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EMERGING MARKETS FORUM

2015 GLOBAL MEETING

Global Emerging
Market Economies
in 2050: Is rapid
convergence dead
or alive?

Introduction and
Overview

Harinder S. Kohli



**Emerging
Markets
Forum**

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Background and historic context

Harinder S. Kohli

The global economy has changed dramatically over the last 60 year. The world has witnessed a significant rise in the incomes and living standards of humanity as a whole. While performance has varied over different time periods, and between the 180 plus different economies, overall their recent progress has been consistent, driven by convergence between the developed and developing economies. As a result, more people have been lifted out of abject poverty in our lifetimes than perhaps at any other point in economic history.

The economic future of the world can be discussed with a focus on concepts like technological change, regional and international cooperation, inclusion, environment, and climate change. It also can be measured on the basis of a single measure: the Emerging and Developing Economies (EDE)'s share of world GDP. Today, by this measure (in terms of purchasing power parity), EDEs far surpass the advanced economies—55 percent of the total global GDP according to IMF data.

Since 2000, the average rate of growth for the emerging economies has been two and a half times that of advanced countries. To a large part, this differential reflects the emergence of China in the world scene in the last quarter century, but this essentially trend goes well beyond China, as a number of other large EDEs (such as India, Indonesia, Turkey, Korea, Mexico, Saudi Arabia, and Nigeria) have also grown significantly.

However, given the global economic turbulence since 2007, the still sluggish growth in much of Europe and Japan, a possible erosion in the global productivity growth rate, the bursting of the recent super commodity cycle, and, most recently, the slowdown in many large emerging economies (e.g., China, Brazil, Turkey, Mexico, South Africa, Nigeria), questions have arisen whether the convergence achieved by a majority of emerging markets during the past sixty years was an aberration and whether we are about to witness an end to this “golden era of rapid convergence.” Can the global economy community once again resume its march towards ever increasing living

standards through technological development and productivity gains? Or would more and more countries fall and remain mired in the middle-income trap?

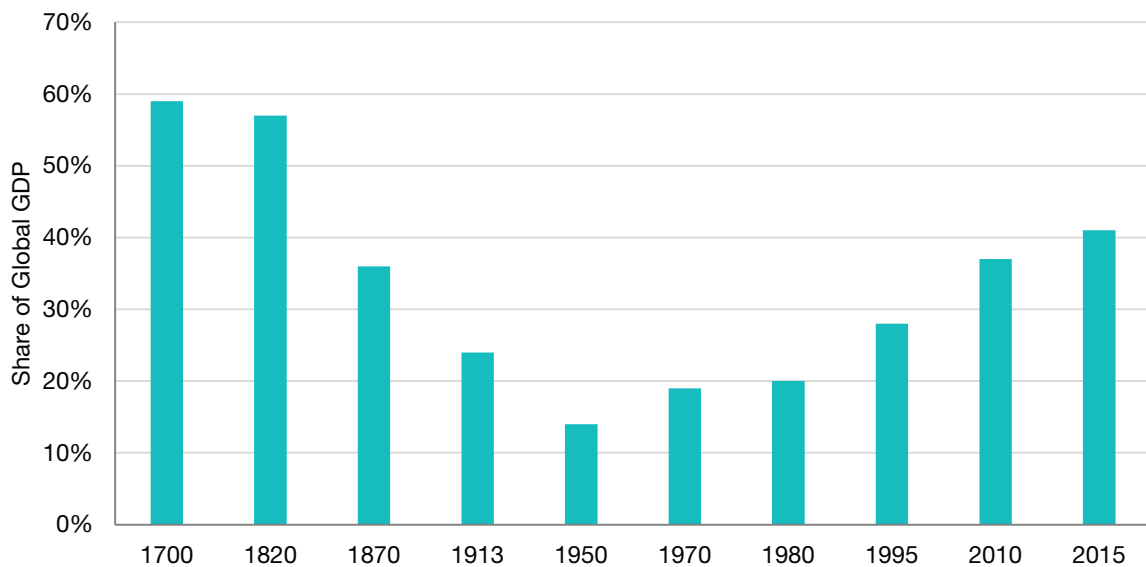
For much of human history, until the advent of the industrial revolution in the 1700s, almost all human beings, irrespective of what part of the world they inhabited, lived in abject poverty. Everyone was almost equally poor (except for a very thin ruling class). And they remained unable to save or invest much in economic assets in order to improve their longer term productivity and income. The life span of an average human being was much shorter (maybe half or less) than today. The quality of life of almost everyone was miserable, and human survival remained a constant challenge over the millennia. All this started to change with the industrial revolution.

The discovery of the steam engine and related technologies, supported by evolving industrial management techniques gradually raised economic productivity of the countries and people concerned. Steady industrial jobs, in turn, induced workers to move from the rural to urban areas leading to the development of modern cities, with better infrastructure and social services. Migration of workers from low productivity agriculture jobs to higher productivity urban employment by itself led to an improvement in the productivity of the country as a whole. Around the same time, the European maritime nations opened and controlled global shipping lanes, starting a long lasting boom in global trade, in specialization, and in the creation of comparative advantages amongst countries. National productivity and income levels, first of European countries and then of North American countries, rose steadily making the “Western countries” both richer and more developed. The rest of the world, in many instances ruled by European colonial powers, kept falling further and further behind in terms of productivity and per capita income.

Just before the industrial revolution, China and India alone accounted for over 50 percent of global GDP, not because they were richer than the rest of the world but because Asia had over 60 percent of the global population.

Given this economic history, the rapid rise of emerging economies during the last 60 years is all the more striking.

Figure 1: Asia's share of world GDP 1700-2015 (PPP)



Source: Maddison, Angus: Contours of the World Economy (1700-1950); Centennial Group International Estimates (1951-2010); Data from 1700-1950 and data for 1951-2010 is in market exchange rates.

By the mid-1950s, Asia's share of global GDP fell to as low as 14 percent before ultimate reversal of this trend that had lasted over 250 years (Figure 1).

Given this economic history, the rapid rise of emerging economies during the last 60 years is all the more striking. The share of G7 economies of the global output (in PPP terms) has gradually dropped from 57 percent in 1960 to only 32 percent in 2015. Developing economies as a whole now account for as much as 55 percent of global output. Other development indicators also tell an equally encouraging story. The proportion of absolute poor (those living at or below \$1.90 per day) has dropped from 52 percent in 1981 to below 10 percent in 2015. In parallel, the percentage of people classified as middle income has jumped from 27 percent of the world's population in 1990 to an estimated 47 percent of the world's population in 2015. People are healthier and living longer (71 years in 2015 vs. 65 years in 1990).

The steady convergence of many large developing economies (led by East Asian countries plus India) with the developed countries has yielded dramatic improvements in the output, income levels, and well-being of the emerging market societies. Whether or not this process will continue over the long term would have a decisive impact on the lives of billions of people in Africa, Asia, Latin America, and, indeed, the world as a whole. Although, the past journey has been far from smooth, as the Great Recession of 2007-08, and the more recent collapse of commodity prices show, we expect the process of convergence to continue, except for any unexpected cataclysmic events somewhere in the world. Furthermore, as more and more of EDE citizens join the ranks of the middle class, they would exert even greater effect on the world economic structure, societal values and governance.

However, the path ahead cannot be taken for granted. The strong performance of recent years was the result of a combination of fortuitous (including one time) factors,

It will take sustained commitment by both the leaders and citizens of emerging market economies to continue or better yet, accelerate their convergence with Advanced Economies.

like the greater opening up to world trade, a sharp rise in internal and external resource mobilization, a steady improvement in education levels, the effects of the demographic (population growth) dividend, new technological and medical breakthroughs, the development of global value chains, and for many in Africa and Latin America, the “super” commodity cycle of the first decade of the century.

It will take sustained commitment by both the leaders and citizens of emerging market economies to continue or better yet, accelerate their convergence with Advanced Economies. Failure to do so could usher in a reversal of history as EDEs become stuck in the middle income trap and once again begin to fall further behind the rest of the world.

Analytical building blocks

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This study is unusual in its objectives, scope, and coverage. Its reach is global: all 185 countries—developed as well as emerging—that comprise the entire global economy are included. The 12 topics covered are challenging in breadth and complexity. The study involves a very long time period, 35 years. And, there was a strong preference on part of the study team to produce evidence based analysis and conclusions. These characteristics called for an analytical approach that did not rely exclusively on only one approach or tool. It was decided to utilize both quantitative and qualitative techniques, including by seeking the contributions and qualitative judgments of over a dozen world-class experts from throughout the world. The main analytic building blocks of the study are as follows:

Traditional growth model

The foundation of the analytic work supporting this study is the standard growth model which estimates trends in economic growth based on each country's labor force, changes in its capital stock, and changes (growth) in total factor productivity over time.

Centennial's model estimates GDP as a function of labor force, capital stock, and total factor productivity for 185 countries between 2015 and 2050 under three different growth scenarios called: "business-as-usual," "optimistic," and "pessimistic (middle income trap)."

A Cobb-Douglas function with constant returns to scale is assumed, with α equal to two-thirds:

$$GDP = TFP \times L^\alpha \times K^{1-\alpha}$$

GDP figures are generated for three different measures: real GDP (constant 2010 prices); GDP PPP (constant 2010 PPP prices); and GDP at expected market exchange rates. The model estimates annual real GDP growth for each country between 2015 and 2050. To derive GDP at market exchange rates, real exchange rate changes are estimated to obtain GDP at market exchange rates.

