution of that spending and the largest contributions to its growth, this is still a BRICs-dominated world and likely to stay that way for some time. The alignment of global portfolios and of global corporate activity has started to move towards this new reality. But in many areas it has probably not fully caught up with it.

No longer enough for investors to recognise the BRICs story

At the same time, we think it matters that the story of a sharp rise in the BRICs’ global growth contribution is more evident in the last 10 years than it is likely to be in the years ahead. In the last decade, simply recognising that the BRICs *were* the story was largely enough to propel outsized investment returns. Those markets were rerated as investors moved from doubting the sustainability of the growth stories in the large emerging markets to embracing it. But this story is now much better known, and the process of integrating the BRICs into the world economy has already run a long way.

Put simply, markets generally pay for shifts in trends, not their continuation. With the shift towards BRICs growth already well advanced and their growth rates unlikely to be higher in the next decade than in the last one, the path ahead is likely to constitute to a greater degree ‘more of the same’, with cyclical risks on both sides. Of course, there is still significant concern about the sustainability of growth in many of these markets, and in China in particular. So it is easy to envisage that attractive opportunities to benefit from confidence in their continued progress will arise cyclically. But it is much harder to accept that simply believing in their long-term growth dynamics can be a sufficient investment thesis now, if it ever was. Markets reward things that they do not expect, not things that (now) they do.

Because markets pay for shifts in trends, not their continuation

Instead, our projections suggest that the unexpected shifts may now be more likely to come from two other sources. First, the growth contribution of some of the non-BRIC EM may rise more significantly than many expect—and their growth profiles may accelerate (*Theme 2*). That said, it is important to acknowledge that there may be substantial uncertainty and risks around the growth paths in many of these markets that are not always fully captured by these central projections.

Second, where the BRICs story does still have a long way to run—alongside the broader shift in EM economies—is in its impact on global spending patterns. We continue to think that the rise of the middle class globally—and the world economy’s ‘Expanding Middle’—is a process that is still at an early stage and that we would like to understand more deeply (*Theme 3*). We think it is more plausible that there will be returns to predicting the underlying spending pressures—in degree and timing—across products as the BRICs and N-11 grow further, and for identifying the pressure points from that growth process, than simply to recognising the growth itself. So if the last decade was more about the ‘macro’ story in these markets, the next decade may be much more about the ‘micro’ story.

Just as clearly as a decade ago, we think the new projections support the idea that the world economy has a strong stake in the continued success of the BRICs and the major emerging markets. They have already become critical engines of world growth in the last 10 years and we think they are likely to cement that role in the years ahead. A world in which they fail to achieve that success is likely to be an uglier one than a world in which they succeed. And, at the headline level, our projections paint a picture of the next 10-20 years in which global growth could enter a golden era and global inequality could continue to narrow (*Theme 4*).

But we are conscious that this rather upbeat ‘world’s-eye’ view hides a more complicated reality under the surface (*Theme 5*). Among the many risks to the projections we set out here, our latest projections highlight the tensions between global and national pictures, and the issues of who benefits or gains access to the increased global growth opportunities. While global growth could remain robust, national growth rates are set to slow in many places. And not everyone (companies or individuals) has equal opportunity to exploit global rather than local opportunities. The pressure on global resources—already a big feature of the last 10 years and likely to remain so for some time—also highlights that not everyone feels the benefits and the costs of robust global growth evenly. We think these political challenges are likely to be more squarely in the spotlight than they were 10 years ago, just as the BRICs themselves now are.

Our projections still imply that the world economy has a strong stake in the continued success of the BRICs and major EM economies...

...but they also highlight the tensions between global and national pictures...

...with political challenges likely to be more squarely in the spotlight in the coming decade

Appendix: Our Methodology in Detail

In this comprehensive revamp of the BRICs projections, we have made a number of methodological changes. While many of them are technical in nature, the series of boxes below highlight each important change, and run through its rationale and how it affects the model projection using as an example one of the BRIC countries.

1.1 Production Function

In line with our original BRICs projections, we continue to use a simple canonical model of economic growth that is common in the academic literature, where growth (ΔY) is a function of growth in the labour force (ΔL), capital accumulation (ΔK) and technical progress (ΔA).

Levels: $Y = AK^\alpha L^{1-\alpha}$

Growth Rate: $\% \Delta Y = \% \Delta A + \alpha (\% \Delta K) + (1-\alpha)(\% \Delta L)$

But we have made some changes to the modelling of the individual components of this model, which we believe makes the model more internally consistent, and the projections more intuitive and empirically plausible.

