



FREDERICK S. PARDEE CENTER  
FOR INTERNATIONAL FUTURES  
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WORKING PAPER 2009.08.03

## ECONOMIC FUTURES AND THEIR IMPLICATIONS FOR GLOBAL DEVELOPMENT: THE UNFOLDING OF THE GREAT RECESSION

Prepared for the U.S. National Intelligence Council

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August 2009

Note: If cited or quoted, please indicate working paper status.



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# **Economic Futures and Their Implications for Global Development: The Unfolding of the Great Recession**

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## 1. Purposes

This paper explores alternative unfoldings of what has come to be called “The Great Recession,” the highly disruptive global economic downturn that began in 2008 and will surely have repercussions around the world through at least the end of our forecast horizon of 2015. The paper will consider four alternative scenarios concerning the progression of the recession itself, as well as mapping some of the potential consequences of those alternatives. Our focus with respect to consequences will be heavily on implications for human development

The tool used for this analysis is the International Futures (IFs) modeling system.<sup>1</sup> IFs is a large-scale integrated global modeling system. The broad purpose of IFs is to serve as a thinking tool for the analysis of near through long-term country-specific, regional, and global futures across multiple, interacting issue areas.

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<sup>1</sup>Development of IFs in recent years has been funded primarily by Frederick S. Pardee in connection with the volume series called Patterns of Potential Human Progress. Additional support has come from the U.S. National Intelligence Council in support of its Project 2020 and Global Trends 2025, and from the United Nations Environment Programme for its *Global Environment Outlook 4*. In 2008-2009 the European Commission funded IFs in a project on “Using State-of-the-Art Models and Tools for the Assessment of ICT Impacts on Growth and Competitiveness.” In recent years, the European Union Center at the University of Michigan provided support for enhancing the user interface and general ease of use of the IFs system. Development of International Futures in 2000-2003 was funded in substantial part by the TERRA project of the European Commission and by the Strategic Assessments Group of the U.S. Central Intelligence Agency. None of these institutions bears any responsibility for the analysis presented here, but their support has been greatly appreciated. Thanks also to the National Science Foundation, the Cleveland Foundation, the Exxon Education Foundation, the Kettering Family Foundation, the Pacific Cultural Foundation, the United States Institute of Peace, General Motors and the RAND Pardee Center for funding that contributed to earlier generations of IFs. Also of great importance, IFs owes much to the large number of students, instructors, and analysts who have used the (freely available) system over many years and provided much appreciated advice for enhancement (see [www.ifs.du.edu](http://www.ifs.du.edu)).

## 2. The Scenarios

Economic scenarios for the coming few years range widely. In traditional terms, some anticipate a largely V-shaped recession, unusually deep and widely-spread around the world, stretching at least well into 2010, but with relatively quick recovery through 2011 in the face of massive monetary and fiscal intervention by governments. Although its authors clearly convey great uncertainty and believe that the risks weigh on the downside, the forecast of the International Monetary Fund's *World Economic Outlook* of April 2009 generally fits into this category (IMF 2009). This perspective appropriately focuses considerably attention on the necessity of planning for the unwinding of massive stimulus.

Although everyone recognizes the critical distinctions between the current economic conditions and those of more normal business cycle-recessions, other scenarios build very explicitly on analogies with earlier severe financial crises, including the Great Depression. (Forecasting by analogy is, of course, one of the most widely used methods.) Reinhart and Rogoff (2008) analyzed both the unfolding and the aftermath of a wide range of such crises, including those of emerging markets as well as those of rich countries. They noted (2008: 2) that in such situations "asset market collapses are deep and prolonged," "the aftermath of banking crises is associated with profound declines in output and employment" with a down phase that averages four years, and "the real value of government debt tends to explode." In short, even with massive intervention, the recessions can last a long time. It is, of course, no surprise that other analysts (see Eichengreen and O'Rourke 2009) are carefully comparing contemporary patterns with the Great Depression, giving attention to similarities and differences in both the unfolding of the downturn and the rolling out of policy initiatives.

In addition to significant differences in scenarios concerning the potential time needed to restart growth and begin to recover lost ground, different scenarios concerning the character of the recovery, including its leadership, are conceivable. Recovery could be widespread globally and relatively balanced in progress across global regions. Or some of the more developed countries of the world might lead recovery. For instance, the U.S., the epicenter of the financial crisis, has the economic power and flexibility that might cause it to bounce back first. Alternatively some of the larger emerging economies, with the great economic momentum of recent years might first regain footing and, in fact, somewhat "decouple" from the rest of the world. For instance, in China's case, the advantages of huge foreign reserves and coherent leadership might have allowed it to apply especially great fiscal and monetary stimulus that may lead to early recovery (or could play out badly over a longer period of time).

Few alternative scenario sets with much specificity have yet emerged (one exception is a set by Bryan and Greenberg 2009). The U.S. National Intelligence Council has, however, created such a set. There are a number of dimensions of uncertainty in the unfolding of the Great Recession that one can use in framing a scenario set, some of which are obvious from the above discussion:

- The speed of recovery (given the severity of the financial crisis, it is highly improbable that it could be as rapid as traditional business cycles, so the most likely possibilities range from somewhat slow to very slow).
- The leaders of the recovery (most likely a few of the more developed countries or some of the larger emerging countries, but possibly a more balanced recovery)
- Whether or not there will be a partial recovery and then a relapse for some or all countries (a double-dip scenario).

And, of course, there are possible wild cards that could affect the pattern of the recession, including sudden turns in the unfolding policy response or even political turmoil that would begin interacting with economic disruption in a vicious cycle.

The NIC scenarios, upon which we build here, look primarily to the first two dimensions for their framing, but are attentive to the third as well. Those scenarios are:

- ***Slower, Rebalanced Growth.*** US and EU recoveries are accompanied by more domestic-demand-driven growth in other countries around the world. In this scenario, US and EU growth would remain below trend as consumers continue to rebuild their wealth and businesses remain cautious about expansion. Growth in East Asia would depend more on Asian demand and would be less robust than the export-oriented growth of recent years. Commodity prices would recover some and help stabilize or boost growth in oil and other commodity producing countries, but prices would remain well below peaks reached in 2008.
- ***Pockets of Growth.*** Developed country markets fail to recover while some large emerging markets manage to grow largely based on domestic demand. Some economic pundits argue the popping of real estate and equity market bubbles in many western economies, including the United States, portends a long period of stagnation following the current recession; akin to Japan's experience during the 1990s and early 2000s. Without strong demand growth coming from the large rich country markets, emerging market growth will increasingly depend on whether emerging market governments are able to generate demand domestically. Commodity prices would stabilize close to current levels as commodity demand growth is anemic in the face of stagnating developed country markets.
- ***Unbalanced Growth.*** The US restores growth while the rest of the world remains mired in recession. Flexible US markets lead to quicker adjustments of business activity at the same time that Washington's efforts boost demand and stabilize the banking system gain traction. Asset markets recover and more confident consumers boost spending, leading to an upsurge in business investment. Recovery elsewhere is elusive as European recession weakens global demand and political turmoil in emerging markets leads to weaker economies. [In this scenario, the efforts of emerging markets and especially of China to push recovery rapidly succeed for a couple of years, but then falter significantly.]
- ***Long Global Recession.*** A series of shocks prevent or derail a sustained global recovery and extend the length of the recession. A collapse of the peg in Latvia and an inability in Russia to continue the defense of the Ruble trigger currency and banking crises in Central

and Eastern Europe. Massive defaults overwhelm European banks, which require new government bailouts and trigger another global credit freeze. European banks further retrench on foreign lending, worsening prospects for emerging markets dependent on foreign financing. Credit losses continue to mount in the United States as the quality of loans and asset backed securities for commercial property, jumbo mortgages, and consumer credit deteriorates, leading to additional US bank failures. Political instability in major emerging market nations, such as China, disrupts momentum in regional centers of growth.

The implementation of these scenarios in IFs benefited greatly from the above general framing of them by the NIC. The specific growth rates in the IFs versions of these scenarios are, however, unique to the IFs representation of them and the International Futures project takes full responsibility for them. See Appendix 1 to this report for growth rates of the G-20 countries and broader global regions<sup>2</sup> in each of the four scenarios.<sup>3</sup>

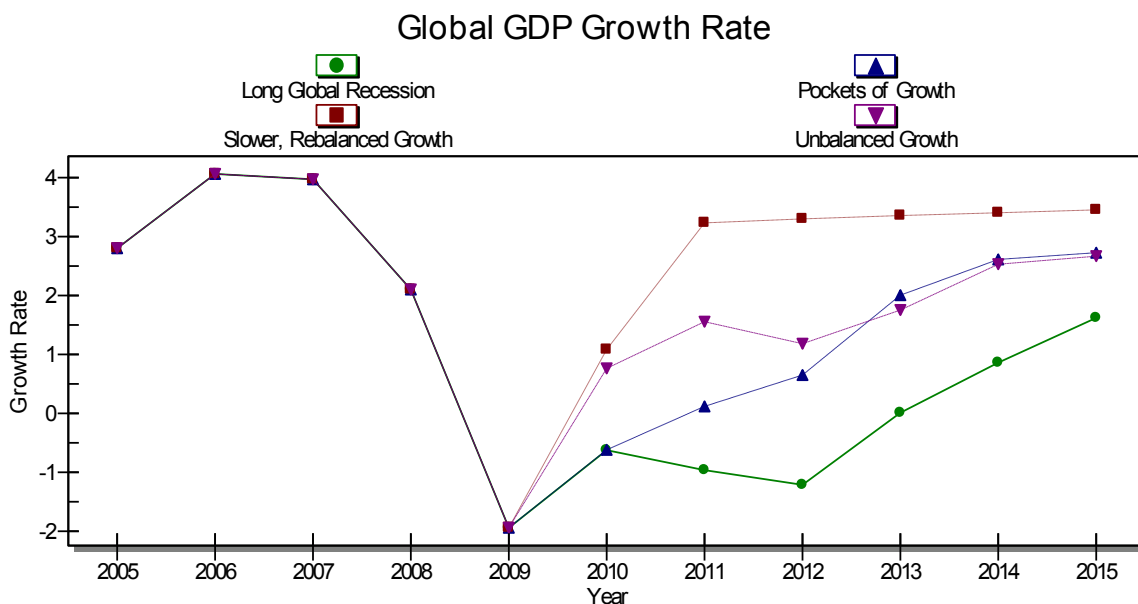
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<sup>2</sup> Our grouping of countries changed that of the IMF very slightly: we added Puerto Rico to the Western Hemisphere and to Emerging and Developing Countries; North Korea and Micronesia to the Developing Asia and to Developing and Emerging Countries; and Palestine to the Middle East and Developing and to Emerging and Developing Counties. A few of the IMF country groupings contained very small countries not in IFs and we omitted these (such as Antigua and Barbuda).

<sup>3</sup> It was very challenging to create the Long Global Recession scenario. After the initial implementation of that scenario, involving using growth rates for countries and regions that fell at or below the levels of Pockets of Growth and Unbalanced Growth, we examined the scenario in more detail and compared it with the No Recession case created with the IFs model (removing the downward impetus starting in 2008 from the IMF WEO scenario). When growth of countries in the Long Global Recession exceeded growth in the No Recession case, we lowered it; when cumulative growth from 2005-2015 exceeded 40 percent, we lowered it except for countries where a clear case such as major expansion of oil or gas revenues existed for expecting higher growth (such as in Qatar). Most of the countries for which we lowered growth were in sub-Saharan Africa; a number of the IMF forecasts for those countries (including Liberia, the Democratic Republic of the Congo, Eritrea, and Ethiopia appeared considerably too optimistic even after downward scenario adjustment for the region as a whole).

## 2.1 Global and Broad Grouping Growth Patterns

The implementation of the Slower, Rebalanced Growth scenario relied heavily on the IMF's April 2009 scenario. We made that scenario more conservative, however, by taking the slower of the IMF's growth rates in 2011 and 2014 (their final forecast year) and using it for all years from 2011 forward. The figure below clearly shows the largely V-shaped pattern built into their scenario.<sup>4</sup> The figure also shows the three other scenarios discussed above. Long Global Recession results in a W-shaped pattern, a fear of the global community should the streams of financial and monetary stimulus prove only temporarily to slow and even partially reverse the downturn.