Research shows that some growth differences between developing countries can be successfully modeled by separating converging and non-converging countries (Gill and Kharas, 2007). A country is deemed to be converging if its per-capita income has rapidly converged over a 20-year period to that of best practice economies.

This convergence reflects technology transfers from richer, more innovating countries, technology leapfrogging, the diffusion of management and operational research from more developed countries, and other ways that a country can induce productivity improvements by learning from economies that are at or closer to the productivity frontier. The lower the country's relative productivity, the larger the boost, and the quicker the catch-up.¹

The model provided separate results for the three scenarios. The difference between the scenarios is how countries are classified, either as converging, non-converging, or failed, and how countries gradually transition between classifications. For all three scenarios, the starting point is the countries' statuses in 2012: 14 countries are rich and converging, 22 are rich and non-converging, 34 (5 Latin American) converging, 103 (24 Latin American) non-converging, and 11 (1 Latin American) failed.

The business-as-usual scenario assumes that all countries will maintain their original tiers classifications through 2042. The second scenario is the optimistic scenario. Here, countries assumed to step up into the category of fast convergers first experience an investment boost and then gradually accelerate productivity growth. The transition of individual countries between converging and non-converging, or from failed to non-converging, is gradual; the countries are made to adopt an intermediate state between failed and not-failed, or between converging and non-converging.

1. TFP is used in the convergence term instead of the per-capita income used by others for three reasons: first, if the equation were to use GDP per capita, over time the TFP of a converging country would not converge to that of the US but instead to other values. Also, since the convergence equation represents convergence of TFP, we use TFP in order to make the equation consistent with its purpose.

The key challenge at this third and final analytic step is to overlay the quantitative results from the model with the qualitative views and judgments of experts is to determine how the ten megatrends will potentially affect economies in various parts of the world.

The model has been successfully employed in ten other similar long-term studies. Because of this past extensive work, we are confident about the model's inner workings and the overall robustness of its outputs.

Assessment of the key global megatrends

The model generates the first round of future scenarios based on historic data on all key economic indicators (for each country, data are stored in the database to which the model is linked). But it is well known that such econometric models are not capable of anticipating changes in the long term trends, or taking into account any new economic realities on their own (being referred to by us as "megatrends").

To overcome this potentially serious weakness in this study, additional work was commissioned to supplement the model results with separate assessments of the most important global megatrends that could alter the future trajectory of the global economy. World-class experts in each field were commissioned to assess the likely developments and their impact on the global economy.

The ten megatrends judged by the study team to be of most influence to the global economy are:

- Demographics: *An aging and stable population*
- Urbanization: *Towards a predominantly urbanized world*
- Globalization of international trade: *Increasingly intertwined economies worldwide*
- Globalization of capital flows: *Towards larger, more integrated financial markets and massive private capital flows*
- Transformation of the global economy: *Steady rise of the emerging economies*
- Rise of a massive middle class: *Towards societies driven by the values and aspirations of the middle class*
- Natural resources: *More intense competition for finite natural resources (including water)*
- Technological progress and development: *Accelerating technological change to find global solutions*

- Climate change: *The time for action is now*
- Communications revolution: *Fueling fast rising aspirations*

Study team judgments

The key challenge at this third and final analytic step is to overlay the quantitative results from the model with the qualitative views and judgments of experts is to determine how the ten megatrends will potentially affect economies in various parts of the world. For this purpose, the study team jointly reviewed how various megatrends may reinforce or offset each other. The discussion of the megatrends in turn led to the identification of a large number of what-if questions. They were fed into the model, yielding dozens of scenarios. The final step was to select only three of these scenarios to be included in the study. This final pruning was purely judgmental. It was more of an art rather than a science.



Global megatrends

Harinder S. Kohli

Almost all studies on long term prospects identify and attempt to assess the potential impact of the fundamental drivers that would, together, heavily influence (though not necessarily determine) the future trajectory of an individual economy or issue at hand. Centennial Group's earlier studies of this nature have also followed this approach. Each study identified the key international and domestic drivers. With each study and with time—as the global economy continued to evolve and major individual economies became integrated more fully with the global economy, it became clearer that most countries and regions are increasingly influenced by the same (or similar) global mega trends. These mega trends when combined with certain key domestic factors (like the quality and effectiveness of domestic institutions, governance as well other domestic factors such as the quality of individual country's infrastructure, business climate and rule of law) now are regarded as the key drivers of economies world wide. Further, these mega trends are relevant to both advanced and emerging economies. According, on the following pages, we highlight ten megatrends that in our judgment are of particular relevance in considering the long term prospects of emerging market economies worldwide.

1. Demographics: An aging and stable population

From overpopulation to aging

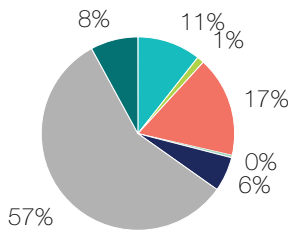
In 1980, the world population was 4.4 billion. Asia represented 57% of the world's population while Africa represented 11%. At this time, the population was growing at 1.8 percent, showing a modest decline from the late 1960s, when the world population had been growing at over 2 percent. Growth in emerging markets far outpaced growth in advanced economies. The main concern during the half century from 1960 to 2010 was over population. Since then, there have been gradual but dramatic changes. The global population today is seven billion. South and East Asia now account for only 55% of the global population and growth rates have eased in all parts of the world except Middle East and Africa. Assuming continuation of the recent trends, the UN expects Africa to increase its absolute population to 2.5 billion by 2050 and its share of global total to 8 percent.

Equally dramatically, almost all regions (except, again, Africa and the Middle East) have already started the trend toward an aging population. As a result, the predominant concern in much of the world has shifted from the past focus on overpopulation to concerns over aging and a declining population today. One dramatic example of this is Japan, where total population is expected to decline by 30 percent between 2010 and 2050. Korea, Singapore and Taiwan are on a similar trajectory. The most dramatic example in the future will be China, which will age faster than any other country in history.

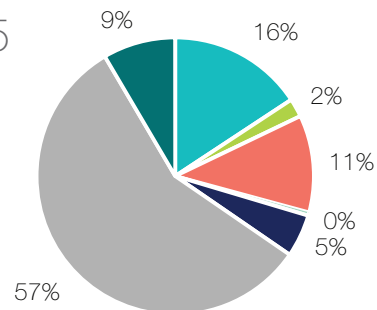
These trends in Asia supplement the already stagnant population growth in Western Europe and the former Soviet Union. Latin America is also expected to have very modest, if any, growth in the absolute size of its population by 2050. The only exceptions to this worldwide phenomenon are Africa and the Middle East. Most developed and developing regions will share from now onwards similar characteristics and challenges regarding demographics. In summary, within our own lifespan, the world has moved dramatically from its past focus on overpopulation to a policy debate on how to cope within an aging, and possibly shrinking, population.

Regional shares of population

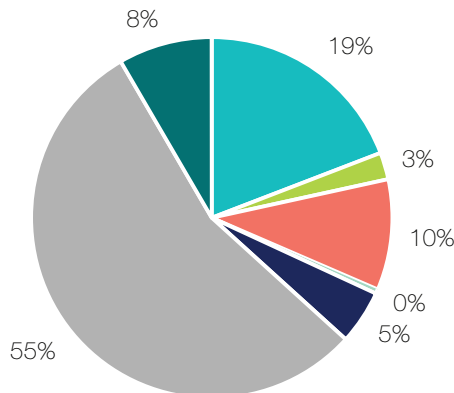
1980



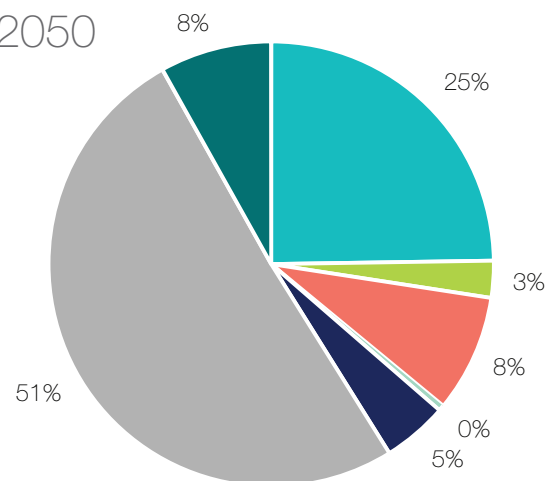
2015



2030



2050



■ Africa ■ Middle East ■ Europe ■ Oceania ■ North America ■ Asia ■ Latin America & Caribbean

Source: Centennial Group

2. Urbanization: Toward a predominantly urbanized world

In 1980, with the exception of citizens of the G7 countries, most people in the world lived in rural areas. Today, more than 50 percent of the world's population lives in urban areas. The most dramatic shifts have been in Asia and Africa.