1.2 Labour Force Growth

We continue to use the United Nations' projections for growth in the working age population (those aged 15-64) as an approximation for labour force growth. Implicitly, we are assuming a constant labour force participation rate (defined as the proportion of the population that is employed or actively looking for work). We explored the option of relaxing this assumption by modelling the labour force participation rates explicitly as a function of variables for which long-term projections exist, such as the distribution of population across different age brackets, life expectancy and the fertility rate. While these variables may be the best alternative to control for changing patterns in participation rates associated to income changes (such as urbanisation, formalisation of economic activity, health improvements, etc.), we are not yet convinced that they lead to superior projections in an overall sense. The main reason is that, by *overweighting* demographic indicators relative to other relevant explanatory variables for which no projections exist, they yield upward-biased estimates for participation rates. Although we believe there is value in controlling for as many variables as possible, we opted for the more conservative estimates stemming from constant labour force participation rates.

Levels: $L = \left(\frac{\text{Labor Force}}{\text{Working Age Population}} \right) * (\text{Working Age Population})$

Growth Rate: $\% \Delta L = \% \Delta \left(\frac{\text{Labor Force}}{\text{WA Pop}} \right) + \% \Delta (\text{WA Pop})$

Assume: $\% \Delta \left(\frac{\text{Labor Force}}{\text{WA Pop}} \right) = 0$

$\therefore \% \Delta L_{i,t} = \% \Delta \text{WA Pop}_{i,t}$

1.3 Capital Accumulation

The capital accumulation process depends primarily on two factors: the initial stock of capital in an economy and the investment rate. In our initial model, we assumed that each country began with a capital stock proportional to output, and continued to invest at the same rate as it had on average over the previous decade. Both these assumptions are somewhat unsatisfying—capital stock levels differ significantly across countries, and it is unrealistic to assume that investment rates stay fixed over long periods of time. This second assumption was particularly unattractive, as countries that currently have abnormally high or low investment rates (i.e., China or many African nations, respectively) were assumed to invest at these rates for several more decades.

Capital Stock

Initial Level:
$$K_{i,0} = \frac{I_{i,t}}{g + \delta}$$

where I_t = investment rate,

g = growth of K from time 0 to time t (approximated by geo. ave. of first 10 years of I growth)

and δ = depreciation rate (4%)

Projected Levels:
$$K_{i,t} = I_t + (1 - \delta) \cdot K_{i,t-1}$$

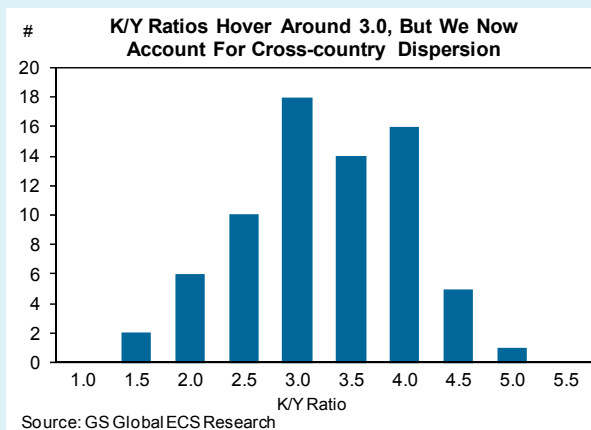
We have made two changes to the capital accumulation process. First, we calculate country-specific initial capital stock levels by extrapolating from historical investment rates. Second, we model each country’s investment rate as a function of demographics and its own history, while also allowing for systematic differences across countries and time. The model does a good job of explaining historical investment rates and is consistent with the empirical observation that countries’ investment and saving rates tend to be highly correlated, and saving rates tend to vary with demographics.

Box A1: Initial Capital Stock and Russia

The capital stock—the total amount of machinery, buildings and technology that can be used for productive purposes—varies across countries according to their output level and past investment rates. For obvious reasons, it is very difficult to measure accurately the total amount of capital in an economy, especially in a broad swathe of countries at differing levels of development. In our previous BRICs projections, we have made the simplifying assumption that each country’s capital stock was proportional to its level of output based on past research which suggested that most countries have capital-to-output ratios of around 2.5. But this is most likely an underestimation for those countries that have had very high investment rates for an extended period of time (and vice versa). And it is even more problematic for former planned economies, such as Russia, as they may have amassed large stocks of capital during their period of repressed consumption and overinvestment, which were subsequently found to be less effective.