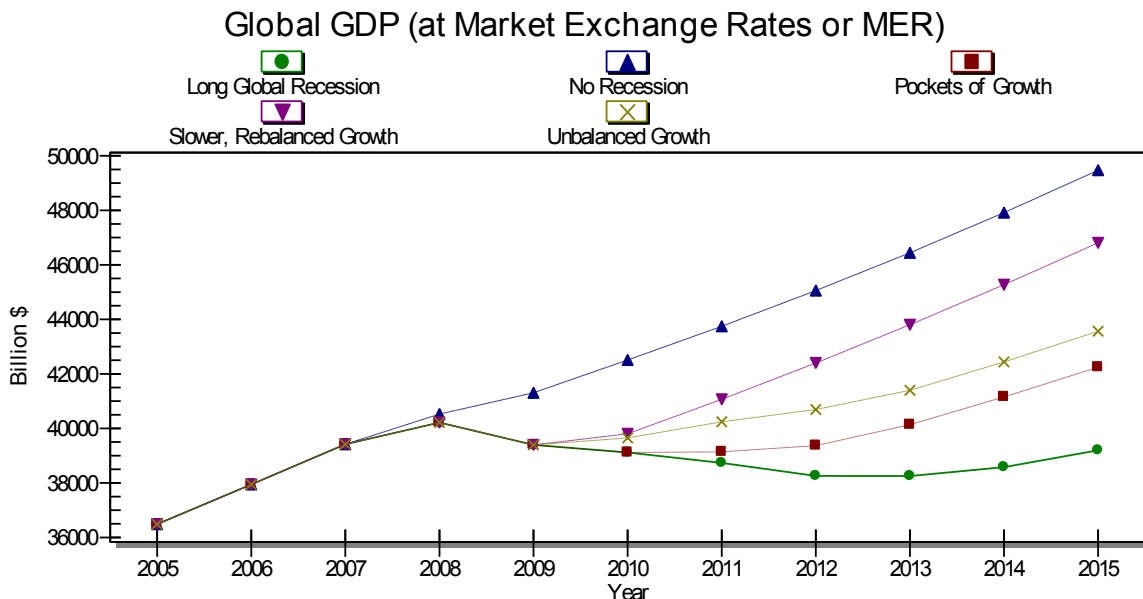


To put our implementation in context, the April 2009 IMF scenario forecast global growth of -1.3% in 2009, but positive growth of 1.9% in 2010 and a rise to 4.8% in 2014. The Slower, Rebalanced Growth scenario values are -2.0%, 1.0%, and 3.4%, respectively. That is, even the most optimistic of the scenarios above is more conservative than that of the IMF. Moreover, in July, the IMF revised upward its global forecast for 2010 to 2.5%, following a contraction of 1.4% in 2009 (IMF 2009b). Our scenarios constitute a relatively pessimistic set for two reasons: (1) the authors' assessment of IMF forecasts historically is that they have generally been overly optimistic; (2) the purpose of this report is to explore challenging cases.

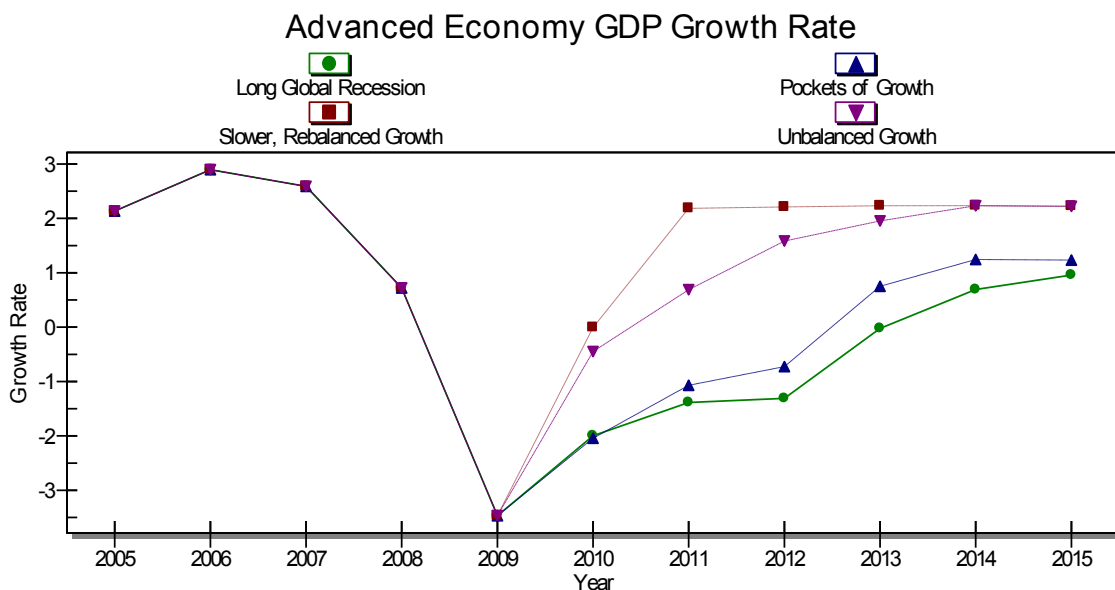
The next figure shows the global GDP that results from each of the four scenarios. It adds also a fifth scenario, a hypothetical "No Recession" scenario maintaining relatively stable growth of the world economy through the forecast horizon. This will be useful in

<sup>4</sup> We used market exchange rates (MER) for economic values unless we specify purchasing power parity (PPP).

our analysis of the various economic and socio-political costs of the four recession scenarios. The total loss of annual GDP by 2015 in the Long Global Recession relative to the No Recession case is \$10.3 trillion or 21% of global product.

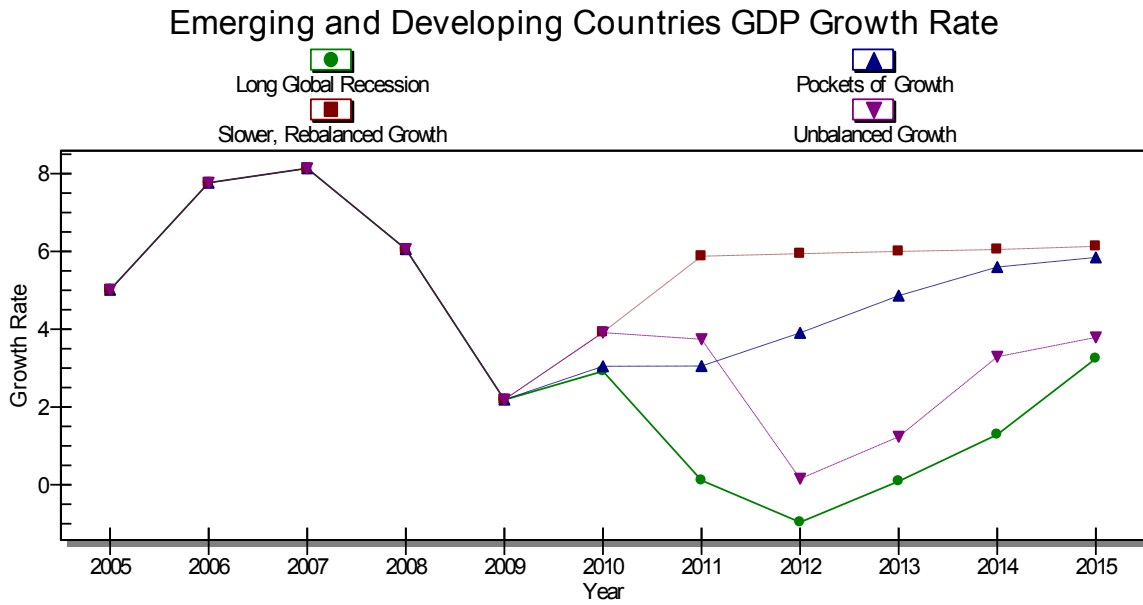


Turning to the global North and South, the latest IMF Economic Outlook update (IMF 2009b: 2) estimated that GDP in the Advanced Economies will be down 3.8% in 2009 and up 0.6% in 2010, climbing to 2.6% annual growth in 2014. The figure below from the conservative IFs implementation of the IMF's forecasts (that is, the Slow, Rebalanced Growth scenario) shows -3.5% in 2009 and roughly 0% in 2010, climbing to 2.3% in 2013 through 2015. (Numbers for the Organization for Economic Cooperation and Development (OECD), another proxy for the global North, are effectively identical.) The other scenarios here all show continuing downturn in 2010, ranging from -0.5 to -2.0%.





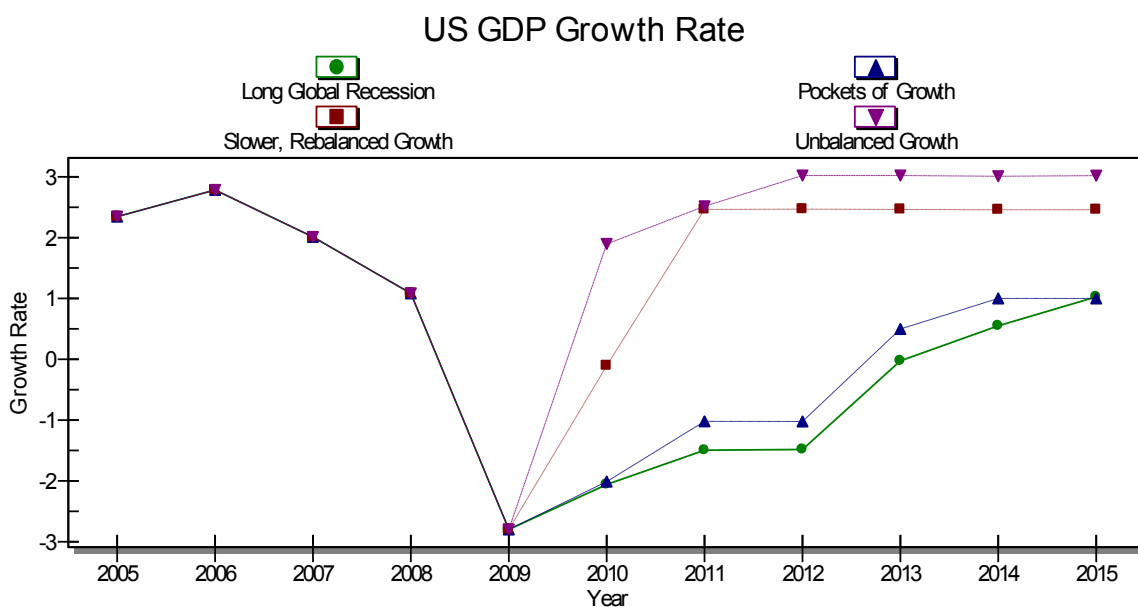
The latest IMF (2009b: 2) forecasts for Emerging and Developing Countries (roughly non-OECD countries) are growth of 1.5% in 2009 and 4.7% in 2010. In the figure below, the values for the same country grouping in the Slower, Rebalanced Growth scenario are 2% and 3.8%.



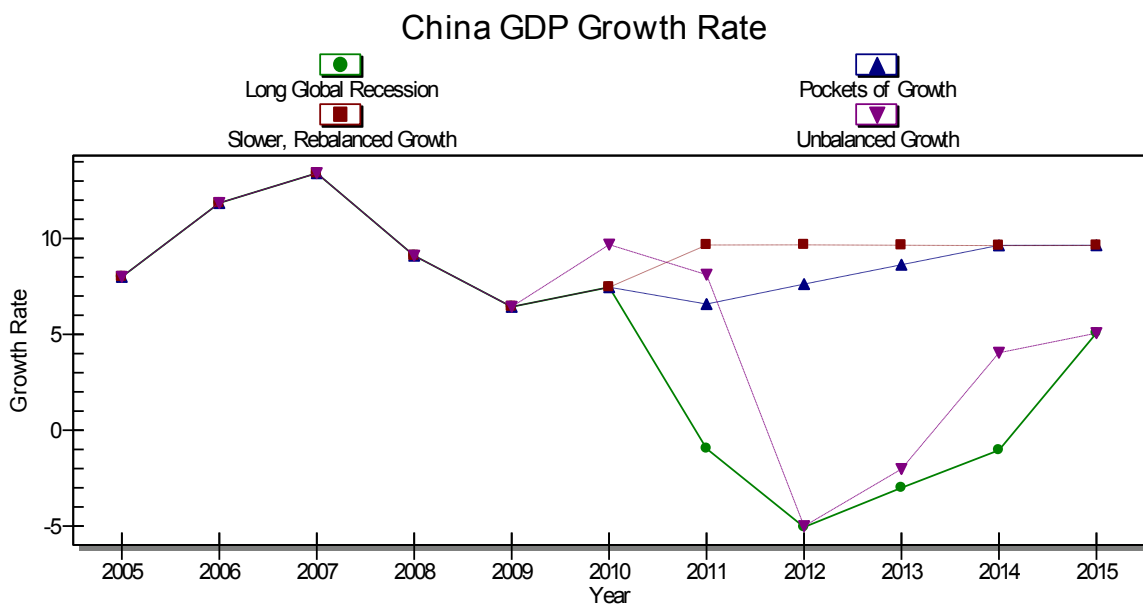
## 2.2 Elaborated Growth Patterns: Great Powers

Turning to the leading global economic powers, the four graphs below show growth patterns across the scenarios for the US, China, India, and the European Union. In each case there are constantly ongoing reassessments of the likely growth outcomes for 2009 and of scenarios for coming years. We will not attempt in this project to revise the values for 2009 or of the forecasts with each such assessment, but we will try to report some of the latest releases in comparison with our implementation.