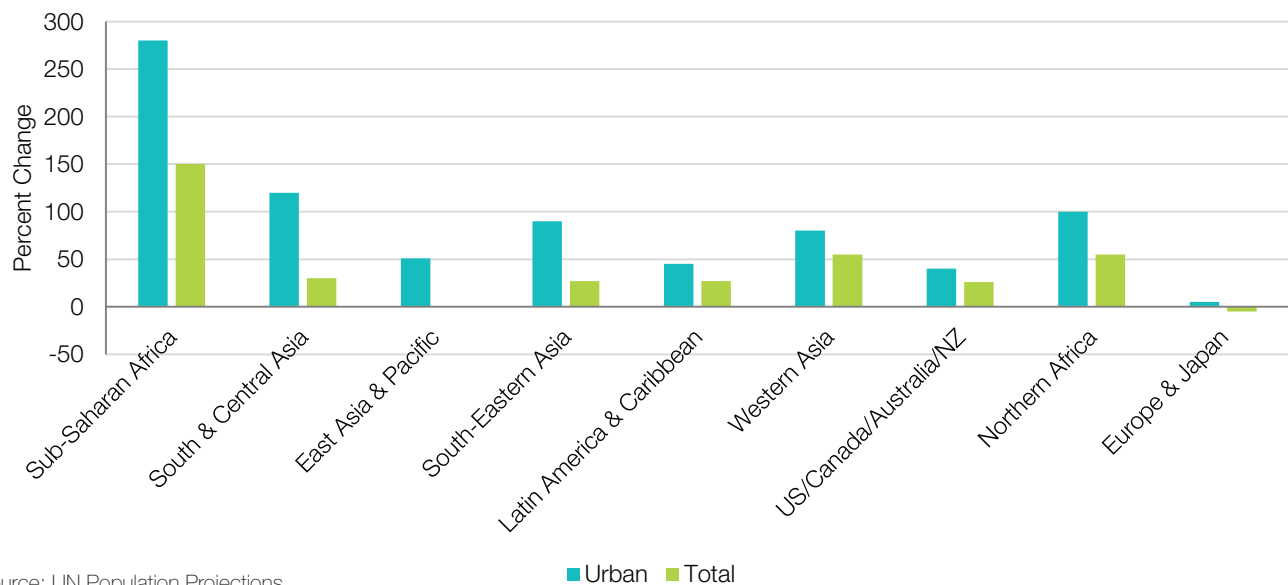
Smart cities

Efficient, safe, and vibrant cities, an integrated regional space and effective urban and regional management with citizen participation are essential ingredients for a country's future competitiveness and for the quality of life of its citizens. As emerging markets continue to grow, the world will experience an urbanization avalanche. This will particularly be the case in Asia, where urban population will rise by nearly 1.4 billion over the next 35 years. Already Asia has seen a major demographic shift. Asia was predominately a rural society in 1970 with just 20 percent, or 442 million people, living in cities and towns, by 2010 Asia's urban population was 40 percent of the total—almost 1.6 billion people. As the pace of urbanization in East Asia and Latin America moderates, but at the same time its speed accelerates in Sub-Saharan Africa and South Asia, the spread of urbanization globally will accelerate between now and 2050. The world needs a priority agenda to handle this expected dramatic demographic shift.

Cities and competitiveness

Mega, as well as secondary cities will play a vital role in economic competitiveness as well as social stability. By 2050, in many emerging economies, around 90 percent of economic output will be generated in urban areas. Cities and towns will also be responsible for over 80 percent of carbon emissions. The efficiency of urban areas will heavily influence a country in economic performance. Cities will need to modernize swiftly and improve the quality of life of their residents in order to accommodate rapid urbanization and, even more, rapidly rising expectations and aspirations of the fast growing middle class. In the case of Asia, migrants poured into often illegal—and now endemic—slum and squatter settlements. In most of the larger cities of Asia (e.g. Manila, Jakarta, Bombay, Calcutta, Karachi, Bangkok), by now, some 25 to 30 percent of the population lives in such settlements, typically in makeshift shacks without basic public services, including water, drainage, sanitation, paved streets, or basic healthcare. Meanwhile, simultaneous expansion of motorized vehicle use—buses, trucks, taxis, but especially the private car—is changing the character of traditional urban cores. City streets built for another age (horse-drawn carriages) are being widened to meet growing demand for space by vehicles. The pressure of population growth and insufficient investment has led to a steady deterioration of public services in country after country. For a more detailed discussion on this topic, see “Urbanization and Development from 2010 to 2050,” by Gregory Ingram.

Percent change in population, urban and total, 2010-2050



Source: UN Population Projections

3. International trade: Increasingly intertwined economies worldwide

For the past century, a key driver of long-term growth has been globalization of international trade, capital, labor flows, and exchange of ideas, which have been facilitated by rapid increases in connectedness among key economies in the world. For instance, merchandise trade as a share of world GDP rose from about 17 percent in 1960 to nearly 50% in 2014. Merchandise trade as a share of world GDP rose from about 17 percent in 1960 to nearly 50% in 2014.

Open economies

Despite the temporary setbacks caused by the Great Recession, further globalization of trade, investments, and capital flows is expected to continue, maybe even accelerate. In the past fifty years, countries that have embraced globalization (such as East Asia) have exhibited superior economic performance.

The basic lesson from this relentless globalization of advanced as well as emerging economies is that individual

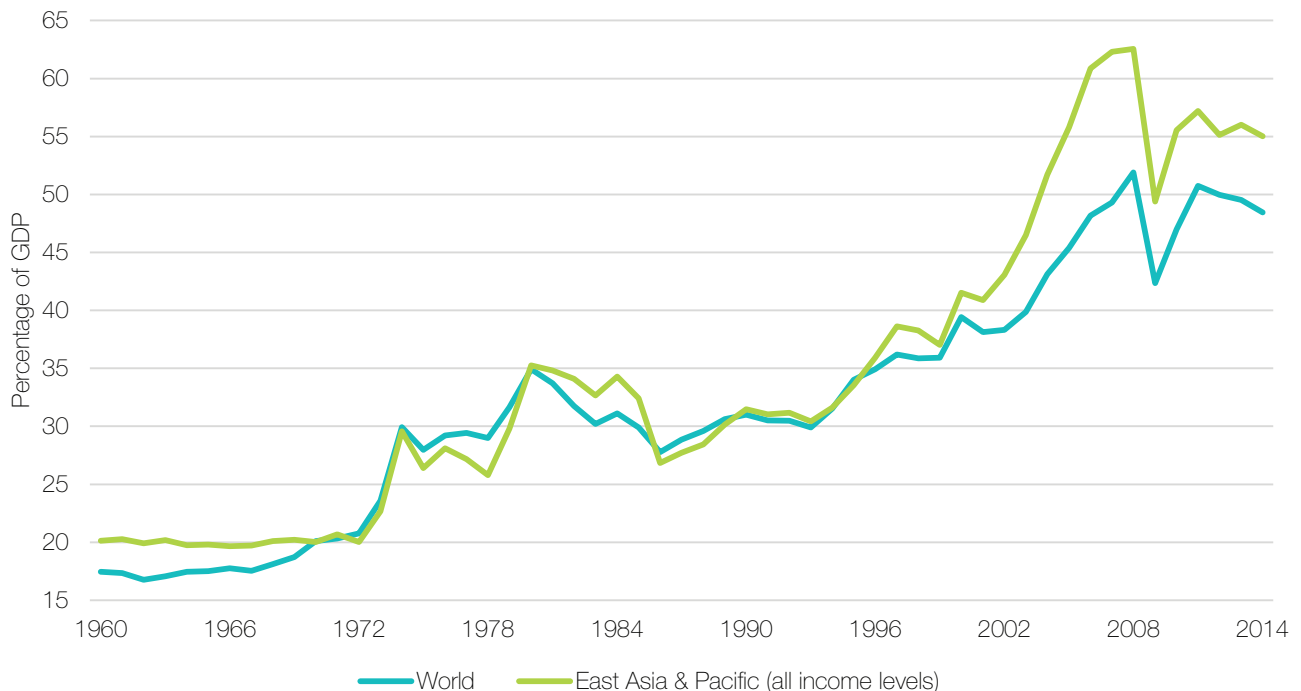
economies need to open themselves to the rest of the world, as East Asia did before achieving superior economic performance. Emerging markets must do more to internalize implications of globalization in their economic strategy and policies. Enhancing resilience to external shocks must be an integral part of such policies and strategies.

Looking to 2050

Asia is expected to account for the bulk of global savings and investments and for the fastest rise in world trade and consumption (assuming that China will continue to encourage and promote domestic consumption over exports and domestic investment). While the G-7 countries will continue to have a much higher GDP per capita than Asia and also have a large share of international trade, it appears clear that from now on incremental growth in global GDP, investment, and trade will come from the emerging markets, particularly in Asia.

Our team remains cautiously optimistic about prospects of continued trade expansion between now and 2050. This is despite the decades-long stalemate at WTO negotiations on further reforms of global trading rules. Our optimism rests on the more recent breakthroughs in massive regional trade agreements between some of the world's largest trading nations under the TPP and TIPP, as well as ASEAN plus 3. For a more detailed discussion, see the background paper by Pascal Lamy.

Merchandise trade as percentage of GDP



Source: World Bank

4. Globalization of finance: Towards larger, more integrated financial markets and massive private capital flows

The future of finance

Significant work has been done since the 2008-2008 global financial crisis (or the Great Recession) to examine the future of finance and its role in supporting real GDP growth. There is now a growing agreement that the earlier work on finance and development had been relatively simplistic, relying on the premise that financial deepening automatically meant financial stability, in the same naive way that central bankers pre-crisis equated monetary stability with financial stability.

