How Solid are the BRICs?

- Since we began writing on the BRICs, each country has grown more strongly than our initial projections. Our updated forecasts suggest the BRICs can realise the ‘dream’ more quickly than we thought in 2003.

- The case for including the BRICs directly in global economic policymaking is now overwhelming.

- We present the prospects for another set of developing countries, a group we call the N-11—the Next Eleven. Of them, only Mexico and perhaps Korea have the capacity to become as important globally as the BRICs.

- We introduce a Growth Environment Score (GES), which aims to summarize the overall structural conditions and policy settings for countries globally. Improving long-term foundations is key to converting potential into reality.

- Encouragingly, the BRICs themselves are all in the top half of the rankings for developing countries. While the BRICs are generally progressing, there is a need for considerable further policy improvement in each.
How Solid are the BRICs?

I. The BRICs Four Years On

It is now two years since we published our Global Economics Paper No. 99: Dreaming with BRICs: The Path to 2050, and four years since we created the acronym in Global Economics Paper No. 66: The World Needs Better Economic BRICs. Since we began analysing these countries, each has grown more strongly than our initial projections. Our updated forecasts suggest that the BRICs economies can realise the ‘dream’ more quickly than we thought in 2003. The case for including this group directly in global economic policymaking in a systematic way is now overwhelming.

This latest paper in the series discusses how the BRICs countries have progressed. We also look at how ‘BRIC-like’ other large population countries are, and present a measure to show how these, the BRICs and all the world’s economies score in terms of sustaining a healthy environment for growth. The BRICs economies do seem to be ahead of many other developing economies, both large and small.

We also present a detailed study of the prospects for another set of developing countries, a group we call the N-11—the Next Eleven. Of them, only Mexico and perhaps Korea have the capacity to become as important globally as the BRICs, although many of them have compelling potential.

For all countries, BRIC-like or otherwise, the key to converting potential into reality continues to be progress in strengthening key long-term conditions for growth (macroeconomic stability, political institutional development, trade and investment openness, and education). We introduce a Growth Environment Score (GES), which aims to summarize the overall structural conditions and policy settings for countries globally. Encouragingly, the BRICs themselves are all in the top half of the rankings for developing countries. While the BRICs are generally progressing, our GES implies there is a need for considerable further policy improvement in each.

II. Dreams and Reality

Two themes have come up repeatedly since we introduced our BRICs 2050 scenarios: Will the BRICs make it? And who else might join them?

There is a major distinction between the BRICs’ potential and the reality. The key to turning one into the other—as we pointed out in our 2003 paper—relies largely on the BRICs finding and keeping in place the conditions for growth. Without these improvements, the BRICs’ potential will not be fulfilled. Demographic advantage is not sufficient. As we showed, ‘miracle conditions’ are not necessary, but a basic set of powerful conditions is crucial. We try to capture the progress and current state of growth conditions in an index that we call the Growth Environment Score (see section VI for details).

A common question we hear is: why just Brazil, Russia, India and China? The simple reason is that we think they represent the group of countries that have both the potential to become important (largely because of their demographic tilt towards the BRICs allows these economies the chance to participate in an integral way in the world economy.

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Separating Myth from Reality in the BRICs Theory

We never anticipated the impact that this research has had, especially the 2003 paper (Global Economics Paper No. 99: Dreaming with BRICs: The Path to 2050). The ideas implicit in these papers, and many of the concepts that have developed since, have become hot investment themes over the past two years. A number of BRICs investment funds have been established and others are in the process of being launched. Many writers, academics and journalists have offered opinions about the BRICs concept, and we thought that it would be appropriate to address some of the issues most frequently raised.

Our BRICs analysis made a clear distinction between potential and reality. Rather than forecasting that China will become the largest economy in the world by 2041 and that India will become the third-largest by 2035—or that the combined BRICs GDP size will become bigger than the G6 (G7 minus Canada) by 2041—we suggested that, if everything went right, then China could become the largest economy in the world by 2041, India the third-largest by 2035, and the combined BRICs GDP could exceed the G6 by 2041. The capacity of the BRICs to influence global dynamics turns on their ability to set and maintain growth-supportive policy settings.

Linked to this growing influence, we see the BRICs as much more than a new emerging market theme. The BRICs are a key aspect of the modern globalised era. What distinguishes the BRICs from any other story of EM growth is their ability to influence, and be influenced by, the global economy and global markets in a broad fashion. The current and prospective outlook for globalisation has the BRICs nations at its core and the interplay between the BRICs economies and the G7 is a critical aspect of globalisation and interdependence. The varied composition among the BRICs, the balance between resource-abundance and resource-dependence within the BRICs, and the global demographic tilt towards the BRICs allows these economies the chance to participate in an integral way in the world economy.
size) and a reasonable chance of meeting the criteria. The case for China and India is especially straightforward, simply on the basis of their massive populations. We did not include Brazil and Russia purely because the acronym would fail to be made if we left them out, as we have repeatedly and amusingly heard. We genuinely believed, and still do, that these two economies, along with China and India, have the potential to be among the most interesting global economic stories and investment themes for many years to come. In addition, we now believe even more strongly that optimal economic policymaking cannot be undertaken without including all of the BRICs countries at the highest level.