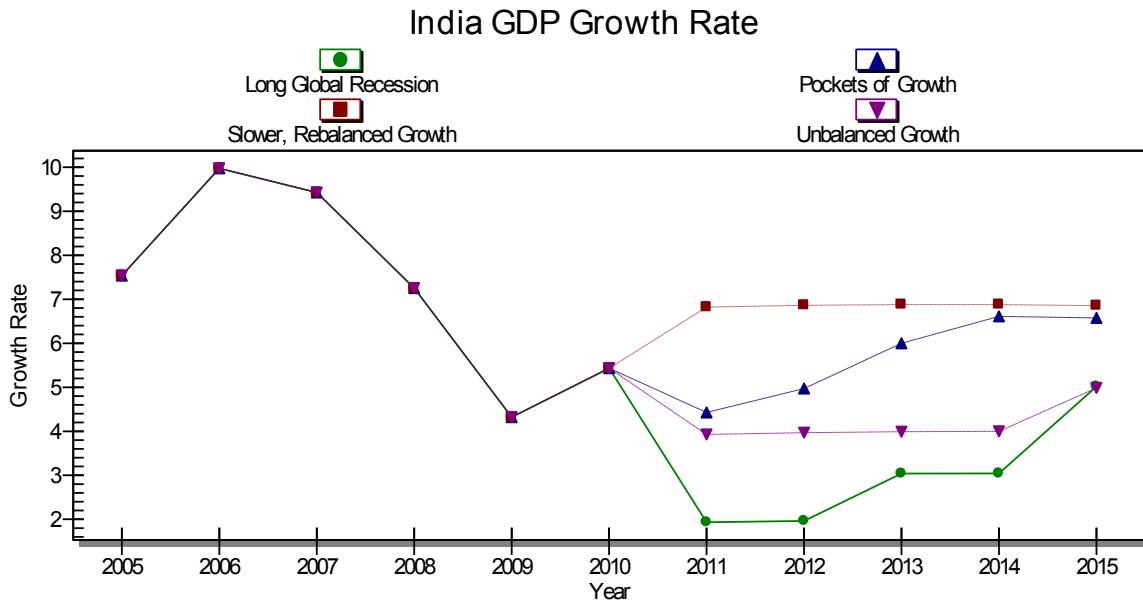
With respect to the United States, the July IMF forecasts for 2009 and 2010 are -2.6% and 0.8% (up 0.6% from the April estimate for 2010). The values in the Slower, Rebalanced Growth Scenario are -2.8% and -0.1% (the Unbalanced Growth scenario raises US growth in 2010 to 1.9%).



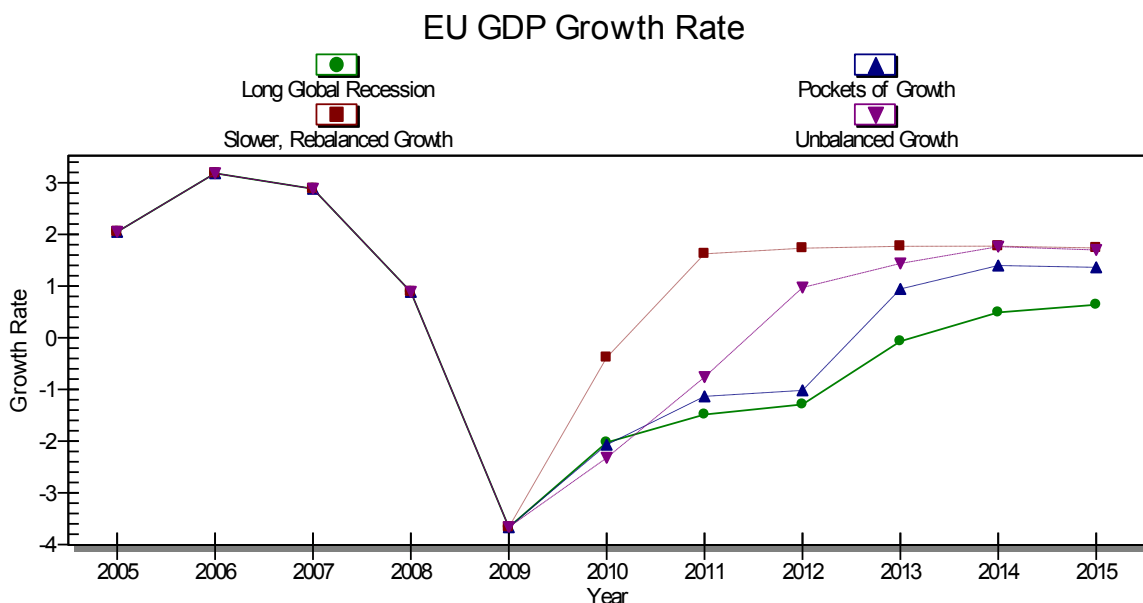
Turning to China, the IMF foresees 7.5% and 8.5% in 2009-10. In June the World Bank raised China's growth rate forecast for 2009 from 6.5% to 7.2% (*Financial Times*, June 19, 2009: 3). And Ardo Hansson, the Bank's lead economist for China, estimated that the fiscal deficit would rise to 5% of GDP, saying that "Growth would be strongly supported this year, but 'there are limits to how much and how long China's growth can diverge from global growth based on government-influenced spending.'" In July the Chinese National Bureau of Statistics estimated that China would hit its target of 8% for 2009 (*Financial Times*, July 17, 2009: 3). The critical questions, of course, are (1) whether the official numbers are reasonable and (2) whether the stimulus will succeed in regenerating sustained economic growth or whether it is setting up a crash in coming years (as in Long Global Recession and Unbalanced Growth scenarios). The values in the Slower, Rebalanced Growth scenario for 2009 and 2010 are 6.5% and 7.5%, but in other scenarios growth falls sharply in either 2011 or 2012.



The IMF expects India's growth to be 5.4% in 2009 and 6.5% in 2010. The Slower, Rebalanced Growth numbers are 4.3% and 5.4%. The downturn in growth for India in the other scenarios is not as significant as that for China because the Indian economy is somewhat more autarkic.

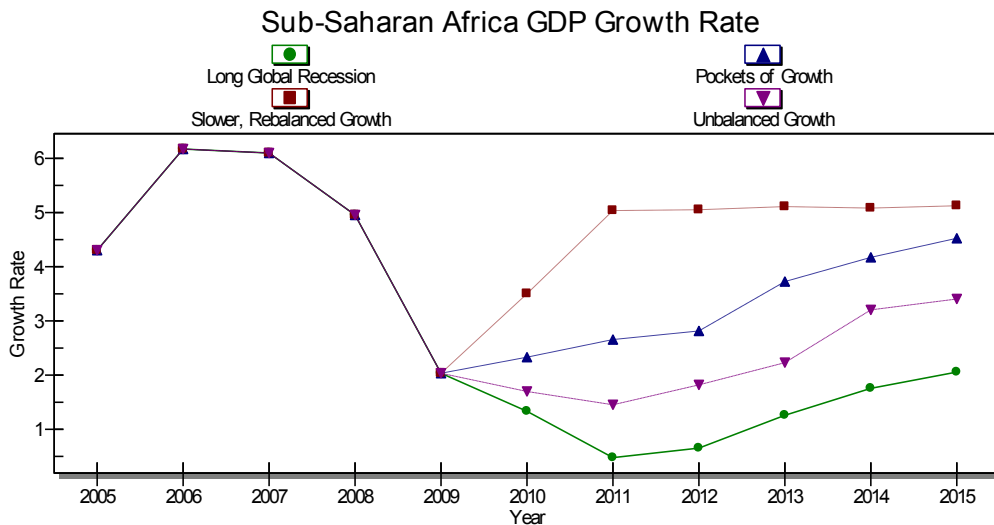


The IMF expects the numbers in the Euro Area to be -4.8% and -0.3% in 2009 and 2010. The respective numbers in Slower, Rebalanced Growth for the European Union of the 27 are -3.7% and -0.4%. In the other scenarios, values for the EU are -2% or lower in 2010 and continue to be relatively low or negative for several years.

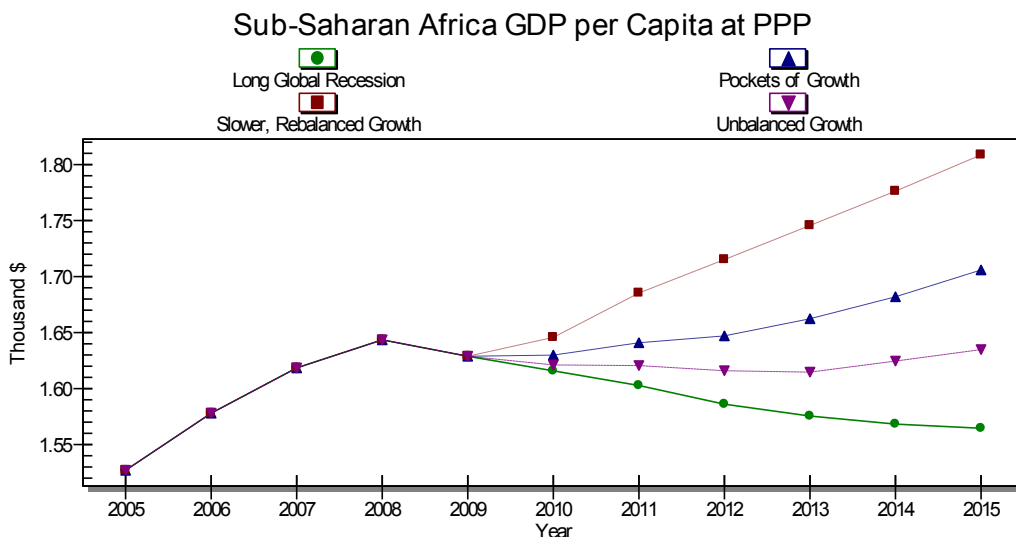


### 2.3 Elaborated Growth Patterns: Developing Regions

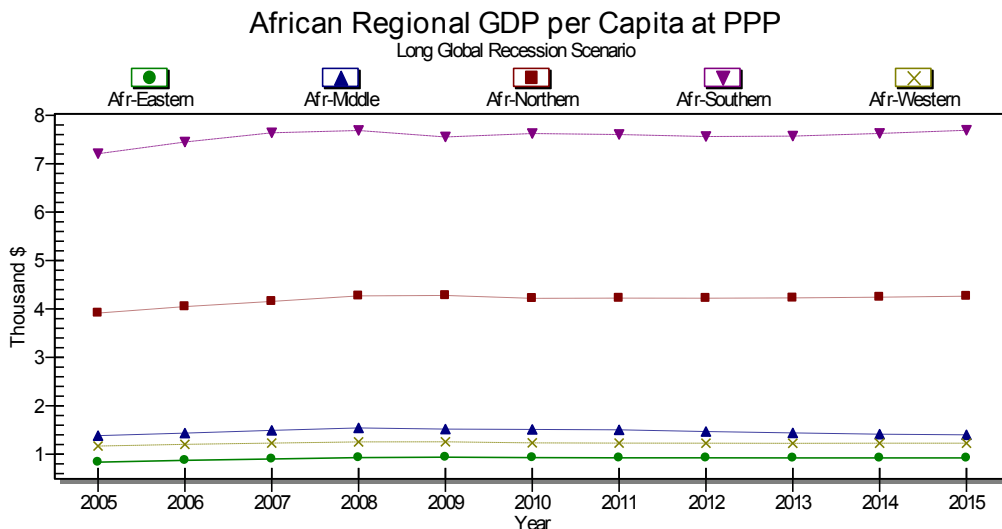
Turning to sub-Saharan Africa, the IMF foresees 1.5% in 2009 and 4.1% in 2010. The values in the Slower, Rebalanced Growth scenario are 2.0% and 3.5%. The other scenarios fall significantly lower.



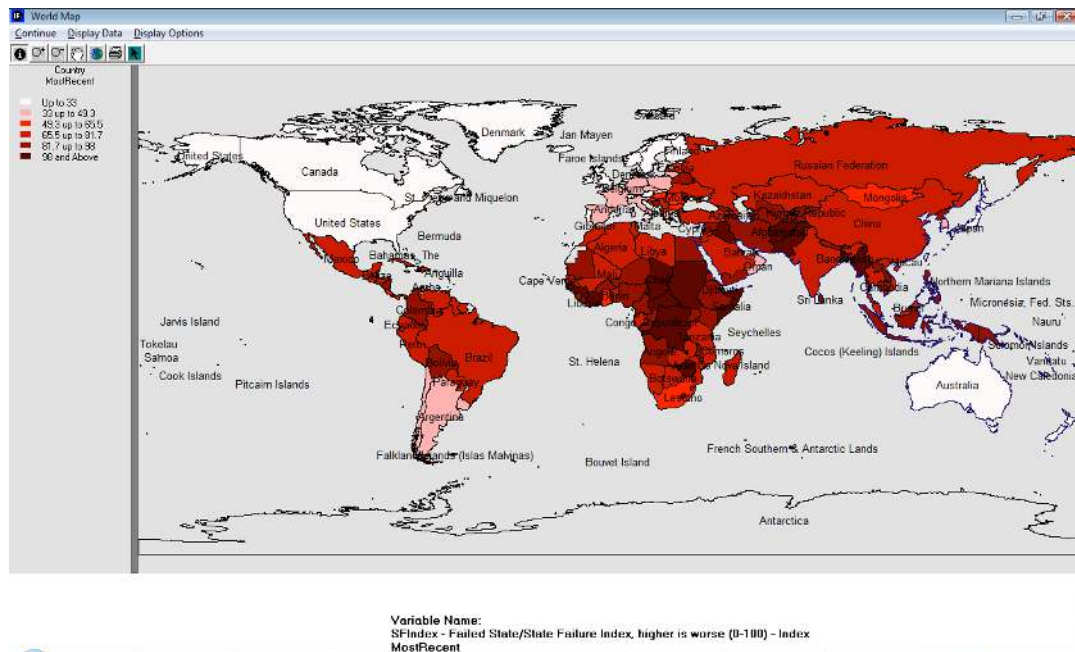
Implications of the growth patterns depend heavily, however, on the growth of population and income per capita. Nearly all of the socio-political impacts that we want to consider flow from stagnation or fall in GDP per capita. Because demographic growth in Africa remains quite rapid, the continuing positive GDP growth rates in the scenarios do not necessarily mean that per capita rates remain positive. The figure below shows that after one year of downturn in 2009, per capita income growth in the Slower, Rebalanced Scenario would resume. But in the Pockets of Growth scenario, minimal growth would characterize the period through 2015, and in the other two scenarios there would be no net growth (or would even be decline) through 2015.