Finance cannot be separated from the real economy/society. Financial markets rest on complex systems evolving within complex systems, their behavior is non-linear and multi-dimensional. This means that there are complex trade-offs between size, efficiency, stability and access (fairness) of financial systems.

Consequently, linear projections of financial deepening by emerging market economies (EMEs) based on simple

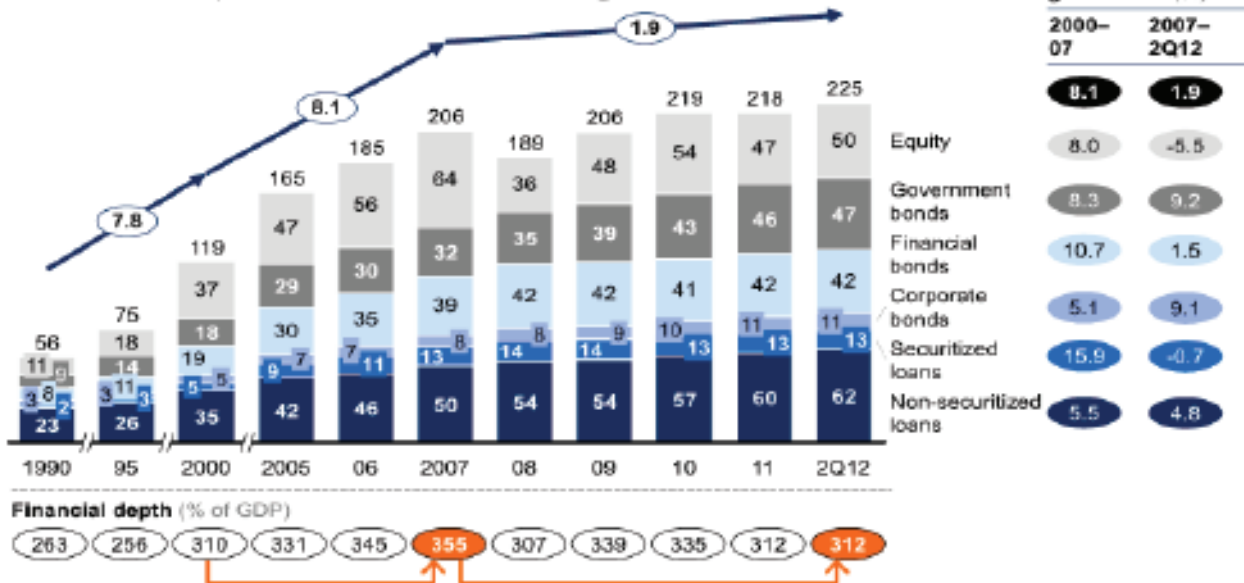
projections of GDP are likely to be optimism-biased. Whether EMEs can overtake advanced economies (AEs) by GDP size and financial deepening (market size) is neither inevitable nor pre-ordained. How the global economy and financial system will evolve vis-a-vis EMEs and Advanced Economies will be dependent heavily on how dynamic and strategic they are in embracing major transformative trends, such as demographics, urbanization, technology, climate change, and natural disasters and territorial conflicts. However, what is clear also is that the globalization of financial markets and an explosion in private capital flows will have a fundamental, mostly positive, impact on the growth prospects. At same time, the uncertainty, volatility, and risks faced by each and every country would most likely increase. For a more detailed discussion of capital flows, please see the background paper by Andrew Sheng.

Growth in global financial assets

Global financial assets have grown to \$225 trillion, but growth has slowed since 2007

Global stock of debt and equity outstanding¹

\$ trillion, end of period, constant 2011 exchange rates



¹ Based on a sample of 183 countries.

SOURCE: McKinsey Global Institute Financial Assets Database; McKinsey Global Institute analysis

5. Transformation of the global economy: Steady rise of the emerging economies

A shift in the global economy

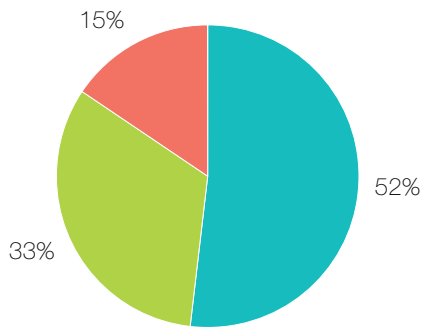
Enormous shifts are taking place around the global economy. Its fortunes no longer depend on the American, European, or Japanese consumers alone, but also equally on investors and consumers from emerging markets. Structural growth in developing countries has decoupled from high-income countries, but business cycles have, if anything become more synchronized. Developing countries' contributions to global investment growth are now higher than that of the advanced countries. At the same time, cyclical upswings and downswings in the growth in developing and high-income countries remain highly intertwined.

The future of global output

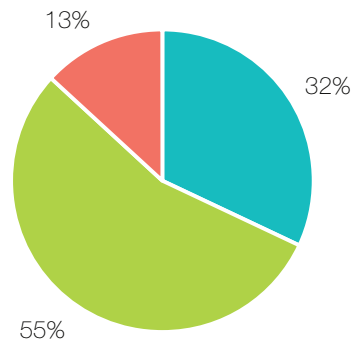
Studies by the Centennial Group and other parties suggest that by 2050 emerging market economies (as classified today) are expected to account for about two-thirds of global output; very different from the situation just a few years ago when the G-7 economies generated two-thirds of world GDP.

The sharpest economic growth is expected in Asia, which could account for half or more of global GDP in 2050. In reaching such a dominant share of the global GDP, Asia is expected to account for the bulk of global savings and investment and a fast rise in world trade and consumption (assuming that China will continue to encourage and promote domestic consumption over exports and domestic investment). While the G-7 countries will continue to have a much higher GDP per capita than Asia and also have a large share of world trade, it appears clear that from now, incremental growth in global GDP, investment, and trade will be generated in the emerging markets, particularly in Asia. For a more detailed discussion, please see "The Longer-Term Prospects for Emerging Market Economies," by Claudio Loser et al.

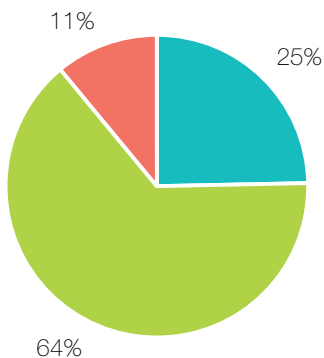
Share of global GDP in...
1980



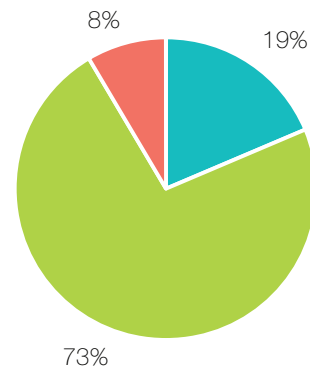
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2030



2050



Source: Centennial Group

6. Rise of a massive middle class: Towards societies driven by the values and aspirations of the middle class

Emerging markets

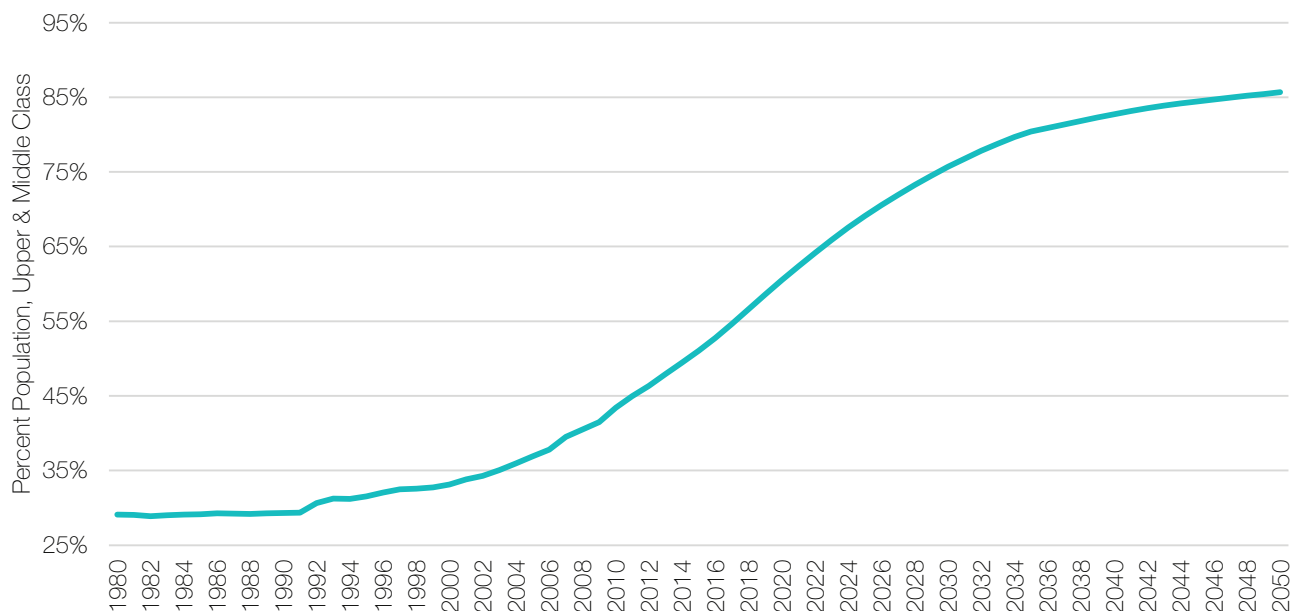
Another global megatrend of this 21st century is the emergence of a large, in many instances even a dominant, middle class in emerging market economies; this would be particularly so in Latin America and Asia. As we have seen earlier, in today's developed economies, emergence of a large middle class has far reaching implications for a society due to its economic, social and even political ramifications.