Our new methodology introduces country-level variation into the initial capital-to-output ratio estimates. We now use the perpetual inventory method to calculate initial capital stock estimates. We make further modifications here for the former Soviet countries, to adjust for the fact that much of the capital stock amassed during the Soviet era of very high investment rates is no longer likely to be

effective. Without this modification, we would overstate the initial capital stock and thereby understate the growth rate in the capital stock going forward. While most of the initial capital/output ratios still cluster around the 2.5-3.5 range (see Chart below), the changes do make a large difference in many specific cases. For instance, in Russia, we now base our capital growth projections off an initial capital stock equal to 2.2 times output. This modification corrects our previous *overstatement* of the capital stock and *understatement* of the growth in the capital stock going forward, and thus, all else equal, increases our estimates for Russian growth.



Investment Rate

$$I_{i,t} = \alpha + \beta_1 I_{i,t-1} + \beta_2 D_{i,t} + \alpha_i + \gamma_t + \varepsilon$$

where D = dependency ratio (from UN projections),
 α_i and γ_t are country and time fixed effects, respectively,
 and $\alpha = 8.89, \beta_1 = 0.73,$ and $\beta_2 = -0.04$

(as determined using annual panel regression of 73 countries from 1961 – 2009)

Box A2: Investment Rate and China

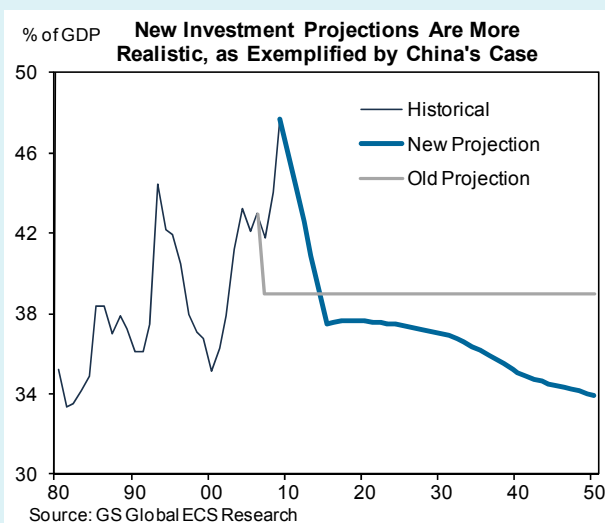
China’s investment rate has been high and rising for the past several decades and, at 45% of GDP in 2010, is one of the highest globally over the past half century. However, China is unlikely to be able to sustain such high investment rates perpetually. The number of new, profitable investment projects with a high marginal return on capital should eventually slow as an economy matures and converges to the technological frontier. Besides, China’s saving rate (the amount of domestic funding available for investment) will fall as its population ages and as opportunities for domestic consumption improve. And, as returns on investment begin to fall, the supply of foreign funding should also lessen incrementally. The experiences of other Asian countries, including Korea, Singapore and Malaysia, and the historical experience of today’s advanced economies suggest that the investment rate trajectory for China should moderate in the years ahead.

In previous rounds of our BRIC projections, we assumed for the sake of simplicity that investment rates for the most part remain constant at the average of the past 10 years. However, both theory and empirics suggest that while slow-moving, investment rates are likely to evolve in different directions depending on country-specific circumstances. And in countries such as China with very high investment rates (and other outliers with very low investment rates), which were unlikely to persist over the long run, this assumption seems particularly problematic.

Our new projections incorporate a new model for investment rates that attempts to address this issue by generating a path (rather than a fixed level) for the investment rate. In this model, investment rates for each country are determined by (i) its own recent historical investment rates, (ii) its share of working-age population and (iii) time- and country-invariant factors. Based on this model, in China, we now project that the investment rate will fall from the current rate of 45% to 34% by 2050, as opposed to assuming that it will remain constant at 39% over the forecast horizon. At 34%, China’s

investment rate would still be high by cross-country standards, but it would be 11ppt lower than current levels. This change addresses a common concern that one often hears—that Chinese investment rates are unsustainable and that this is likely to cause growth to slow in the future. Our new model-determined path for investment rates explicitly quantifies this, and we believe that this new path is more reasonable. It is based on a model rather than a simple extrapolation, and matches more closely the historical experiences of other countries.

In terms of the projections, a lower investment rate for China translates into slower capital accumulation and slightly lower growth rates in China. Assuming no other changes to the model (but using the most recently available vintage of the data), this lowers China’s average GDP growth rate over the projection period to 5.1% from 5.2% in the previous projections. Based on the full methodological revamp undertaken in this paper, China’s average GDP growth rate is 4.7%.