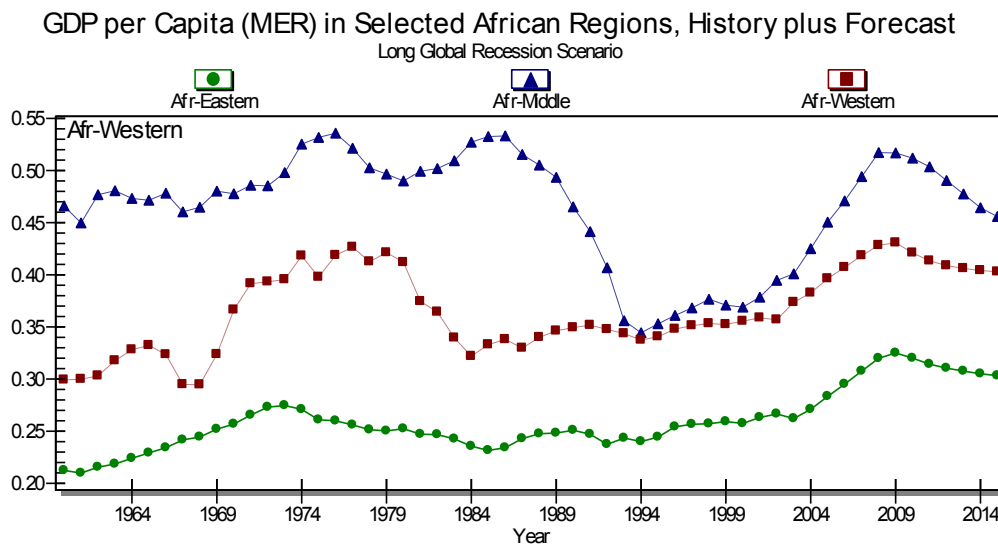
Looking more deeply into Africa through an examination of subregions, the worst case scenario (worst of the four explored here, not the worst conceivable) would result in essentially flat GDP per capita through 2015.



The map below shows recent (generally 2008) values from the Fund for Peace state failure index (as reported also in *Foreign Policy*). It shows us what we mostly already know, namely that the countries to which we should be most attentive. Generally they range in an arc of instability or crisis (it has had various names and definitions) through Africa from West to Middle to East, on to Central Asia and AfPak in particular, and into Southeast Asia.

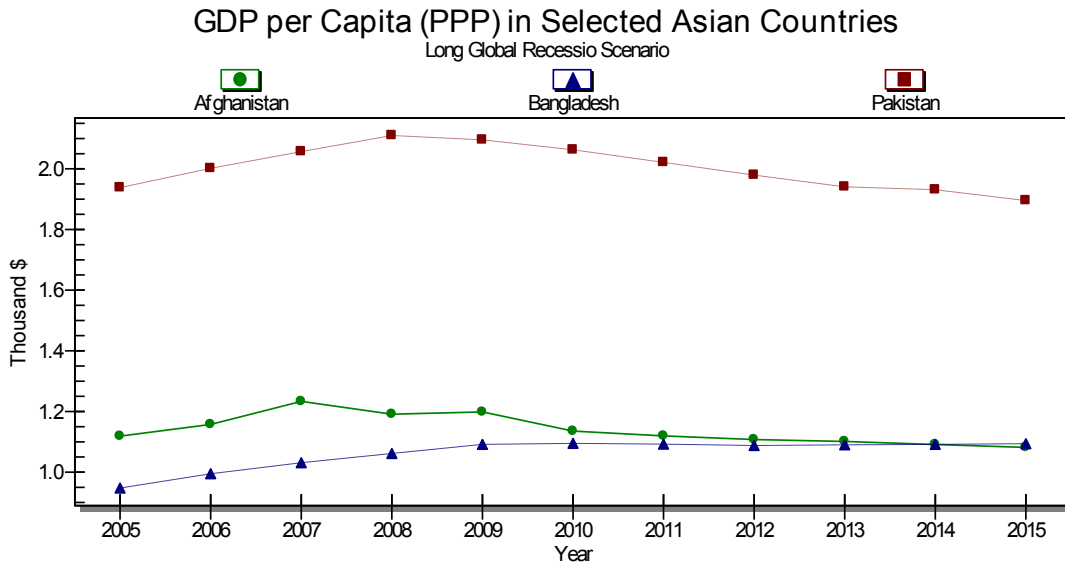


Focusing on Western, Middle, and Eastern Africa, the figure below provides historic context for the forecasts of growth in GDP per capita from the Long Global Recession Scenario. After a relatively good long decade following decolonization in the very early 1960s (lasting until 1972 in Eastern Africa and 1974 in Western Africa), those regions suffered twenty or more years of stagnant or deteriorating circumstances. A few years of improvement, mostly in the early years of the new century (through 2008), may have set up more positive conditions going forward, and, in part based on that turning upward, the IMF scenario (to which the other scenarios here are pegged) was really quite optimistic through 2014 (see again the figure earlier). Even the figure below, with our most pessimistic scenario, does not forecast unusually rapid decline in historic context.



Drilling down even further, however, to the country level, almost all of Africa has negative per capita growth prospects (at both MER and PPP) between 2008 and 2015 in the case of a Long Global Recession. The exceptions are in North and South Africa, and growth rates are low there also in the scenario.

Looking beyond Africa, the figure below shows the GDP per capita forecasts for three important Asian countries. It is, of course, especially difficult to anticipate changes within countries already in conflict, and any forecast for Afghanistan, in particular, may be especially uncertain.





### 3. Implications of Growth

Given that there are relatively few scenarios for the Global Recession, it is not surprising that there is limited analysis, albeit somewhat more speculation, concerning its broader implications for global development and the human condition, our principal focus here. Moreover, even measurement of that condition, a major foundation of forecasting, is difficult. Most data on social conditions of people around the world come from one of two sources. The first is primarily anecdotal and partial—attention to local surveys or journalistic insight. The second and more generalized, scientific source is from household surveys that tend to be taken only every few years and do not exist at all in a substantial number of countries. Compilation and reporting from them also often lags several years behind changing conditions. Thus our understanding of conditions immediately prior to the beginning of the recession is somewhat inchoate. And most of the analysis here will focus more on the differences across scenarios than on the precise values for any given indicator.

We will pay special attention to poverty as a basic measure of human condition—and to its opposite, the growth of income and especially the growth of the global middle class. We will also look at malnutrition and health, conditions that tend to respond fairly quickly to changes in income levels. And we speculate somewhat on some longer and broader consequences of the recession.

#### 3.1 Poverty

Although most speculation/forecasting concerning the consequences of the Great Recession is sincerely concerned with the possible victims of a deep and unusually prolonged recession, some of it can be, quite frankly, alarmist. Organizations whose missions involve attention to and protection of the most vulnerable populations can, even when well-meaning, exaggerate the impact of it on those populations. In an example, writing in the Forward to Amnesty International's 2009 annual report, Irene Khan stated that "The World Bank has predicted 53 million more people will be thrown into poverty this year, on top of the 150 million hit by the food crisis last year, wiping out the gains of the last decade... Skyrocketing food prices are leading to more hunger and disease, forced evictions and foreclosures to more homelessness and destitution."<sup>5</sup>

In fact, the World Bank's *Global Monitoring Report 2009* stated more precisely that "As a result of the food and financial crises, the pace of poverty reduction has slowed. Poverty will decline in 2009, but the World Bank estimates that about 55 million more people will live on less than \$1.25 a day (in 2005 purchasing power parity terms) in developing countries this year than expected pre-crisis."<sup>6</sup>

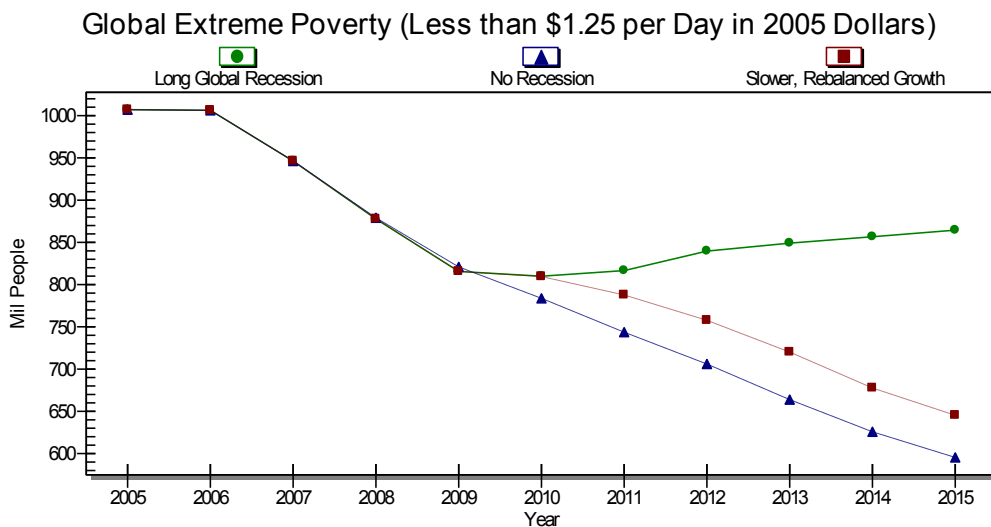
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<sup>5</sup> <http://thereport.amnesty.org/sites/report2009.amnesty.org/files/documents/air09-foreword-en.pdf>, page 6.

<sup>6</sup> See Factsheet: Global Financial Crisis and Impact on Developing Countries for the *Global Monitoring Report 2009: A Development Emergency* (April release). The figure of \$1.25 per day is revision to 2005 dollars of the long-standing \$1.08—or \$1 in short-hand—extreme poverty standard in 2000 dollars.

The distinction between change in level and change in trajectory is fundamentally important. The economic analysis of the last section indicated that, of the scenarios explored here, only the Long Global Recession scenario leads to an absolute decline in GDP per capita of most countries in sub-Saharan Africa, the region of greatest vulnerability. Income is a direction function of GDP per capita and its distribution (both between households and other agent classes, notably firms and government, and across household types, notably the rich and poor). Implications of the recession for distribution are extremely complex, with potential winners among the poorest populations (such as poor urban residents who had earlier faced food prices rapidly inflated by growing middle-class demand) as well as losers (such as those who were growing food from small plots for that market). This analysis, in the absence of other information at this point, assumes neutral overall distributional impacts—all segments of the population suffer equally in proportion to their income (recognizing, of course, that those with lower levels of income are much nearer thresholds like extreme poverty and malnutrition than those with higher incomes, and thus may suffer more in terms of basic well-being).<sup>7</sup>

The figure below shows the global numbers in poverty in three scenarios. The No Recession scenario indicates the “might have been,” the continuation of fairly steady reduction in the number of people globally living on less than \$1.25 per day. The Slower, Rebalanced Growth scenario would effectively cost 1-2 years in that path of reduction (or about 50 million people, as the World Bank analysis suggests). The Long Global Recession scenario, because it leads to slightly decreasing GDP per capita in sub-Saharan Africa, basically flat-lines (in fact, somewhat reverses) global reduction in poverty, leaving 270 million more people under \$1.25 per day in 2015 that would have been the case without a recession.

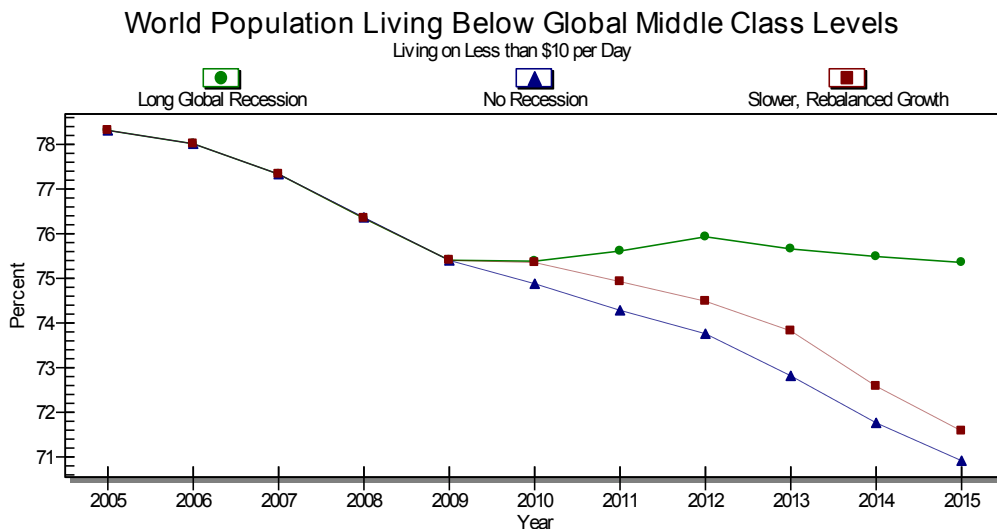


<sup>7</sup> The World Bank (2009: 33) estimated that the growth of international remittances to emerging market economies slowed somewhat in 2008 and will drop about 5% in 2009 and 2010, while those to fragile states will be stable in 2008 and 2009, growing again in 2010. Although remittances to middle-income countries like Mexico tend to favor the poor, those in the lowest-income countries often favor the relatively well to do. Again, this suggests a mixed and uncertain distribution impact.