Centennial Group's estimates suggest that the two emerging regions are poised to fuel an explosive growth in the number of people who may be classified as belonging to the middle class (per capita income of between \$10 and 100 a day in PPP terms). In terms of absolute numbers, Latin America and Asia will lead this trend. Indeed, in the past fifteen years Latin America has already witnessed an unprecedented growth in its middle class as a result of the decade of robust economic growth and a welcome reduction (though still modest) in the disparities thanks to the success of the poverty alleviation programs in China, Brazil, and Mexico, and most recently in India and Vietnam.

In 1990, people classified as middle class already comprised almost 50 percent of Latin America. By 2014, the ratio had risen to about 65 percent, the highest of any developing region (though the total number of middle class citizens exceeded in Asia).

Based on the current trends, by 2050, as much as over 95 percent of Latin American and almost all of the East Asian would be classified as either middle class or upper income. There will be almost no absolute poor by today's standards in these two regions. The total number of middle and upper income persons could approach 2.3 billion in East Asia and 730 million in Latin America. This will be truly transformational, compared to the situation only a generation ago. In other words, by 2050, Latin America and Asia will be the regions predominantly populated by the middle or upper income citizens; these Asians and Latin Americans will look towards Africa. Already by 2030, such citizens will account for between 80-85 percent of the global total.

Percentage of world population classified as upper or middle class



Source: Centennial Group

7. Natural resources: Competition for finite natural resources

A new equilibrium

The expected increasing affluence of some 4-5 billion additional Asians, Latin Americans, and Africans between now and 2050 would greatly expand potential demand for and conceivably greatly intensify competition for, finite scarce natural resources (energy, minerals, water, and fertile land), especially if they emulate current Western lifestyles. Global supply may not readily accommodate changes in demand of this magnitude, especially for non-renewable raw materials.

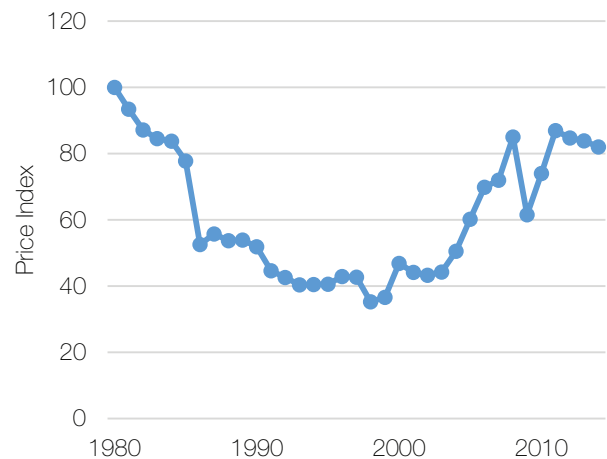
Concerns about the sustainability of economic growth are not new. They date back to Malthus and re-emerge whenever economic growth is rapid. Until two years ago, there was a backdrop of rising prices of food, fuel, and other raw materials (until two years ago). The new equilibrium will surely be found in a combination of adjustments: price increases to reduce demand and increase supply; new technologies to reduce unit consumption and/or substitute with more plentiful, renewable resources; and recycling to minimize waste.

Commodity prices

Increased globalization and higher demand from commodity deficits fast-growing Asian economies like China and India unleashed a super commodity cycle around 2005. Commodity prices also become more synchronized and had been on a steep upward trend. The post-2005 commodities boom was one of the largest on record, and the movement of energy, metal, and agriculture prices is much more tightly linked than in the past, including due to the increasing trading and hedging by the financial markets. In the future, given increased synchronization of business cycles, commodity price fluctuations are expected to continue. So would be the price volatility partly because of the greater role being played by financial markets and speculators.

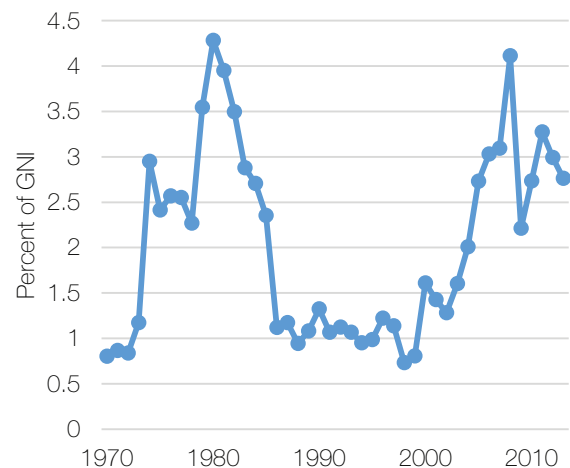
Over the longer term, potential demand for most commodity is expected to remain high. But technological progress continues to increase the efficiency of resource use, and energy and food use per unit of global GDP continues to decline. Overall, real commodity prices are expected to exhibit periodic fluctuations. For a more detailed discussion, see the background paper by Ram Agarwal.

World commodity prices



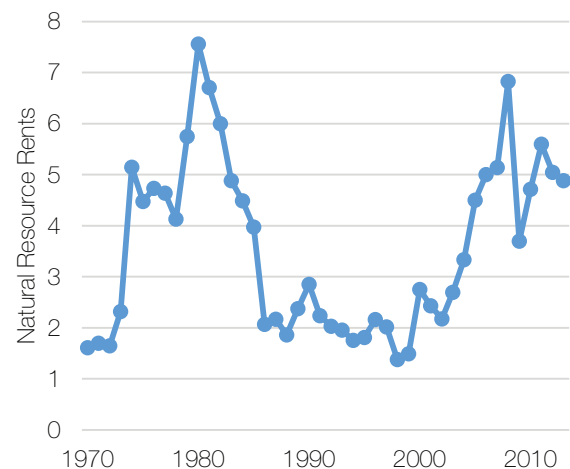
Source: IMF

World natural resource depletion



Source: World Bank

World natural resource rents



Source: World Bank

8. Technological progress & development: Potential solutions to the world's evolving challenges

Technological development has the potential to provide the solutions to other global megatrends and to help the world tackle current and new global challenges. It could also be the key to sustaining productivity growth at or close to the growth rates achieved over the past 100 years. A few examples of rapid technological progress are described below.

Information technology

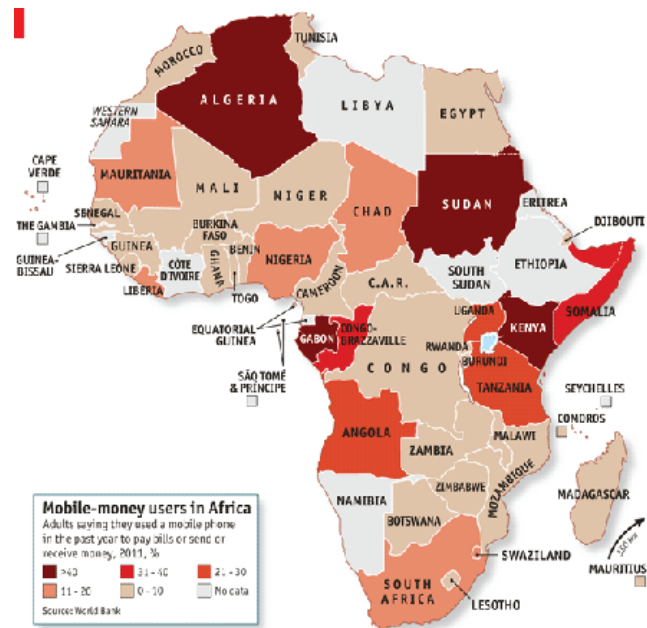
The performance of microprocessors has improved by 25,000 times since their invention. Every 18 months, technology has helped double the speed of microprocessors. The computer of 2050 is expected to be as powerful as all computers in Silicon Valley today put together. The buzz words in the computer world are: smaller, faster, cheaper, pipelined, superscalar and parallel. Several laboratories around the world are busy exploring novel technologies that may one day herald the arrival of a new generation of computers and microelectronic devices. Some are exploring the possibility of developing quantum techniques, which would capitalize on the non-classical behavior of the devices. Others are taking non-silicon routes by developing data storage systems that can potentially use photonically activated bio-molecules. Yet others are exploring nano-mechanical logic gaps.

Mobile internet

Nielsen reported that 91% of US consumers already have their mobile phones within reach at all hours. By 2050, practically all Internet connections could be through mobile devices, and a majority of new Internet users could be using mobile devices as their primary or sole means of connecting to the Internet, indeed to the rest of the world. The mobile world will be omnipresent in 2050.

Automation of knowledge work

By 2050, computers will be able to perform tasks today typically considered 'human' – such as complex analyses, subtle judgments, and creative problem solving. We will be able to interact with a machine in the way that one would with a coworker. Instant access to information and substantial enhancement in the quality and pace of decision making, and consequently, the



Source: *The Economist*

performance, will be the benefit. Indeed, thinking machines with processing powers that far exceed those of the human brain will become a distinct possibility by 2050.