1.4 Technical Progress

For emerging markets including the BRIC economies, we model technical progress (or total-factor productivity (TFP) growth) as a process of catch-up to the technological frontier, which we assume to be the US. We think of this convergence process as a combination of potential and conditions. The *potential* for catch-up growth is a decreasing function of income levels: low income or less-developed countries still have plenty of opportunities both for high-return physical and human capital accumulation, and for technical advancement via the spread of technologies that are widespread at the frontier. The *conditions* necessary for achieving this potential are related to the ability of a given country to actually realise those high return opportunities to increase investment or bring about the spread of frontier technology. We capture this within our Growth Environment Score (GES) framework, which incorporates the economic, political and social factors empirically linked to growth performance.

To implement this framework, we continue to calculate productivity growth as a function of US productivity growth, relative income and a convergence speed that is directly linked to a country's GES. However, we have improved the link between GES and convergence speeds to allow for the fact that GES tend to rise with income. In previous reports, we have set the convergence speed at a level determined by its current GES for the early part of the projection period, and then assumed that all convergence speeds converged to a common global average (with some particularly low GES performers converging to a lower average). Now, we 'project' the GES according to its historical and cross-sectional relationship with income, and then calculate a path for each country's convergence speed based on the path of its GES. This has the positive effect of eliminating discontinuities in the convergence process and making it more dependent on country fundamentals.

Productivity Growth

$$\% \Delta A_{i,t} = \% \Delta A_{US} - CF_{i,t} * \ln \left(\frac{YPC_{i,t}}{YPC_{US,t}} \right)$$

where $\% \Delta A_{US} = 1.3\%$ (consistent with 2% labour productivity growth),
and $YPC = \text{real income per capita measured in PPP\$}$

We also continue to modify the near-term convergence speeds of countries with planned economy experiences, including China and Russia among the BRICs. We assume higher initial convergence rates than implied by these countries' GES, to account for the inefficiencies from their Communist experiences, which should make early productivity gains more quickly and easily achievable.

Calculate Convergence Factors (CF)

Base Regression:

$$\% \Delta Y_{i,t} = \alpha + \beta_1 \ln(Y_{i,t}) + \beta_2 GES_{i,t} + \beta_3 \ln(Y_{i,t}) * GES_{i,t} + \gamma_t + \varepsilon$$

$$\text{where } \alpha = -4.9, \beta_1 = 0.56, \beta_2 = 3.3, \text{ and } \beta_3 = -0.3$$

(as determined using panel regression where $t = 1, 2, 3$ refer to approx 5 year periods between 1996 and 2010)

Convergence Factor (for non-formerly planned economies):

$$CF_{i,t} = -(\beta_3 * GES_{i,t} + \beta_1)$$

Convergence Factor (for formerly planned economies):

$$2011-2019: \quad CF_{i,t} = -(\beta_3 * GES_{i,t} + \beta_1) + \text{boost}$$

where boost = 0.8 for Bulgaria, China, Czech Rep, Hungary, Poland, Romania, Ukraine and 1.8 for Russia

$$2020-2035: \quad CF_{i,t} = -(\beta_3 * GES_{i,t} + \beta_1) + \text{boost} * \left(1 - \frac{t - 2020 + 1}{16}\right)$$

$$2036-2050: \quad CF_{i,t} = -(\beta_3 * GES_{i,t} + \beta_1)$$

Project GES

$$GES_{i,t} = GES_{i,t-1} + \beta_1 * \ln \left(\frac{Y_{i,t-1}}{Y_{i,t-2}} \right)$$

$$\text{where } \beta_1 = 0.79$$

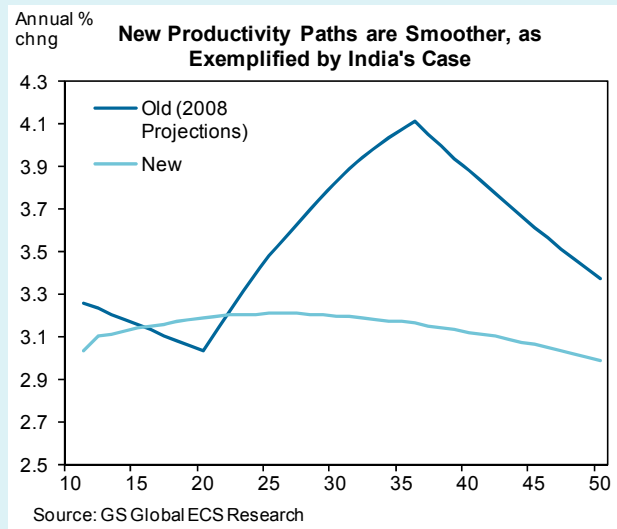
(as determined using linear regression of GES on logged real per capita GDP of all country GES observations from 1996 – 2009),
and income is lagged to prevent circularity in calculations

Box A3: TFP Growth and India

India has the lowest GES among the BRICs, indicating that it has the least advanced economic, social and political conditions that facilitate rapid economic growth. In the context of our projections, India’s low GES implies that it should see lower productivity growth and less catch-up convergence as its poor GES impedes its ability to use its inputs of capital and labour efficiently. But as India grows richer over time, we would expect its GES to rise and its rate of productivity growth and convergence speeds to rise concomitantly. Thus, it is necessary to take into account this feedback loop between GES and income to avoid biasing projections downwards.