### 3.2 The Global Middle Class

As the numbers of those living in poverty falls, the size of the middle class tends to rise. Most definitions of the middle class put the bottom rung of it somewhere in the \$3,000-\$5,000 range (at PPP), because that is the level at which people have satisfied their most basic consumption needs, including shelter and a diet well above the caloric needs for survival and turn their buying-power attention to consumer items such as refrigerators and automobiles. They may also turn social-influence attention to social issues such as justice and democracy (and unfortunately also to national identity and out-groups). Thus the attention of Bhalla and others to \$10 per day as a threshold to entry of the middle class (with \$100 as the upper level) is very reasonable.<sup>8</sup> Pegging it at 57 percent of global population, Bhalla is very considerably more optimistic about the size of the global middle class than assessments based on World Bank data and analysis would support. Using World Bank data, the IFs project calculates that approximately 75 percent of the world lived on less than \$10 per day in 2005, leaving no more than 25 percent of the world in the middle and upper classes.<sup>9</sup>

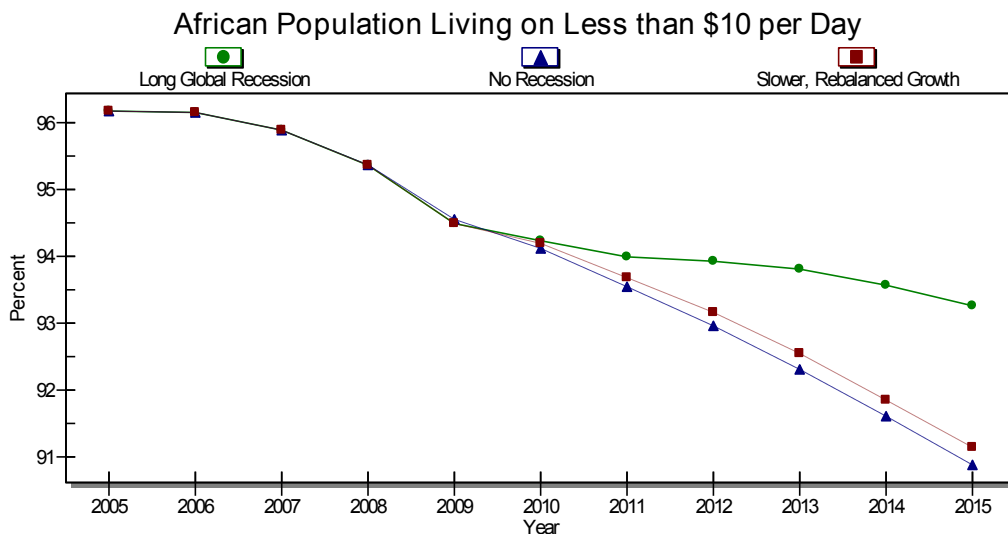
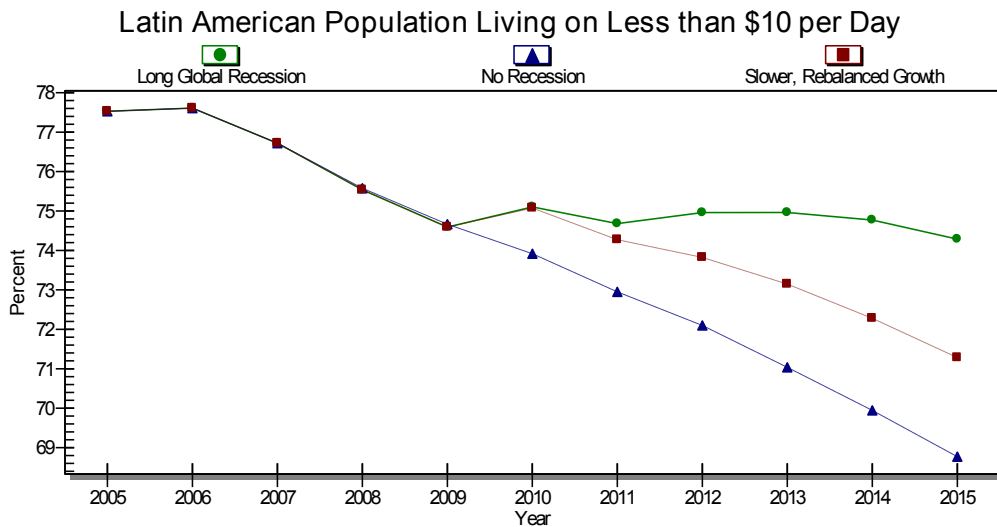
Again, however, while absolute levels on this measure are very important, it is largely the pattern of change over time and the differences across scenarios that help us understand the implications of the Great Recession. The figure below shows forecasts of those living on less than \$10 per day. In the historic pattern and the No Recession scenario, the trend was steadily downward, moving about 0.7 percent of the world's population into the middle class each year. The Slower, Rebalanced scenario again disrupts that for a year or so, while the Long Global Recession would stop the process.



<sup>8</sup> See "Burgeoning Bourgeoisie," *The Economist*, February 12, 2009.

<sup>9</sup> The IFs calculations used log-normal distributions fit to World Bank estimates of those living on less than \$1 and \$2. The project estimates that about 2.5 percent of the world's population lives on more than \$100 per day leaving the global middle class at 22 percent. Milanovic and Yitzhaki (2002: 155) even more conservatively (but earlier) estimated the middle class size to be 11 percent globally.

There are variations in the impact of the scenario across regions. The Slower, Rebalanced Growth scenario would have somewhat greater relative impact for the growth of the middle class in Latin America than it does globally, and therefore the recession could be more apparently hurtful there. In sub-Saharan Africa, the portion of the population above \$10 per day is very small, but the scenarios make less difference in overall trajectory. In Africa, of course, that very small middle class can be a critical source for economic and political elites—thus the loss of even 2-3 percent in potential size of that group is highly significant.

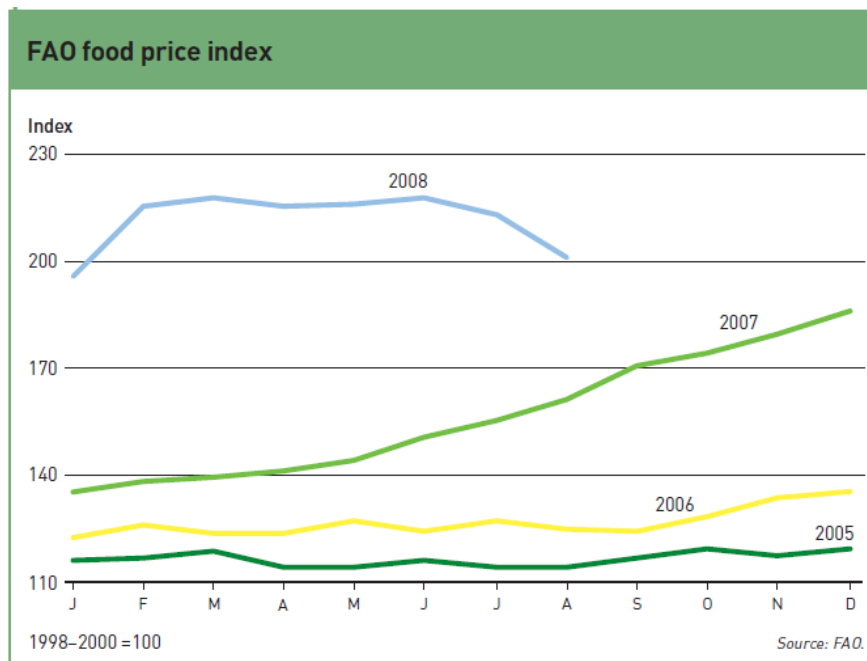


### 3.3 Malnutrition

In recent years there has been a great deal of attention to increasing hunger around the world. There has been a surge of attention in the Great Recession. For instance, the *Denver Post* (June 20, 2009, page 18A) published an article titled “Ranks of the World’s Hungry Swell,” reporting that that “The global financial meltdown has pushed the ranks of the world’s hungry to a record 1 billion, a grim milestone that poses a threat to peace and security, United Nations food officials said Friday.” The accompanying graph showed the global numbers increasing from about 830 million in 1995-97 to about 930 in 2008, then jumping to 1020 in 2009.

It is, however, incredibly important to distinguish the impact on malnutrition of income and food prices, something that the quotation fails to do. Historically, the numbers of absolute poor (those living on less than \$1 per day) and those malnourished (defined especially well for children in terms of height and weight measures) have moved in close parallel. In fact, the original absolute poverty measure was consciously set at a threshold of income needed to move out of a condition of malnutrition. As long as food prices were stable or slowly declining (and in the long run they have been slightly declining) this relationship held. But it was a major run-up in food prices in recent years, in advance of the financial crisis, that pushed more people into malnutrition; if one already spends most income on food, higher prices proportionately reduce food availability.

The figure below shows the rapid run-up in world food prices between 2005 and 2008. For some grains, it has been worse. The World Bank (2009: 36) reported that an index of rice prices with a base of 100 in 1996 rose sharply in 2007 and especially 2008, reaching about 400 from below 100 in 2006.



Source: UN FAO (2008: 6).

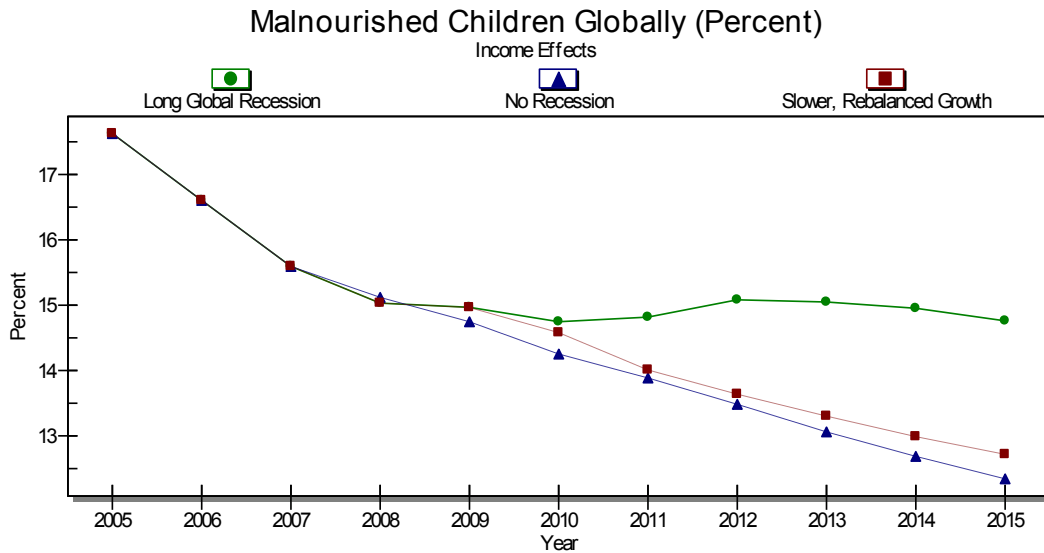
These run-ups in food prices, in advance of the global recession, caused a big increase in malnutrition. The FAO has estimated that the *number* living with malnutrition globally from 1990 into the early part of the century was roughly stable (and roughly equal to the number of those living on less than \$1 per day), thereby declining as *portion* of global population. But they have recently estimated (FAO 2008: 6) that in 2007 the number went up by 75 million relative to the 848 million in 2003-2005. And the newspaper quotation earlier indicates that FAO revisions have pushed the number for 2008 to about 1 billion (963 million).<sup>10</sup>

What will be the impact of the Great Recession? Although incomes are important, they tend to change no more than 5-10 percent per year on average. Food prices can double or drop by 50 percent. Thus the answer (on average) depends even more on food prices than on income and therefore depends heavily on the drivers of food price change.<sup>11</sup> In the very short run those include global stockpiles and annual harvest results. But across our horizon they include (1) the levels of food prices themselves (high prices have now set in motion increased plantings and investment that will begin to drive prices back down quite soon, as the most recent food price data have begun to suggest), (2) the competition of energy for agricultural production (massive subsidies of crop-based biofuels have been one driver of pressure on food supplies and prices), and (3) the increased demand for food from the growing global middle class, including richer Chinese and Indians. Because the recession has driven down energy prices at least for the near term, biofuels are no longer growing as rapidly, just as slower income growth has slowed some food demand growth. Thus there is strong reason to believe that the Great Recession will lower prices and reduce malnutrition in the relatively near future. The figure from IFs below captures the income-related effects, but unfortunately does not capture the effect of food prices. Note that without the price effect, the rate of child malnutrition probably would have dropped between 2005 and 2015, instead of rising according to estimates. More than likely, a forecast taking into account food prices would have nearly the reverse consequences of the figure below.

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<sup>10</sup> A June 2009 estimate by the FAO for 2009 was 1.02 billion. See <http://www.fao.org/news/story/en/item/20568/icode/> Given the significant decline in commodity prices since mid 2008, this seems unlikely (although the FAO indicates that prices declines have not been as significant in many countries as global commodity prices, in part because stockpiles have not yet been rebuilt).

<sup>11</sup> Obviously, those who lose employment and all income view the average from a rather different perspective from that of those still employed.