Making technology work for the global good

All the technological advances and breakthroughs described above are exciting and promising. Add to it the expected breakthroughs in energy production, rapid advances in bio-technologies, genetics and medical services and we have the makings of a brave new world.

However, in order to ensure that the promise of these technologies meet their full potential, there will be several challenges; social, cultural, political, policy level, etc. that will have to be dealt with.

We must also keep in mind that technological innovation has to be backed up by a business model innovation, a system delivery innovation, workflow innovation, organizational innovation, policy innovation, etc.

Find more information about this megatrend in "Technology 2050" by R.A. Mashelkar.

9. Climate change: Time to act is now and to do so jointly

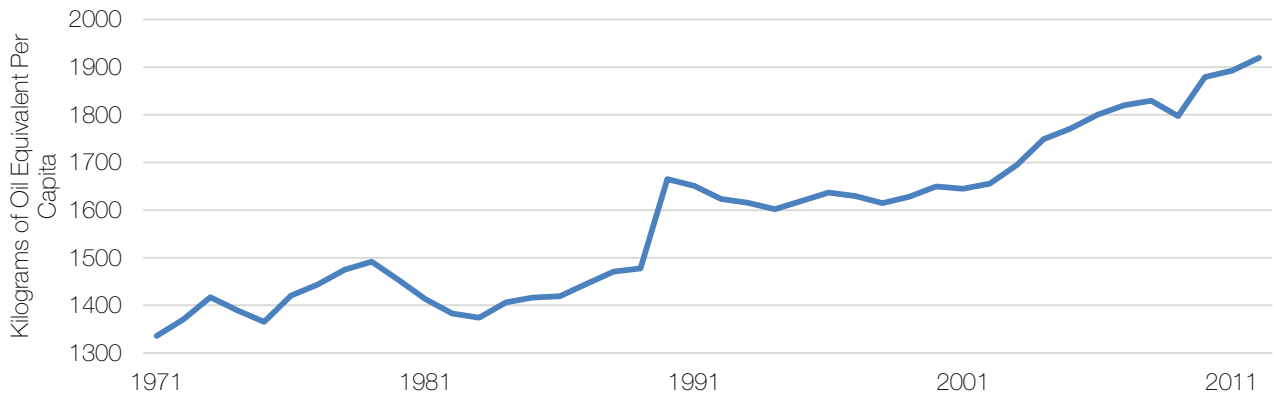
Likely adverse impact

Climate change will likely have a critical impact on the future development prospects of each and every country. Global warming caused by a sharp rise in carbon emissions and other man-made actions, is leading to rapid and unprecedented climate change throughout our planet. The changes are difficult to quantify with a high degree of confidence, but are certain to have an adverse impact on most countries. The increased frequency of severe weather events, increased coastal flooding, a sharp increase in drought stricken areas, and a deterioration in urban air quality are probably manageable over the next two to three decades. Beyond that, however, there is much greater uncertainty and clear risks of catastrophic developments.

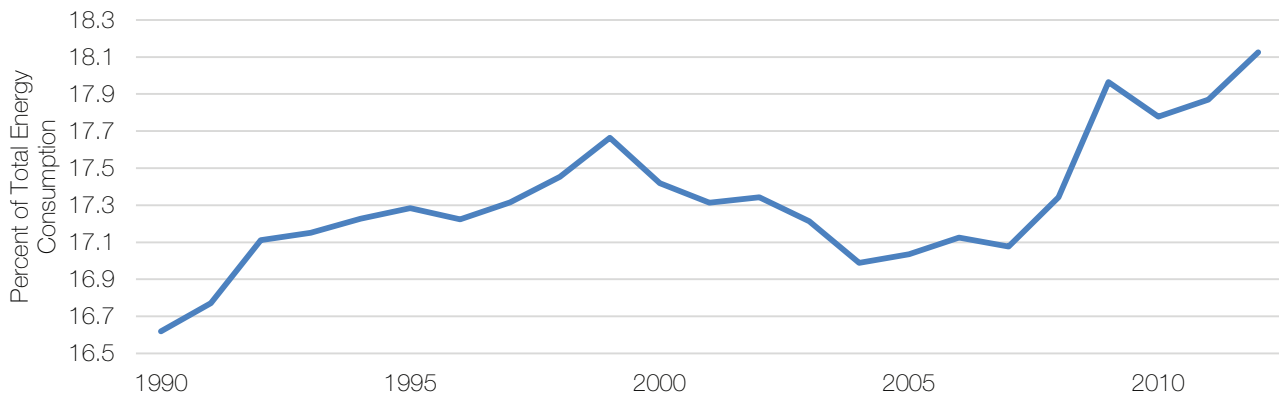
Emerging consensus

Despite inevitable uncertainties, by now there is broad consensus amongst most international scientists and environmental economists that the effects of climate change could threaten human lives and damage the social capital and that it could even reverse the fruits of development that both advanced and developing countries have accumulated over the centuries. International development partners are working to mainstream climate change issues into their development cooperation policies and strategies. All countries—developed and developing—must step forward now and start taking remedial steps in order to limit the rise of global temperatures to less than 3°C by 2100. Hopefully, the UN Conference on Climate Change scheduled for December 2015 in Paris will help forge a global consensus on how to best to do so and make universal commitments towards its implementation. For a more detailed discussion of climate change, please see the background paper by Alexander Pfeiffer and Cameron Hepburn.

World energy use



World renewable energy consumption



Source: World Bank

10. Communications revolution: Fueling and satisfying rising aspirations

Recent events in Egypt and Tunisia (and even more dramatically by the rise of ISIS in the Middle East) have demonstrated the power of the communications revolution on even more traditional societies and politics. This power can be put to use to facilitate human progress. But they can also be misused to disturb global peace and harmony.

How information is shared

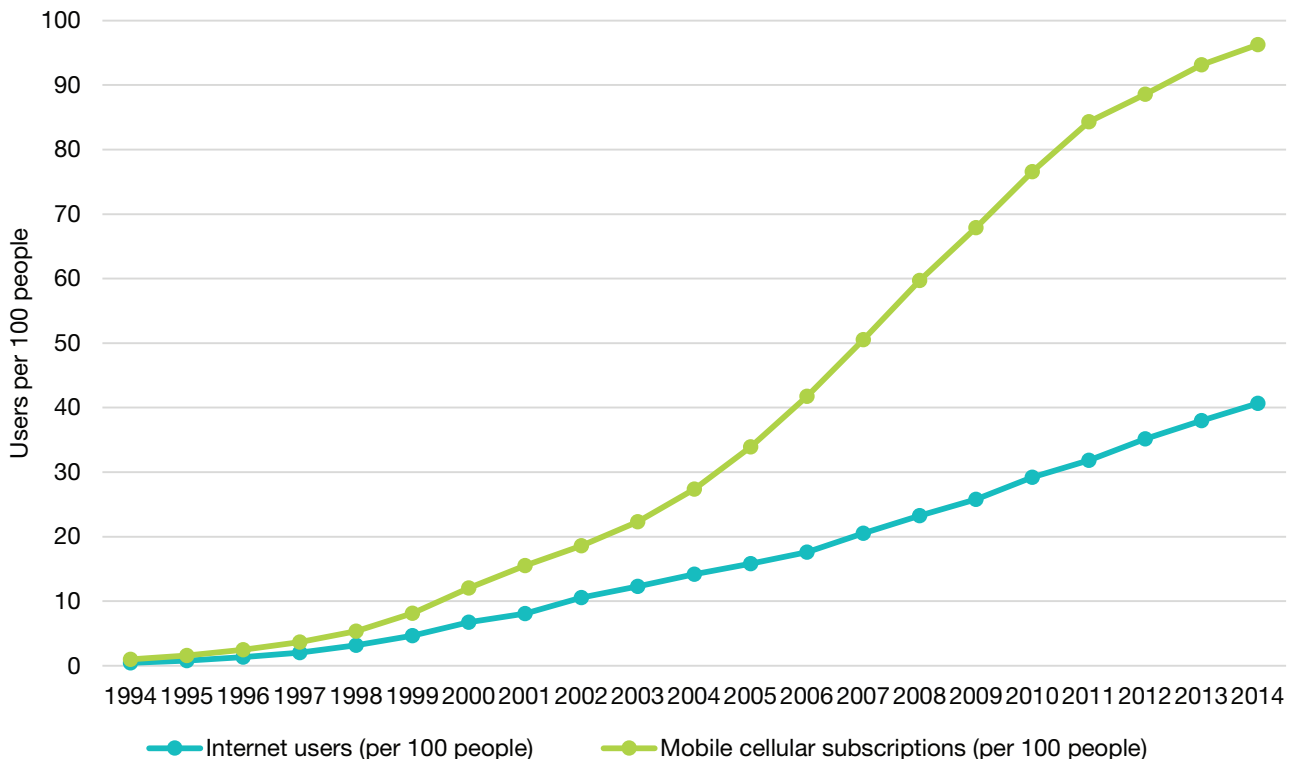
Satellites, television, mobile telephony, and the Internet—leveraged by the new social media—have already revolutionized the way in which information is gathered, stored, searched and shared within and across national boundaries. Witness the advent of the World Wide Web within the last two decades and more recently, the sudden emergence to new global business giants like Google, Facebook, and Twitter. The latest example of how the communication revolution can be harnessed to create brand new business models to deliver services to

the consumers worldwide is Uber. It is hard to imagine that Amazon disrupted the traditional retail business model only a decade ago.