While we have acknowledged these feedback effects in the past, we have integrated them in a much more explicit and systematic manner in this round of projections. Previously, we linked productivity growth rates to a country’s GES *only* in the first 10 years of our projection period. Subsequent to that, we then made the assumption that growth conditions across all developing countries would improve over time and that convergence speeds would themselves converge to a common rate in the remainder of the projection years. For a few countries at the bottom of the GES rankings we assumed that convergence speeds move towards a lower average to prevent an abrupt increase. In practice, however, this formulation did not entirely eliminate all discontinuities in the convergence process. In India, for example, and other countries with relatively weak GES—but not weak enough to qualify for the bottom bucket—this meant that their convergence speed increased significantly after the first 10 years and in the latter years of the projection period, due to our implicit assumption that their GES would improve quite dramatically.

In our new projections, we ‘project’ what the GES for India and other countries will be given their historical (projected) path of income growth. Convergence speeds then improve on the back of each country’s projected GES path over time, rather than jumping to a global average. This smoothes the productivity growth path and links it more explicitly to individual country fundamentals. In India, this change reduces the convergence speed that we are assuming in the latter years of our projection period, and thus decreases the contribution of productivity growth to overall growth. These new, lower productivity growth rate projections (see Chart below) fit much more closely with India’s recent performance and are a better reflection of its relatively weak growth conditions.



1.5 Exchange Rate Trends

We have also made changes to the way in which we model long-run exchange rate trends. These shift the projections further in the direction of having more of the growth in USD-denominated GDP coming from real growth and less from real currency appreciation.

We continue to think of real exchange rate appreciation as a function of relative productivity growth differentials. This is grounded in theory and empirics, which both show that countries' exchange rates tend to appreciate towards their PPP equilibrium value as they grow richer over time (an observation known as the 'Balassa-Samuelson effect'). Previously, we assumed that a country's market exchange rate would appreciate 0.5% for every 1% increase in its per capita income relative to that of the US. However, this assumption proved problematic because of its implicit supposition that the current level of the exchange rate was the 'correct' starting point for this process. Currencies that were much stronger or weaker than one would expect given their current level of development never adjusted for this initial over/undervaluation over time, and thus ended up overshooting or undershooting their PPP equilibrium exchange rates more than seemed reasonable.

To correct for this issue, we now explicitly incorporate information on current under/overvaluation of exchange rates. In our updated model, a country's real exchange rate path is determined by two processes: (1) convergence towards its PPP equilibrium rate as they grow richer and (2) convergence towards the 'correct' deviation from PPP for a given relative income level (based on the historical and cross-sectional data). For instance, China's exchange rate should appreciate both because it is growing richer and because its current deviation from its PPP value is larger than one expect given its relative income level (i.e., it is more undervalued relative to PPP than other countries at a similar income level).

This new procedure also has the benefit of preventing the market exchange rate from overshooting its PPP equilibrium rate, which was a frequent outcome in previous projection rounds. As a result, the new PPP conversion process results in less cumulative appreciation than before for the BRICs and most EM. This implies that the USD-denominated projections will be commensurately lower, holding all else equal, and thus shifts the projections further in the direction of having more of the growth in USD-denominated GDP coming from real growth and less from real currency appreciation.