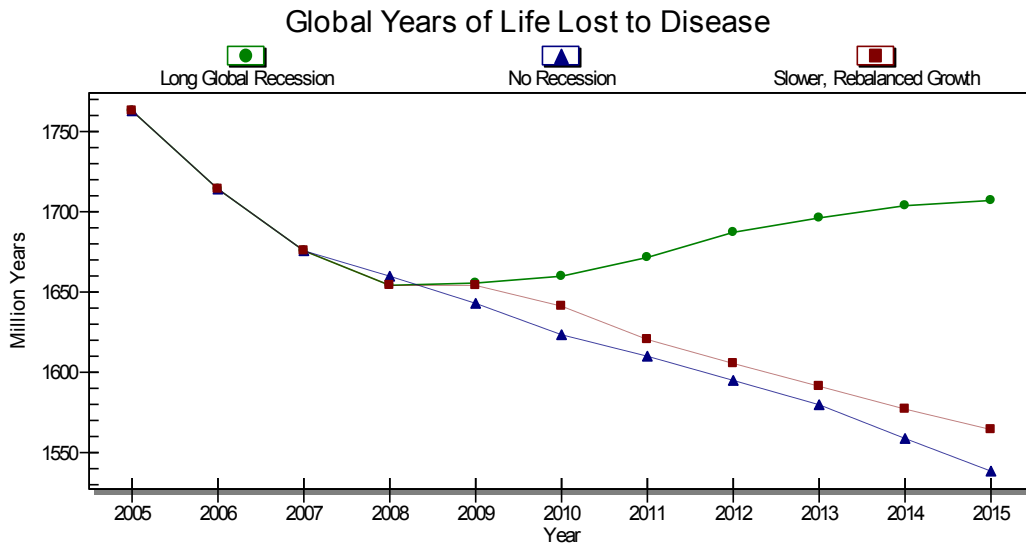


### 3.4 Health and Education

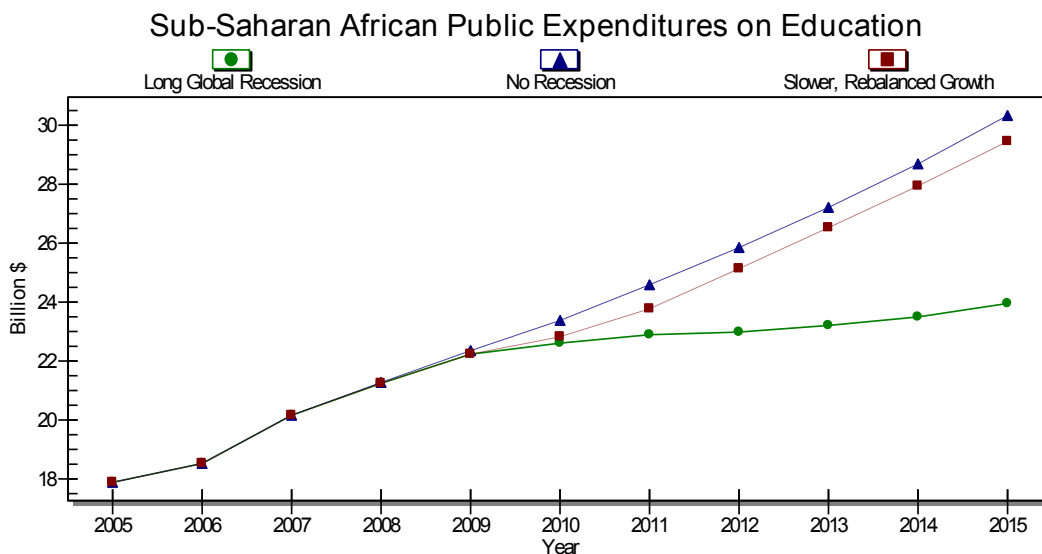
As much as analysts of health have wanted to find that expenditures on health and other health system indicators greatly affect health outcomes (morbidity and mortality), they tend to find that income is perhaps the key driver in the short and near term (technology is clearly critical over the longer term). Thus it is not surprising that the figure below shows that the Slower, Rebalanced Growth scenario slows down, relative to the No Recession scenario, the progressive global reduction in years of life lost to disease. The Long Global Recession scenario would effectively stop and even reverse the advance; the cumulative difference through 2015 in the Long Global Recession case is 620 million years of life lost.<sup>12</sup> Obviously, these losses would not occur equally across a population. Some portions, notably the poor, would potentially die much younger and other portions would experience little change in life expectancy relative to No Recession. The Long Global Recession would also lead to higher infant mortality rates in sub-Saharan Africa than the No Recession case, specifically 80.4 per thousand, rather than 77 per thousand.<sup>13</sup>

<sup>12</sup> A year of life lost is a standard measure in health analysis. It is a year of life forgone relative to the gender-specific average life expectancy of the longest-lived population of the world (currently Japanese males and females). The IFs forecasting formulations have been adapted from those of the World Health Organization's Global Burden of Disease project. We do not, however, discount years of foregone life for deaths at earlier ages. (In IFs the process to generate this figure from Self-Managed Display is to select HLYLL for all causes of death and genders and to discount early years, if desired.)

<sup>13</sup> Because technological advance also continues to drive infant mortality down (not just income levels affect those rates), the No Recession case shows some continued progress, but slower than the historic pattern. The increase in the years of life lost in the figure for the No Recession scenario reflects in part a growing population.



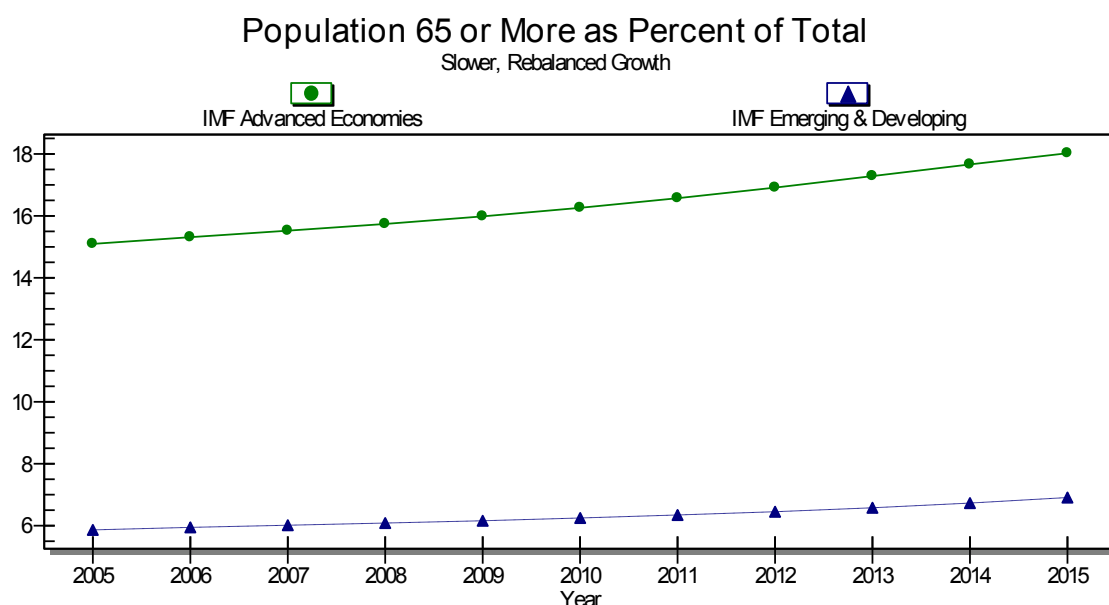
Analysis with IFs of the impact of the Great Recession on education is harder and less certain than that on health, because cost structures in education tend to vary more directly with income than they do in health, so that lower incomes more easily generate offsetting reduction in costs. Moreover, there is something of a countercyclical character of education—people can use more education to position themselves in a weaker economy (a well-known phenomenon in high-income countries, but much less likely in low-income countries). Thus the figure below, which shows the lower public expenditures that are likely in sub-Saharan Africa in the case of the Long Global Recession may not translate very directly into reduced education enrollment. Such a flattening of expenditure growth would, of course, have some significant impact (public spending on education in Advanced Economies actually decreases in the Long Global Recession).





### 3.5 Broader Social Impact

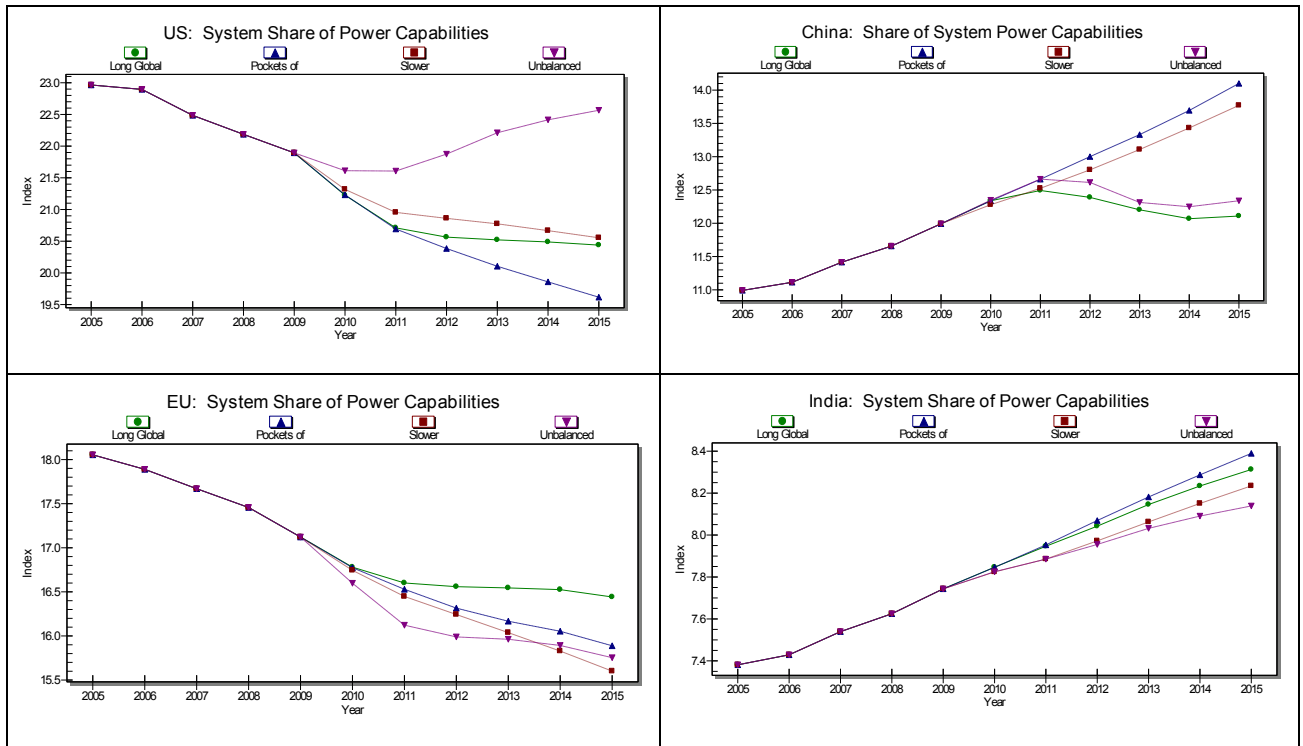
The Great Recession, with the strains it is putting on fiscal balances, has arrived at a complicated time for many countries, perhaps especially the high-income ones. Those countries, now moving sharply into fiscal deficit (and in a few important cases moving even more deeply than before into fiscal deficit), face the pension and health funding demands of an aging population. The OECD has emphasized this issue: “Strains in pensions systems, in both private and public provision, threaten to turn the financial crisis of the past two years into a social crisis lasting for decades, the Organization for Economic Co-operation and Development warned yesterday.” (*Financial Times*, June 24, 2009). The figure below shows the demographic changes underway.



Although this paper does not directly explore the implications of global recession for social stability, it is well known that it is not simply absolute downturns and loss of well-being that give rise to unrest, but also loss of momentum relative to historic and therefore expected rates of progress. Throughout this paper, we have seen that loss of momentum on income and social indicators.

### 3.6 Global Power Shares

The panel below shows the global system shares of power capabilities for major countries and the European Union. Clearly, the ongoing trends (*relative* rise of China and India and *relative* decline of the US and Europe), most consistently obvious in the Slower, Rebalanced Growth scenario, remain largely the same across scenarios. The Unbalanced Growth and Long Global Recession scenarios both contain assumptions of substantial declines in Chinese growth early in the next decade and at least temporarily interrupt its rise. Similarly, the Unbalanced Growth scenario posits an early resumption of growth and dynamism in the US and reverses its decline. None of the scenarios interrupt the rise of India and only the Long Global Recession begins to slow the *relative* decline of Europe.



## Appendix: Scenario Details

The creation of four economic scenarios and their introduction into IFs required several steps:

1. We created a new base case input file for IFs, accepting the GDP (at market prices) growth rates of the IMF's *World Economic Outlook 2009* (IMF 2009) through 2014 without change. We computed values for 2015 (beyond the WEO horizon) as the average of values from 2011 through 2015.<sup>14</sup> In this process, we built upon country-specific forecasts from the IMF (downloaded from the IMF WEO web site) to create the IMF WEO 2009 base case. For ease of reading, the tables below show GDP growth rates only for the countries of the G-20 (omitting the European Union which is also a member of the G-20) and for the IMF roll-up regions, but the base-case scenario built on the IMF WEO is fully country-specific, as are the four scenarios built around it.
2. We modified the IFs model so that it would accept this long series of exogenously specified growth rates, overriding endogenous computation. We transferred the IMF WEO 2009 growth rates from Excel spreadsheets into the IFsFull.dat file, which the model reads when it rebuilds the base case. That file now contains a line for each of the 183 countries of IFs, containing economic growth rates from 2005 through 2015.
3. Using Excel spreadsheets, we initially prepared the other four scenarios in terms of annual growth rates also, leaving the values for the years through 2009 unchanged from the IMF WEO 2009 scenario. We specified growth rates from 2010 through 2015 for each of the 19 countries in the G-20 (omitting the European Union) and for each of the IMF regional groupings. We did not specify different annual growth rates for each of the countries within the IMF regions.
4. We computed via spreadsheet the differences in growth rates between the IMF WEO 2009 base case and the four scenarios, for each of the 19 G-20 countries and each IMF region. We transferred these growth rate differences to four scenario files (.sce files such as Long Global Recession.sce) as values for the parameter MFPADD (an additive factor that affects change in multifactor productivity).<sup>15</sup> These .sce files first contain lines with values for each of the IMF

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<sup>14</sup> For those who wish to run IFs beyond 2015, it remains fully possible to do so. After 2015 the model resumes computing economic growth endogenously.