Role in developing countries

Until a few years ago, digital or electronic communications were primarily the preserve of developed countries. In the past 10 years this revolution has also spread to developing countries, especially in Asia. Just 10 years ago, only two or three of 1,000 Indians had access to a telephone (mainly fixed lines). By the end of 2014, India had almost 1 billion cell phone connections, for well over two-thirds of all Indians. Similarly, Internet penetration has exploded, not only in high-income East Asia, but also in middle-income PRC and India. The pace of change of this communication revolution is likely only to accelerate in the next 40 years.

Mobile cellular subscriptions & internet users, 1994-2014



Source: World Bank, 2015

Findings and conclusions

Harinder S. Kohli

The main findings of the overall study are as follows:

1. *Convergence is alive and well but by no means guaranteed.* The various scenarios generated by the Centennial's model of the world economy suggest that, all said and done, prospects are good that the ongoing shift in relative economic power will likely continue and emerging markets as a group will continue their convergence with the advanced, richer economies through 2050.
2. The past superior performance of many EMEs in the recent years was partly (but not exclusively) the result of a number of important one-time events whose beneficial impact has already been mostly harvested. Such events include:
 - The unprecedented opening up to international trade and knowhow during the past 60 years;
 - Reform in the domestic business environment and opening to international capital helped enhance both domestic and international investment rates boosting the overall economic growth;
 - Dramatic improvements in education levels worldwide during the past 50 years has helped improve social indicators and raised labor productivity;
 - The effects of the demographic dividend, as population growth rates have fallen and dependency ratios have improved ;
 - Easier access to and the acquisition of new technologies;
 - Major medical breakthroughs that have cut down child fatalities and allowed people to live into old age;
 - For many countries, the commodity boom during the first decade of the century;
 - And above all, the success of the world community in containing regional conflicts and avoiding a full-fledged global war for now almost 60 years. Absence of major global conflicts has saved enormous human and financial resources that in turn allowed most societies to focus on economic development and invest precious resources into economic priorities.
3. *Clearly, many of these factors that positively influenced economic development during the past 60 years cannot and are not going to be repeated, at least to the same degree.* Other factors—like the dramatic improvements in terms of trade of commodity exporters, were cyclical and have either been already been reversed. Furthermore, the largest advanced economy (the US) appears ready to ease back on the massive stimulus (including close to zero interest rates) launched eight years ago to fight the dangers posed by the Great Recession. As the Federal Reserve reverts to more normal monetary policy, there will be huge adjustments in the world economy, including return of massive capital flows back to the G7 countries. This, combined with the ongoing changes in the structure of domestic demand in China and repeated crises of growth in many of the countries, means that the past engines of growth for the global economy may not continue (with the same force and impact in the future).
4. Overall, our study team concludes that it is most likely that actual outcomes by 2050 would indeed fall within the range of the three scenarios portrayed in this study. This cautiously optimistic bottom line is justified by the fact that economic fundamentals that normally drive long-term growth are likely to remain favorable for another three decades or so: existence of still a large technological and productivity gap which emerging economies can close; relatively high saving and investment rates compared to Advanced Economies; a window of another 20 to 30 years with positive demographic trends; optimism that technological breakthroughs can

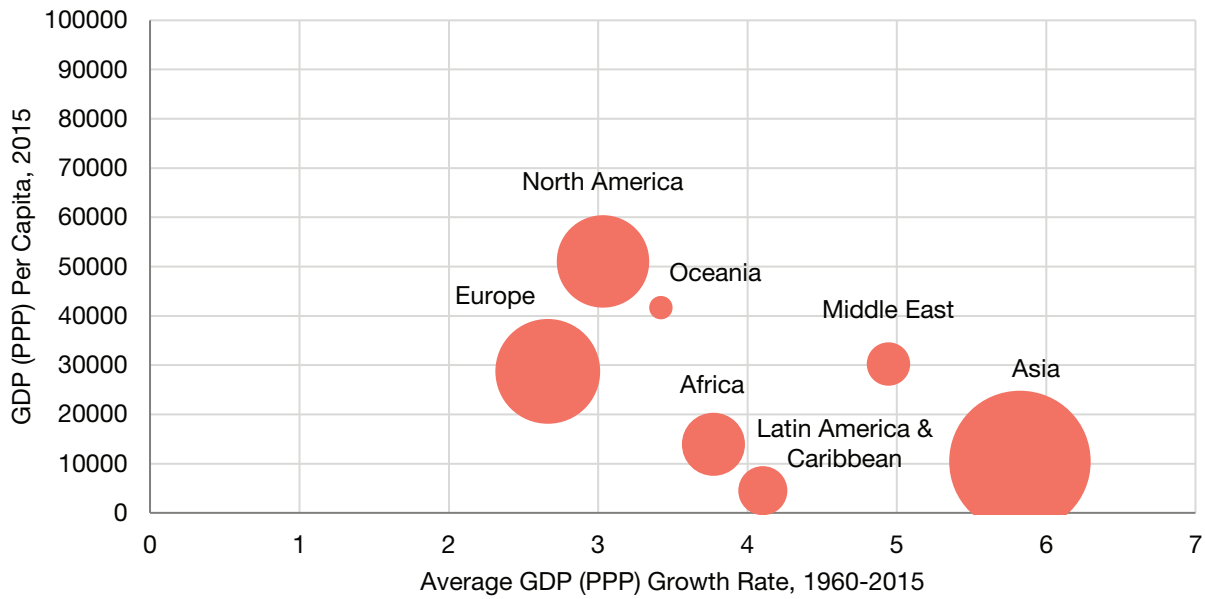
Continued rapid convergence cannot be taken for granted, and the countries simply cannot afford to become complacent.

help tackle the new economic challenges; scope for significant further improvements in human capital; and finally, the possibilities of further improved quality and effectiveness of domestic institutions.

5. *However, the pace of convergence, and of the growth in their output, between now and 2050 will vary by country and over time.* In addition to the long-term fundamentals and country specific drivers, the growth rates (and therefore the pace of convergence) will be influenced by the shorter term business cycles. Since 2000, the average rate of growth for the emerging economies has been two and a half times that of advanced countries. China explains a significant part of the differential, but the list of factors and countries affecting economic prospects of the emerging markets goes well beyond China (or commodity prices).
6. *Just ten countries (of which only four will be Advanced Economies) could well account for almost 70 percent of global growth in the next 35 years.* Furthermore, as more and more citizens of the emerging market economies become part of the middle class, they will have an ever increasing impact on the world's economic structure, societal values, life styles, and governance.
7. *The task ahead to realize these bright prospects will not be easy.* Continued rapid convergence cannot be taken for granted, and the countries simply cannot afford to become complacent.
8. *Downside risks remain high.* Countries may stray away from the desired reform path, and instead get mired in the middle-income trap. The latter development will inflict an enormous cost on hundreds of millions, or even billions, of human beings in terms of income levels and human well-being.
9. *Domestic policies and actions—or their absence—would be decisive in determining whether a country will stay on the path of rapid convergence with the global best practices.*
10. *Most of all, the future performance of the emerging market economies in 2050 lies essentially in the hands of the countries' political, economic, and business leaders.* And it depends on the ability of the concerned citizens to ensure that their leaders continue to give the utmost priority to the countries' economic performance and outcomes.

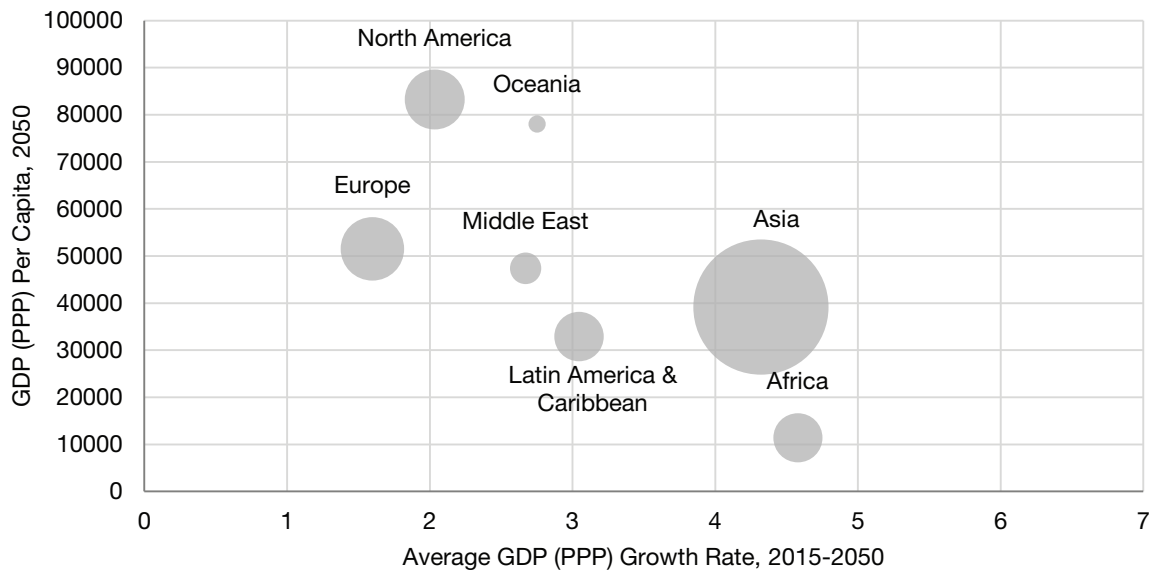
Domestic policies and actions—or their absence—would be decisive in determining whether a country will stay on the path of rapid convergence with the global best practices.