Market Exchange Rate

$$\% \Delta mktE_{i,t} = -\beta * \ln\left(\frac{relativeYPC_{i,t}}{relativeYPC_{i,t-1}}\right) - \alpha \left[\beta * \ln(relativeYPC_{i,t}) - \ln\left(\frac{pppE_{i,t-1}}{mktE_{i,t-1}}\right) \right]$$

where $\beta = 0.24$ (the coefficient of the bivariate regression of the deviation from PPP on relative income (both in logs),
and $\alpha = 0.05$ (decay factor)

PPP Exchange Rate

$$pppE_{i,t} = pppE_{i,2010}$$

Box A4: Exchange Rate and Brazil

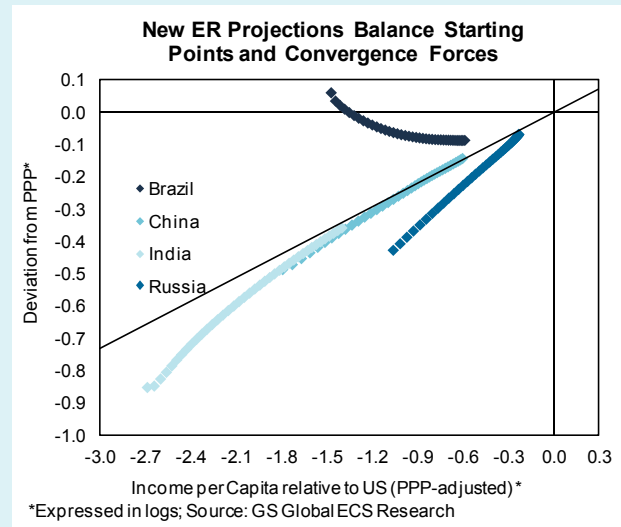
A key part of making our BRICs projections accessible in current US Dollar terms involves converting the output of a ‘real’ growth model into nominal Dollar values using a process for nominal exchange rate determination. The moves in currency exchange rates can be extremely significant, with a considerable impact on the final projections. Consider the example of Brazil. Brazil’s nominal exchange rate against the USD has appreciated sharply over the past several years, and is now nearly 100% stronger than it was back in 2003 when we published our first set of BRICs projections. From an average level of around 3.07 in 2003, the BRL/USD cross has moved to an average of about 1.65 in the past year. In the process, it has shifted from being *undervalued* relative to its PPP equilibrium exchange rate by as much as 60% in 2003, to *overvalued* on this measure by nearly 10% in 2011 thus far.

In the light of these significant swings, our old long-run real exchange rate projection model, which focused exclusively on the long-run positive relationship between income growth and real currency appreciation, and keyed off current levels, turned out to have a major drawback since it ignored the starting valuation point. As a result, a currency such as the BRL, which started from an overvalued position, would never ‘correct’ for this misalignment, and would end up permanently overshooting its PPP equilibrium.

Our new exchange rate projection methodology corrects for this problem. We now explicitly incorporate information on current under/overvaluation of exchange rates. In our new model, a country’s real exchange rate path is determined by two processes: (i) convergence towards its PPP equilibrium rate as they grow richer (the ‘Balassa-Samuelson’ effect) and (ii) an adjustment towards the ‘correct’ deviation from PPP for a given

relative income level (based on the historical and cross-sectional data). This second adjustment process works to make our exchange rate projections less sensitive to any given starting point, by correcting for any initial under- or overvaluation, at the same time as preserving the theoretically attractive characteristics of the Balassa-Samuelson effect.

In the case of Brazil, this creates two offsetting effects. There is still appreciation pressure on the exchange rate as income grows and converges towards frontier levels, but this is offset from depreciation pressure as the exchange rate adjusts towards its ‘correct’ deviation from PPP. Together, this prevents Brazil’s exchange rate from permanently overshooting its equilibrium rate; instead, it actually depreciates over the projection period as the downward pull from overvaluation dominates the upward push from income growth (as shown in the Chart below).



1.6 Developed Economies

In the past, we have used a simplified procedure for our DM projections; the rationale was that the growth process changes qualitatively once economies have ‘caught up’ with the technical frontier. Specifically, we assumed a common 2% labour productivity growth rate and constant exchange rates across the developed world, so that variation in GDP growth and level projections were purely a function of demographics.

This time around, we have decided to use the same more fundamental growth model for *all* countries, both developed and developing. This introduces more country-specific variation in the DM projections and increases the internal consistency of the model. Reassuringly, it does not change the end-results significantly; this suggests that our updated model captures the steady-state growth stage, which most DMs have reached and which we previously had tried to replicate with a separate procedure.