<sup>15</sup> The transfer process itself involved several steps. A file called ScenarioNameAdjustGrowthComputeDiff.xls was used to enter the desired growth rates and to compute the difference between those and the WEO scenario (unadjusted). The differences divided by 100 were manually copied to ScenarioNameInputPrep.xlsx, which was formatted in preparation for the creation of an IFs .sce file (with fields for CUSTOM, variable name, all non-specified or -100 cells, etc.). This was saved as ScenarioNameInputPrep.csv to put in that comma, separated variable format. The next step requires manual opening of Notebook and then a File Open of the .csv file (not a clicking on the .csv file to open

regions, followed by the values for the 19 countries of the G-20. When these .sce files are loaded into the IFs scenario tree, the model processes the groups first, assigning the differences to each country member of the group. Then it processes the countries, overriding the regional specifications with country-specific ones. Important: because the introduction of the scenarios involves an additive change to economic growth rates of the base case, the process preserves the relative differences in growth across members of groups (such as the difference between Uruguay and Colombia within Latin America).

5. We modified the IFs model so that it would allow the MFPADD parameter to work on top of the exogenously specified growth rates of the IMF WEO 2009 base case.
6. We tested the results of this process (in the process of preparing the first versions of this working paper) and revised the process accordingly over time.

|  | WEO 2009 Scenario |      |      |      |      |      |      |      |
|--|-------------------|------|------|------|------|------|------|------|
|  | 2008              | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
| Argentina                              | 7.0               | -1.5 | 0.7  | 2.6  | 3.0  | 3.0  | 3.0  | 2.9  |
| Australia                              | 2.1               | -1.4 | 0.6  | 1.9  | 2.8  | 2.9  | 3.0  | 2.7  |
| Brazil                                 | 5.1               | -1.3 | 2.2  | 3.0  | 3.4  | 3.8  | 4.5  | 3.7  |
| Canada                                 | 0.5               | -2.5 | 1.2  | 2.5  | 3.8  | 3.4  | 2.5  | 3.0  |
| China                                  | 9.0               | 6.5  | 7.5  | 10.2 | 10.7 | 10.3 | 10.0 | 10.3 |
| France                                 | 0.7               | -3.0 | 0.4  | 1.7  | 2.0  | 2.2  | 2.3  | 2.0  |
| Germany                                | 1.3               | -5.6 | -1.0 | 1.5  | 1.8  | 2.0  | 2.2  | 1.9  |
| India                                  | 7.3               | 4.5  | 5.6  | 6.9  | 7.6  | 7.9  | 8.0  | 7.6  |
| Indonesia                              | 6.1               | 2.5  | 3.5  | 4.5  | 5.0  | 5.5  | 6.0  | 5.3  |
| Italy                                  | -1.0              | -4.5 | -0.4 | 0.7  | 1.4  | 1.6  | 1.9  | 1.4  |
| Japan                                  | -0.6              | -6.2 | 0.5  | 2.2  | 3.2  | 2.8  | 2.5  | 2.7  |
| Korea                                  | 2.2               | -4.0 | 1.5  | 5.3  | 5.1  | 4.7  | 4.5  | 4.9  |
| Mexico                                 | 1.3               | -3.7 | 1.0  | 4.7  | 5.5  | 5.3  | 4.9  | 5.1  |
| Russia                                 | 5.6               | -6.0 | 0.5  | 3.4  | 4.5  | 4.8  | 5.0  | 4.4  |
| Saudi Arabia                           | 4.6               | -0.9 | 2.9  | 4.4  | 4.9  | 5.0  | 5.1  | 4.9  |
| South Africa                           | 3.1               | -0.3 | 1.9  | 3.9  | 4.3  | 4.5  | 4.4  | 4.3  |
| Turkey                                 | 1.1               | -5.1 | 1.5  | 4.0  | 3.5  | 3.5  | 3.5  | 3.6  |
| United Kingdom                         | 0.7               | -4.1 | -0.4 | 2.1  | 2.9  | 2.8  | 2.8  | 2.7  |
| United States                          | 1.1               | -2.8 | 0.0  | 3.5  | 3.6  | 3.3  | 2.4  | 3.2  |
| Advanced economies                     | 0.9               | -3.8 | 0.0  | 2.6  | 3.1  | 3.0  | 2.6  | 2.8  |
| Euro area                              | 0.9               | -4.2 | -0.4 | 1.4  | 1.8  | 2.0  | 2.3  | 1.9  |
| Major advanced economies (G7)          | 0.6               | -3.8 | 0.0  | 2.7  | 3.1  | 2.9  | 2.4  | 2.8  |
| Newly industrialized Asian economies   | 1.6               | -5.6 | 0.8  | 4.4  | 4.8  | 4.9  | 4.8  | 4.7  |
| Other advanced economies (Advanced eco | 1.6               | -4.1 | 0.6  | 3.3  | 3.9  | 4.0  | 4.0  | 3.8  |
| Emerging and developing economies      | 6.1               | 1.6  | 4.0  | 6.1  | 6.7  | 6.8  | 6.8  | 6.6  |
| Africa                                 | 5.2               | 2.0  | 3.9  | 5.2  | 5.3  | 5.5  | 5.4  | 5.3  |
| Africa: Sub-Sahara                     | 5.5               | 1.7  | 3.8  | 5.4  | 5.3  | 5.5  | 5.4  | 5.4  |
| Central and eastern Europe             | 2.9               | -3.7 | 0.8  | 3.8  | 4.3  | 4.2  | 4.0  | 4.1  |
| Commonwealth of Independent States and | 5.5               | -5.1 | 1.2  | 3.8  | 4.8  | 5.1  | 5.3  | 4.7  |
| Developing Asia                        | 7.7               | 4.8  | 6.1  | 8.3  | 8.9  | 8.9  | 8.8  | 8.7  |
| ASEAN-5                                | 4.9               | 0.0  | 2.3  | 4.3  | 5.2  | 5.8  | 6.0  | 5.3  |
| Middle East                            | 5.9               | 2.5  | 3.5  | 4.2  | 4.4  | 4.5  | 4.5  | 4.4  |
| Western Hemisphere                     | 4.2               | -1.5 | 1.6  | 3.6  | 4.1  | 4.2  | 4.3  | 4.0  |

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it). If all of this works properly, the notebook file will have the correct formatting for a .sce file and can be saved as such.

|  | Slower, Rebalanced Growth |      |      |      |      |      |      |      |
|--|---------------------------|------|------|------|------|------|------|------|
|  | 2008                      | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
| Argentina                              | 7.0                       | -1.5 | 0.7  | 2.6  | 2.6  | 2.6  | 2.6  | 2.6  |
| Australia                              | 2.1                       | -1.4 | 0.6  | 1.9  | 1.9  | 1.9  | 1.9  | 1.9  |
| Brazil                                 | 5.1                       | -1.3 | 2.2  | 3.0  | 3.0  | 3.0  | 3.0  | 3.0  |
| Canada                                 | 0.5                       | -2.5 | 1.2  | 2.5  | 2.5  | 2.5  | 2.5  | 2.5  |
| China                                  | 9.0                       | 6.5  | 7.5  | 9.5  | 9.5  | 9.5  | 9.5  | 9.5  |
| France                                 | 0.7                       | -3.0 | 0.4  | 1.7  | 1.7  | 1.7  | 1.7  | 1.7  |
| Germany                                | 1.3                       | -5.6 | -1.0 | 1.5  | 1.5  | 1.5  | 1.5  | 1.5  |
| India                                  | 7.3                       | 4.5  | 5.6  | 6.9  | 6.9  | 6.9  | 6.9  | 6.9  |
| Indonesia                              | 6.1                       | 2.5  | 3.5  | 4.5  | 4.5  | 4.5  | 4.5  | 4.5  |
| Italy                                  | -1.0                      | -4.5 | -0.4 | 0.7  | 0.7  | 0.7  | 0.7  | 0.7  |
| Japan                                  | -0.6                      | -6.2 | 0.5  | 2.2  | 2.2  | 2.2  | 2.2  | 2.2  |
| Korea                                  | 2.2                       | -4.0 | 1.5  | 4.5  | 4.5  | 4.5  | 4.5  | 4.5  |
| Mexico                                 | 1.3                       | -3.7 | 1.0  | 4.7  | 4.7  | 4.7  | 4.7  | 4.7  |
| Russia                                 | 5.6                       | -6.0 | 0.5  | 3.4  | 3.4  | 3.4  | 3.4  | 3.4  |
| Saudi Arabia                           | 4.6                       | -0.9 | 2.9  | 4.4  | 4.4  | 4.4  | 4.4  | 4.4  |
| South Africa                           | 3.1                       | -0.3 | 1.9  | 3.9  | 3.9  | 3.9  | 3.9  | 3.9  |
| Turkey                                 | 1.1                       | -5.1 | 1.5  | 3.5  | 3.5  | 3.5  | 3.5  | 3.5  |
| United Kingdom                         | 0.7                       | -4.1 | -0.4 | 2.1  | 2.1  | 2.1  | 2.1  | 2.1  |
| United States                          | 1.1                       | -2.8 | 0.0  | 2.4  | 2.4  | 2.4  | 2.4  | 2.4  |
| Advanced economies                     | 0.9                       | -3.8 | 0.0  | 2.6  | 2.6  | 2.6  | 2.6  | 2.6  |
| Euro area                              | 0.9                       | -4.2 | -0.4 | 1.4  | 1.4  | 1.4  | 1.4  | 1.4  |
| Major advanced economies (G7)          | 0.6                       | -3.8 | 0.0  | 2.4  | 2.4  | 2.4  | 2.4  | 2.4  |
| Newly industrialized Asian economies   | 1.6                       | -5.6 | 0.8  | 4.4  | 4.4  | 4.4  | 4.4  | 4.4  |
| Other advanced economies (Advanced eco | 1.6                       | -4.1 | 0.6  | 3.3  | 3.3  | 3.3  | 3.3  | 3.3  |
| Emerging and developing economies      | 6.1                       | 1.6  | 4.0  | 6.1  | 6.1  | 6.1  | 6.1  | 6.1  |
| Africa                                 | 5.2                       | 2.0  | 3.9  | 5.2  | 5.2  | 5.2  | 5.2  | 5.2  |
| Africa: Sub-Saharan                    | 5.5                       | 1.7  | 3.8  | 5.4  | 5.4  | 5.4  | 5.4  | 5.4  |
| Central and eastern Europe             | 2.9                       | -3.7 | 0.8  | 3.8  | 3.8  | 3.8  | 3.8  | 3.8  |
| Commonwealth of Independent States and | 5.5                       | -5.1 | 1.2  | 3.8  | 3.8  | 3.8  | 3.8  | 3.8  |
| Developing Asia                        | 7.7                       | 4.8  | 6.1  | 8.3  | 8.3  | 8.3  | 8.3  | 8.3  |
| ASEAN-5                                | 4.9                       | 0.0  | 2.3  | 4.3  | 4.3  | 4.3  | 4.3  | 4.3  |
| Middle East                            | 5.9                       | 2.5  | 3.5  | 4.2  | 4.2  | 4.2  | 4.2  | 4.2  |
| Western Hemisphere                     | 4.2                       | -1.5 | 1.6  | 3.6  | 3.6  | 3.6  | 3.6  | 3.6  |