Figure 1: Size of regional economies in GDP (PPP), 2015



Source: Centennial Group International

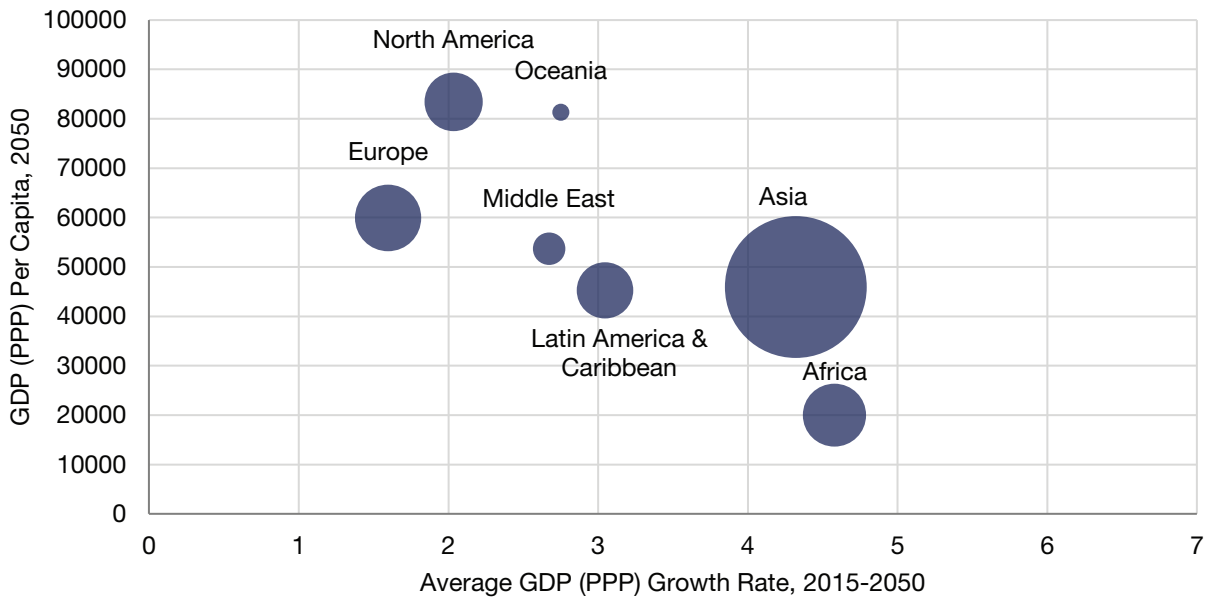
Figure 2: Size of regional economies in GDP (PPP), 2050, business-as-usual scenario



Source: Centennial Group International

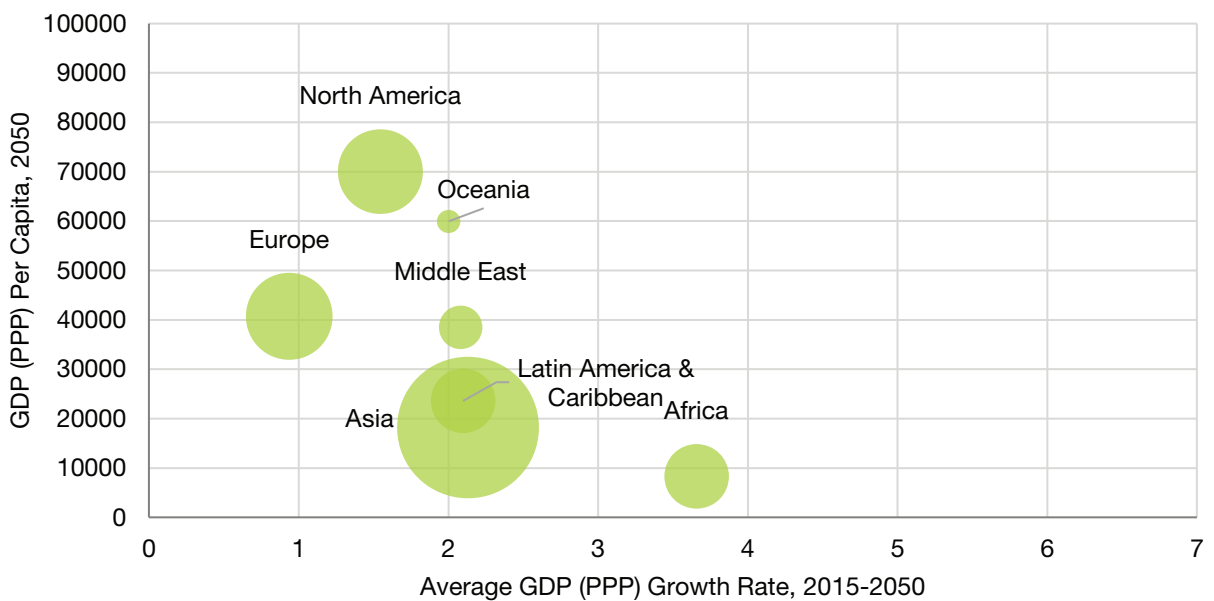
Most of all, the future performance of the emerging market economies in 2050 lies essentially in the hands of the countries' political, economic, and business leaders.

Figure 3: Size of regional economies in GDP (PPP), 2050, optimistic scenario



Source: Centennial Group International

Figure 4: Size of regional economies in GDP (PPP), 2050, pessimistic scenario



Source: Centennial Group International

Policy implications

Harinder S. Kohli

The fundamental message of this study is that the world is marching towards an increasingly intertwined and mutually dependent world.

The study highlights the following policy implications for the emerging economies and, indeed, for the overall global economic prospects:

1. The world is in the midst of a historic economic, social, and political transformation. 40 years ago, the vast majority of people in the world lived in abject poverty and suffered from widespread hunger and disease. With the impressive progress made since then, it is conceivable that the world could be transformed once again in the next 40 years: a global economy that would be 3.5 times its size today, with an average per capita of US\$28,000 as against US\$11,500 today (in PPP terms); a world that is comprised of mostly urban, middle class, better educated and healthier societies largely free of absolute poverty, enjoying the living standards of average southern European societies today. Asia could account for almost half of the global output.
2. In parallel with the tectonic shifts in the economic weight of different regions, overall global growth rates would steadily decline between now and 2050, reflecting both worldwide aging (except Sub-Saharan Africa) and the steady catching up with the technological frontier.
3. The study challenges the widely held view (or at least the wish) that the emerging markets' rapid rise in the global economy is somehow inevitable. It reminds of the economic history of other once-successful countries (Argentina during the past hundred years; Japan and Brazil before and after the 1980s, and even since the peaking of the latest super commodity cycle in 2012).
4. The study's downside scenario, under which more and more countries could fall in the middle-income trap, in turn could lead to widespread political and social instability. The major risks to be guarded against include, but are not limited to: inability to avoid the resource curse, failure to improve the quality and credibility of institutions, and failure to meet the fast-rising aspirations of the people, particularly the inability to create sufficient number of productive jobs.
5. The countries' success in conquering the past challenges—like absolute poverty—is in turn bringing into focus a new set of challenges. In sharp contrast to the past when advanced and emerging economies faced starkly different challenges and prospects, in the coming years, most new challenges will be increasingly apply to the advanced and emerging economies alike. Examples of such common issues include: disparities in opportunities and incomes; intense competition for natural resources (including water) as the living standards of billions of Asians, Latin Americans, and Africans rise; the needs of the aging societies; and an even greater premium on increasing the productivity and competition to survive in a more globalized world.
6. The increasing affluence and the resultant potential addition of as many as 4 to 5 billion additional middle-class consumers would likely well exceed the ability of our planet to sustain human life, unless there are technological breakthroughs or major changes in the lifestyles of consumers worldwide, or most likely a combination of both.
7. The traditional sharp boundaries between developed and developing countries (or between the north and south) will become more and more blurred between now and 2050. Instead, the past bipolar world economy will be replaced by a continuum, with many current developing countries joining the group of high-income countries as Singapore and Korea have already done so. Further, in terms of absolute size, some middle-income economies (China, Brazil, India, Indonesia, Nigeria,

The long-term future of the emerging economies lies essentially in the hands of their own political, economic, and business leaders.

and Turkey) will join the ranks of the world's largest economies. As a result, the self-interest of the major economies—both high- and middle-income—would increasingly coincide (rather than conflict).

8. In the future, there will be a huge premium on the ability and willingness of national leaderships to make pragmatic policy decisions driven by a long-term perspective. The quality and effectiveness of institutions—and their ability in assuring equitable rule of law for all—will be decisive. All nations must pursue relentlessly the creation and strengthening of institutions that will be needed as the economies become both more complex and more globalized.
9. New opportunities and obligations that would arise out of the emerging economies' increasing weight in the global economy, including the desire and need for very different mechanisms for global economic governance.
10. The political, economic and business leaderships must remain very vigilant against complacency and continuously enhance resilience to shocks (external as well as domestic).

In other words, the long-term future of the emerging economies lies essentially in the hands of their own political, economic, and business leaders.