Table A1: Average GDP Growth Rates (%) *

	1980-89	1990-99	2000-09	2010-19	2020-29	2030-39	2040-50
BRICs							
Brazil	3.0	1.7	3.3	5.4	4.7	4.0	3.1
China	9.8	10.0	10.3	7.5	5.4	3.5	2.9
India	5.4	5.7	6.9	6.9	6.0	5.7	5.1
Russia	..	-3.8	5.5	5.3	4.0	2.8	1.8
N-11							
Bangladesh	3.3	4.8	5.8	6.3	6.2	5.9	5.3
Egypt	5.3	4.1	5.0	6.4	6.1	5.4	4.5
Indonesia	5.7	4.3	5.1	6.0	5.6	5.0	4.4
Iran	0.6	5.2	4.8	4.7	4.7	3.8	2.5
Korea	8.6	6.7	4.4	3.4	2.2	1.7	1.5
Mexico	2.4	3.5	1.8	5.0	4.6	3.9	3.2
Nigeria	1.8	2.6	8.7	7.2	7.6	7.9	7.6
Pakistan	6.6	4.0	4.6	6.0	6.4	6.2	5.6
Philippines	2.0	2.8	4.6	6.8	6.9	6.4	5.8
Turkey	4.2	4.0	3.8	5.4	4.7	3.9	3.1
Vietnam	5.0	7.4	7.3	7.4	6.8	5.9	4.7
G-7							
Canada	3.0	2.4	2.1	2.8	2.4	2.4	2.4
France	2.3	1.8	1.4	2.3	2.4	2.3	2.4
Germany	1.9	2.3	0.9	2.0	1.4	1.3	1.6
Italy	2.1	1.4	0.5	2.0	2.0	1.5	1.7
Japan	4.4	1.5	0.6	1.8	1.8	1.4	1.3
United Kingdom	2.5	2.2	1.7	2.6	2.7	2.4	2.3
United States	3.1	3.2	1.7	2.2	2.1	2.2	2.2
Aggregates (Averages)							
BRICs	5.9	4.9	7.9	6.9	5.3	4.0	3.5
N-11	4.0	4.5	4.3	5.4	5.2	4.8	4.4
Other EM	1.7	2.5	4.4	4.8	4.5	4.2	3.9
DM	2.9	2.5	1.5	2.2	2.1	2.0	2.1
World	3.2	3.1	3.5	4.3	3.9	3.5	3.3
Regions (Averages)							
ASIA	5.6	5.0	5.9	5.9	5.0	4.0	3.7
LATAM	2.2	2.9	3.1	5.1	4.6	4.0	3.3
CEE	2.1	-1.3	4.6	4.8	4.0	3.1	2.2
MENA	1.5	4.5	5.0	5.1	4.9	4.3	3.5
AFR	2.4	1.8	5.7	5.9	6.5	7.1	7.2
EUR	2.2	2.2	1.5	2.2	2.2	1.9	2.0
NAM	3.0	3.1	1.7	2.3	2.1	2.2	2.2

*These projections are based on the methodology described in the Appendix, and because the exercise's consistency across countries leaves out many country-specific considerations, they should not be interpreted strictly as forecasts.

Source: GS Global ECS Research, IMF

Table A2: GDP Level (2010 USD bn) *

	1980	1990	2000	2010	2020	2030	2040	2050
BRICs								
Brazil	377	778	802	2,090	3,268	4,944	7,178	9,713
China	469	598	1,496	5,878	13,817	25,584	37,716	52,619
India	423	500	599	1,538	3,477	7,174	13,896	24,984
Russia	324	1,465	2,895	4,706	6,563	8,011
N-11								
Bangladesh	45	47	59	105	217	451	892	1,631
Egypt	52	140	124	218	500	1,100	2,125	3,606
Indonesia	221	193	207	707	1,296	2,272	3,809	6,037
Iran	217	130	120	357	742	1,435	2,352	3,194
Korea	149	414	666	1,007	1,561	2,068	2,536	3,030
Mexico	525	441	839	1,039	1,913	3,212	4,894	6,947
Nigeria	140	48	58	217	434	952	2,179	4,906
Pakistan	66	74	92	175	380	836	1,743	3,328
Philippines	75	68	95	189	401	839	1,680	3,166
Turkey	218	310	333	742	1,260	2,115	3,215	4,451
Vietnam	65	10	39	104	258	612	1,248	2,183
G-7								
Canada	623	893	905	1,574	1,940	2,282	2,801	3,473
France	1,602	1,914	1,664	2,583	2,839	3,477	4,277	5,365
Germany	1,915	2,371	2,379	3,316	3,534	3,947	4,457	5,218
Italy	1,068	1,740	1,374	2,055	2,197	2,580	2,917	3,418
Japan	2,482	4,687	5,827	5,459	5,874	6,295	6,707	7,366
United Kingdom	1,257	1,560	1,848	2,247	2,786	3,604	4,539	5,686
United States	6,462	8,891	12,423	14,658	18,100	22,288	27,742	34,582
Aggregates (Sums)								
BRICs	1,269	1,876	3,221	10,972	23,457	42,408	65,354	95,328
N-11	1,775	1,876	2,631	4,859	8,964	15,892	26,674	42,477
Other EM	2,467	1,791	2,828	5,611	9,370	15,165	23,343	34,398
DM	18,496	26,115	30,336	38,986	45,389	54,192	64,958	78,872
World	24,007	31,658	39,016	60,428	87,180	127,656	180,330	251,075
Regions (Sums)								
ASIA	4,658	7,537	10,245	17,541	30,776	50,924	76,807	113,257
LATAM	1,803	1,712	2,465	4,491	7,424	11,937	18,079	25,586
CEE	570	548	1,133	3,423	6,149	9,979	14,263	18,140
MENA	969	716	930	2,045	3,669	6,381	10,181	14,694
AFR	428	286	274	689	1,233	2,380	4,979	10,650
EUR	8,495	11,074	10,641	16,007	17,890	21,484	25,478	30,693
NAM	7,085	9,784	13,328	16,232	20,040	24,571	30,543	38,055