|  | Long Global Recession |      |      |      |      |      |      |      |
|--|-----------------------|------|------|------|------|------|------|------|
|  | 2008                  | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
| Argentina                              | 7.0                   | -1.5 | 0.7  | 1.0  | 1.0  | 1.0  | 2.0  | 2.0  |
| Australia                              | 2.1                   | -1.4 | -2.0 | -1.0 | -1.0 | 0.0  | 1.9  | 1.9  |
| Brazil                                 | 5.1                   | -1.3 | 2.2  | 2.0  | 2.0  | 2.0  | 3.0  | 3.0  |
| Canada                                 | 0.5                   | -2.5 | -2.0 | -1.0 | 0.0  | 1.0  | 2.0  | 2.5  |
| China                                  | 9.0                   | 6.5  | 7.5  | -1.0 | -5.0 | -3.0 | -1.0 | 5.0  |
| France                                 | 0.7                   | -3.0 | -2.0 | -1.5 | -1.5 | -0.5 | 0.0  | 0.5  |
| Germany                                | 1.3                   | -5.6 | -2.0 | -1.5 | -1.5 | -0.5 | 0.0  | 0.5  |
| India                                  | 7.3                   | 4.5  | 5.6  | 2.0  | 2.0  | 3.0  | 3.0  | 5.0  |
| Indonesia                              | 6.1                   | 2.5  | 3.5  | -1.0 | -1.0 | 1.0  | 3.0  | 4.0  |
| Italy                                  | -1.0                  | -4.5 | -2.0 | -1.0 | -1.0 | 0.0  | 0.7  | 0.7  |
| Japan                                  | -0.6                  | -6.2 | -2.0 | -1.0 | -1.0 | 0.0  | 1.0  | 1.0  |
| Korea                                  | 2.2                   | -4.0 | -2.0 | -1.0 | -1.0 | 0.5  | 3.0  | 3.0  |
| Mexico                                 | 1.3                   | -3.7 | 1.0  | 0.0  | 1.0  | 1.0  | 3.0  | 3.5  |
| Russia                                 | 5.6                   | -6.0 | -2.0 | -1.0 | -1.0 | 0.0  | 1.0  | 2.0  |
| Saudi Arabia                           | 4.6                   | -0.9 | 2.9  | 0.0  | 0.0  | 1.0  | 2.0  | 3.0  |
| South Africa                           | 3.1                   | -0.3 | 1.9  | 0.0  | 0.0  | 1.0  | 2.5  | 2.5  |
| Turkey                                 | 1.1                   | -5.1 | 1.5  | 1.0  | 1.0  | 1.5  | 2.5  | 2.5  |
| United Kingdom                         | 0.7                   | -4.1 | -2.0 | -1.5 | -1.5 | 0.0  | 0.5  | 0.5  |
| United States                          | 1.1                   | -2.8 | -2.0 | -1.5 | -1.5 | 0.0  | 0.5  | 1.0  |
| Advanced economies                     | 0.9                   | -3.8 | -2.0 | -1.0 | -1.0 | 0.0  | 1.2  | 1.5  |
| Euro area                              | 0.9                   | -4.2 | -2.0 | -1.5 | -1.5 | 0.0  | 0.5  | 0.5  |
| Major advanced economies (G7)          | 0.6                   | -3.8 | -1.5 | -1.0 | -1.0 | 0.0  | 0.5  | 1.0  |
| Newly industrialized Asian economies   | 1.6                   | -5.6 | 0.0  | 1.0  | -3.0 | -1.0 | 1.0  | 2.0  |
| Other advanced economies (Advanced eco | 1.6                   | -4.1 | -1.0 | -1.0 | -1.0 | 0.0  | 0.5  | 1.0  |
| Emerging and developing economies      | 6.1                   | 1.6  | 2.0  | 2.0  | 0.5  | 1.0  | 1.5  | 2.0  |
| Africa                                 | 5.2                   | 2.0  | 0.5  | 1.0  | 1.0  | 1.5  | 1.5  | 2.0  |
| Africa: Sub-Saharan                    | 5.5                   | 1.7  | 1.0  | 1.0  | 1.0  | 1.5  | 1.5  | 2.0  |
| Central and eastern Europe             | 2.9                   | -3.7 | -2.0 | -1.0 | -1.0 | 0.0  | 2.0  | 2.0  |
| Commonwealth of Independent States and | 5.5                   | -5.1 | -2.0 | -1.0 | -1.0 | 0.0  | 2.0  | 2.0  |
| Developing Asia                        | 7.7                   | 4.8  | 2.5  | 2.5  | 2.0  | 2.5  | 2.5  | 3.0  |
| ASEAN-5                                | 4.9                   | 0.0  | 0.0  | 1.0  | 0.0  | 1.0  | 1.5  | 2.0  |
| Middle East                            | 5.9                   | 2.5  | 0.0  | 0.5  | 0.5  | 1.0  | 1.5  | 1.5  |
| Western Hemisphere                     | 4.2                   | -1.5 | -1.0 | -1.0 | -1.0 | 0.0  | 1.0  | 1.5  |

|  | Pockets of Growth |      |      |      |      |      |      |      |
|--|-------------------|------|------|------|------|------|------|------|
|  | 2008              | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
| Argentina                              | 7.0               | -1.5 | 0.7  | 2.0  | 2.6  | 2.6  | 2.6  | 2.6  |
| Australia                              | 2.1               | -1.4 | -2.0 | -1.0 | 0.0  | 1.5  | 1.9  | 1.9  |
| Brazil                                 | 5.1               | -1.3 | 2.2  | 2.5  | 3.0  | 3.0  | 3.0  | 3.0  |
| Canada                                 | 0.5               | -2.5 | -2.0 | -1.0 | 0.0  | 2.0  | 2.5  | 2.5  |
| China                                  | 9.0               | 6.5  | 7.5  | 6.5  | 7.5  | 8.5  | 9.5  | 9.5  |
| France                                 | 0.7               | -3.0 | -2.0 | -1.0 | -1.0 | 1.0  | 1.5  | 1.5  |
| Germany                                | 1.3               | -5.6 | -2.0 | -1.0 | -1.0 | 1.0  | 1.5  | 1.5  |
| India                                  | 7.3               | 4.5  | 5.6  | 4.5  | 5.0  | 6.0  | 6.6  | 6.6  |
| Indonesia                              | 6.1               | 2.5  | 3.5  | 3.5  | 4.0  | 4.5  | 4.5  | 4.5  |
| Italy                                  | -1.0              | -4.5 | -2.0 | -1.0 | -1.0 | 0.7  | 0.7  | 0.7  |
| Japan                                  | -0.6              | -6.2 | -2.0 | -1.0 | 0.5  | 0.5  | 1.0  | 1.0  |
| Korea                                  | 2.2               | -4.0 | -2.0 | -1.0 | 0.0  | 3.0  | 4.0  | 4.0  |
| Mexico                                 | 1.3               | -3.7 | 1.0  | 1.0  | 2.0  | 3.0  | 4.0  | 4.7  |
| Russia                                 | 5.6               | -6.0 | -2.0 | -1.0 | 1.0  | 3.0  | 3.4  | 3.4  |
| Saudi Arabia                           | 4.6               | -0.9 | 2.9  | 3.5  | 4.0  | 4.4  | 4.4  | 4.4  |
| South Africa                           | 3.1               | -0.3 | 1.9  | 2.5  | 2.0  | 3.5  | 3.9  | 3.9  |
| Turkey                                 | 1.1               | -5.1 | 1.5  | 2.0  | 2.0  | 3.5  | 3.5  | 3.5  |
| United Kingdom                         | 0.7               | -4.1 | -2.0 | -1.0 | -1.0 | 0.5  | 1.0  | 1.0  |
| United States                          | 1.1               | -2.8 | -2.0 | -1.0 | -1.0 | 0.5  | 1.0  | 1.0  |
| Advanced economies                     | 0.9               | -3.8 | -1.5 | -0.5 | -1.0 | 1.0  | 1.5  | 1.5  |
| Euro area                              | 0.9               | -4.2 | -2.0 | -1.0 | -1.0 | 1.0  | 1.4  | 1.4  |
| Major advanced economies (G7)          | 0.6               | -3.8 | -2.0 | -0.5 | -1.0 | 1.0  | 1.5  | 1.5  |
| Newly industrialized Asian economies   | 1.6               | -5.6 | 0.5  | 3.5  | 3.5  | 3.5  | 3.5  | 3.5  |
| Other advanced economies (Advanced eco | 1.6               | -4.1 | -2.0 | -1.0 | -1.0 | 1.0  | 1.5  | 1.5  |
| Emerging and developing economies      | 6.1               | 1.6  | 3.0  | 5.0  | 5.5  | 6.0  | 6.5  | 6.5  |
| Africa                                 | 5.2               | 2.0  | 2.0  | 2.5  | 3.0  | 3.5  | 4.0  | 4.5  |
| Africa: Sub-Saharan                    | 5.5               | 1.7  | 2.0  | 2.5  | 3.0  | 3.5  | 4.0  | 4.5  |
| Central and eastern Europe             | 2.9               | -3.7 | -2.0 | -1.0 | 0.0  | 2.0  | 3.0  | 3.0  |
| Commonwealth of Independent States and | 5.5               | -5.1 | -2.0 | -1.0 | 0.0  | 2.0  | 3.0  | 4.0  |
| Developing Asia                        | 7.7               | 4.8  | 3.0  | 4.0  | 5.0  | 6.0  | 7.0  | 7.0  |
| ASEAN-5                                | 4.9               | 0.0  | 0.0  | 2.0  | 2.0  | 3.0  | 3.0  | 4.0  |
| Middle East                            | 5.9               | 2.5  | 0.5  | 1.0  | 2.0  | 2.0  | 3.0  | 3.0  |
| Western Hemisphere                     | 4.2               | -1.5 | -1.0 | -1.0 | 0.0  | 1.0  | 1.5  | 2.0  |

|  | Unbalanced Growth |      |      |      |      |      |      |      |
|--|-------------------|------|------|------|------|------|------|------|
|  | 2008              | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
| Argentina                              | 7.0               | -1.5 | 0.7  | 1.0  | 2.0  | 2.0  | 2.0  | 2.6  |
| Australia                              | 2.1               | -1.4 | -2.0 | -1.0 | 1.9  | 2.5  | 2.5  | 2.5  |
| Brazil                                 | 5.1               | -1.3 | 2.2  | 2.5  | 3.0  | 3.0  | 3.5  | 3.5  |
| Canada                                 | 0.5               | -2.5 | -2.0 | 1.5  | 2.0  | 2.5  | 2.5  | 2.5  |
| China                                  | 9.0               | 6.5  | 9.7  | 8.0  | -5.0 | -2.0 | 4.0  | 5.0  |
| France                                 | 0.7               | -3.0 | -4.0 | -2.0 | 1.0  | 2.0  | 2.0  | 2.0  |
| Germany                                | 1.3               | -5.6 | -4.0 | -2.0 | 1.0  | 1.5  | 1.5  | 1.5  |
| India                                  | 7.3               | 4.5  | 5.6  | 4.0  | 4.0  | 4.0  | 4.0  | 5.0  |
| Indonesia                              | 6.1               | 2.5  | 3.5  | -1.0 | 1.0  | 2.0  | 3.0  | 4.0  |
| Italy                                  | -1.0              | -4.5 | -2.0 | -1.0 | 0.7  | 0.7  | 0.7  | 0.7  |
| Japan                                  | -0.6              | -6.2 | -2.0 | -1.0 | -1.0 | 0.0  | 1.0  | 1.0  |
| Korea                                  | 2.2               | -4.0 | -2.0 | -1.0 | 1.0  | 2.0  | 3.0  | 3.0  |
| Mexico                                 | 1.3               | -3.7 | 1.0  | 2.0  | 3.0  | 4.0  | 5.0  | 5.0  |
| Russia                                 | 5.6               | -6.0 | -2.0 | 1.0  | 2.0  | 3.0  | 4.0  | 4.0  |
| Saudi Arabia                           | 4.6               | -0.9 | 2.9  | 0.0  | 1.0  | 1.0  | 2.0  | 3.0  |
| South Africa                           | 3.1               | -0.3 | 1.9  | 0.0  | 1.0  | 2.0  | 3.0  | 3.5  |
| Turkey                                 | 1.1               | -5.1 | 1.5  | 2.0  | 3.0  | 3.5  | 3.5  | 3.5  |
| United Kingdom                         | 0.7               | -4.1 | -2.0 | 0.0  | 1.0  | 2.0  | 2.5  | 2.5  |
| United States                          | 1.1               | -2.8 | 2.0  | 2.5  | 3.0  | 3.0  | 3.0  | 3.0  |
| Advanced economies                     | 0.9               | -3.8 | 0.0  | 1.0  | 1.0  | 1.0  | 2.0  | 2.0  |
| Euro area                              | 0.9               | -4.2 | -1.0 | 0.0  | 0.0  | 0.0  | 1.0  | 1.0  |
| Major advanced economies (G7)          | 0.6               | -3.8 | -1.0 | 0.5  | 0.5  | 1.0  | 1.0  | 1.0  |
| Newly industrialized Asian economies   | 1.6               | -5.6 | 0.8  | 3.0  | -3.0 | -1.0 | 2.0  | 3.0  |
| Other advanced economies (Advanced eco | 1.6               | -4.1 | 0.5  | 2.0  | 2.5  | 2.5  | 2.5  | 2.5  |
| Emerging and developing economies      | 6.1               | 1.6  | 3.0  | 4.0  | 1.0  | 2.0  | 3.0  | 3.0  |
| Africa                                 | 5.2               | 2.0  | 1.0  | 2.0  | 2.0  | 2.0  | 3.0  | 3.0  |
| Africa: Sub-Saharan                    | 5.5               | 1.7  | 1.0  | 2.0  | 2.0  | 2.0  | 3.0  | 3.0  |
| Central and eastern Europe             | 2.9               | -3.7 | -1.0 | 1.0  | 1.0  | 2.0  | 3.0  | 3.0  |
| Commonwealth of Independent States and | 5.5               | -5.1 | -1.0 | 1.0  | 1.0  | 2.0  | 3.0  | 3.0  |
| Developing Asia                        | 7.7               | 4.8  | 3.0  | 5.0  | 2.0  | 3.0  | 3.0  | 4.0  |
| ASEAN-5                                | 4.9               | 0.0  | 1.0  | 2.0  | 0.0  | 1.0  | 2.0  | 2.0  |
| Middle East                            | 5.9               | 2.5  | 2.0  | 2.0  | 2.0  | 1.0  | 2.0  | 2.0  |
| Western Hemisphere                     | 4.2               | -1.5 | 0.0  | 2.0  | 2.0  | 2.0  | 2.0  | 2.0  |



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