*These are projections based on the methodology described in the Appendix, and because the exercise's consistency across countries leaves out many country-specific considerations, they should not be interpreted strictly as forecasts.

Source: GS Global ECS Research, IMF

Table A3: GDP per Capita Level (2010 USD) *

	1980	1990	2000	2010	2020	2030	2040	2050
BRICs								
Brazil	3,096	5,201	4,598	10,723	15,531	22,421	31,983	43,586
China	477	522	1,179	4,382	9,956	18,365	27,714	40,614
India	604	572	568	1,256	2,507	4,709	8,541	14,766
Russia	2,209	10,248	20,528	34,491	49,995	63,486
N-11								
Bangladesh	561	444	453	706	1,299	2,481	4,673	8,392
Egypt	1,153	2,464	1,830	2,693	5,278	10,334	18,280	29,212
Indonesia	1,466	1,045	968	2,946	4,936	8,125	13,125	20,571
Iran	5,633	2,374	1,842	4,829	9,153	16,990	27,386	37,423
Korea	3,983	9,643	14,479	20,901	31,334	41,084	51,382	64,393
Mexico	7,634	5,232	8,391	9,161	15,193	23,719	34,581	48,268
Nigeria	1,859	495	468	1,369	2,129	3,692	6,802	12,591
Pakistan	824	664	640	1,007	1,852	3,568	6,763	12,106
Philippines	1,598	1,098	1,226	2,024	3,657	6,639	11,859	20,433
Turkey	4,953	5,730	5,227	10,197	15,606	24,400	35,599	48,577
Vietnam	1,195	148	494	1,179	2,681	6,032	11,999	20,996
G-7								
Canada	25,418	32,243	29,509	46,272	52,191	57,276	66,867	79,575
France	29,732	33,746	28,187	41,132	43,097	50,789	60,515	74,058
Germany	24,456	29,977	28,890	40,286	43,637	49,663	57,656	69,782
Italy	18,988	30,625	24,109	33,940	35,840	42,395	48,476	57,781
Japan	21,413	38,340	46,346	43,141	47,070	52,362	58,661	67,860
United Kingdom	22,328	27,266	31,393	36,228	42,336	51,992	63,457	78,091
United States	28,115	35,094	43,975	47,225	53,693	61,625	72,347	85,791
Aggregates (Averages)								
BRICs	1,701	2,036	1,813	5,144	10,152	17,270	25,003	34,595
N-11	4,546	4,117	5,816	8,085	11,685	16,222	21,987	29,363
Other EM	15,022	5,704	7,034	12,183	17,852	24,818	32,202	39,385
DM	25,290	33,347	36,843	43,977	48,744	55,971	65,495	78,114
World	19,979	24,232	24,458	26,089	27,701	31,966	38,154	46,472
Regions (Averages)								
ASIA	12,462	18,867	17,181	14,149	15,518	19,702	25,210	33,553
LATAM	6,750	4,873	6,275	9,497	14,351	21,630	31,432	43,703
CEE	4,634	4,061	3,654	10,420	18,336	29,783	43,070	55,528
MENA	27,763	9,446	11,269	17,024	22,856	29,897	37,188	44,833
AFR	4,236	2,725	2,172	3,727	4,548	5,869	8,400	13,001
EUR	24,097	30,351	27,834	39,745	42,795	50,192	59,029	71,242
NAM	27,876	34,850	42,790	47,145	53,565	61,245	71,860	85,231

*These are projections based on the methodology described in the Appendix, and because the exercise's consistency across countries leaves out many country-specific considerations, they should not be interpreted strictly as forecasts.

Source: GS Global ECS Research, IMF

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