In our initial report, we did exclude several other large developing countries that have the potential to be much bigger economies in coming decades. We did not ignore South Africa—in fact we specifically showed how unlikely it would be that South Africa could reach the size of any of the BRICs despite its own potential. We excluded Indonesia, Pakistan, Turkey and some of the Middle Eastern nations that could become quite large, though may not have true BRICs potential. The reasons for excluding other candidates in our earlier studies were either because they lacked the potential to become large and important players (in many cases because they are just too small) or because we thought that fulfilling the conditions was an unrealistic assumption.

In this paper, we discuss the candidacy of other countries to be BRIC-like. We have estimated projections up to 2050 to include another broad group of possible candidates, a group we call the N-11—the Next Eleven. By and large, our new work confirms our initial belief. We still find that the BRICs stand out relative to the bulk of these other candidates, in terms of the potential to be a major economic force. Of the other countries we look at, only Mexico and perhaps Korea have the potential to rival the BRICs—economies that we excluded initially because we view them as already more developed. Mexico’s favourable demographics and scope to catch up place it among the BRICs in terms of economic size by 2050. Korea, albeit somewhat smaller, is better placed than most others to realise its potential due to its growth-supportive fundamentals.

Nigeria and Indonesia emerge as interesting prospects, but they face serious fundamental weaknesses in the conditions that we identify as necessary. Each of the countries in the N-11, Korea and Mexico excluded, faces its own specific dilemmas, and perhaps unlike the four BRICs, they are not close to the heart of current and likely future globalisation developments. That does not mean that these other countries cannot achieve their own BRICs-like aspirations—indeed several probably will—but the probability is lower and their potential ultimate size is smaller.

III. Bigger BRICs, Bigger Impact

Since we first published our BRICs 2050 scenarios, the BRICs have grown significantly better than we assumed. Each of the BRICs exceeded its growth path in 2004 by at least a percentage point, and all but Brazil are expected to do so in 2005. Our regional economists’ forecasts show that the BRICs should continue to exceed our projections in the next couple of years, suggesting that in the near term our approach is proving conservative. Of course, global economic and financial conditions have been favourable, although the BRICs economies themselves have been central to these developments.

The BRICs’ impact on the global economy has continued to grow over the last few years, through a wide range of different dimensions:

Growth and Trade

Between 2000 and 2005, the BRICs contributed roughly 28% of global growth in US dollar terms, and 55% in Purchasing Power Parity (PPP) terms.

Their share of global trade continues to climb at a rapid rate. At close to 15% currently, it is now double its level in 2001.

The BRICs Contributed Close to 30% to Global Growth Over the Past 5 Years

The BRICs’ Near-Term Growth Outlook Is Positive

Source: GS calculations

Source: World Bank, GS forecasts
Trade among the BRICs has also accelerated, with intra-BRICs trade now nearly 8% of their total trade compared with 5% in 2000. There have been numerous signs of developing trade relationships, including the sharp increase in Brazilian trade with China and Chinese investment commitments in Brazil. India (in intellectual property) and Brazil (in agriculture) have also illustrated their policymaking leadership among developing countries through the WTO negotiation process.

**Capital Flows**

The BRICs have played an important part in global financial developments. Latest estimates suggest that the BRICs now hold more than 30% of world reserves. China is the dominant contributor, but Russia, India and Brazil have all accumulated substantial reserves also.

Despite this reserve accumulation, real exchange rates in each country have appreciated over the last two years. Real exchange rate appreciation was and remains an important part of our projected paths out to 2050.

BRICs’ current accounts continue to be in healthy surplus, reflecting the group’s key role in the global savings supply. With China’s surplus increasing sharply, the BRICs’ current account is likely to come in at around US$240bn in 2005, or close to 6% of BRICs’ GDP. The BRICs are increasingly important counterparts to the US current account deficit.

BRICs’ share as a destination for global FDI also continues to rise (now 15% of the global total, nearly three times higher than in 2000). What is even more striking is that BRICs’ FDI outflows have also picked up (to more than 3% of the global total, a sixfold increase since 2000) as BRICs companies expand their own global presence. M&A transactions have also picked up.

**Markets**

BRICs’ share of oil demand is moving steadily higher, with an estimated 18% share, projected to rise further this year and next. This dynamic still has a long way to run, with the next decade in particular the likely point of maximum pressure on energy and other natural resources, as we showed in Global Economics Papers No.118 (The BRICs and Global Markets: Crude, Cars and Capital) and No.119 (Can the G7 Afford the BRICs Dreams to Come True?).
BRICs stock markets have also generally performed very strongly since 2003, with Brazilian, Russian and Indian indices all up by around 150% over that period. China is the one exception, where the idiosyncrasies of the local market have seen very lacklustre performance continue into this year. China provides a warning that the local market may not be the best investment vehicle for the local growth story. BRICs market capitalisation continues to climb, currently at close to 4% of the global total, a story we described in our report last year.

Current success is obviously no guarantee of future performance, but it is encouraging that the BRICs have so far grown faster than we envisaged.

We have now updated our projections to take into account the recent economic data and the latest demographic projections, rebasing our figures to 2005. Key elements of the initial projections remain in place, with minor variations. China would now overtake the US by 2040 (slightly ahead of our 2003 projections), while India would overtake Japan by 2033 (slightly later than earlier projections, due to the recent improvements in Japan’s economic performance).

We have also added Canada to our analysis, given some suggestions that we specifically excluded Canada from our G6 developed country group (in reality, we initially analysed the G3—the US, Japan and the four large European economies, labeling it the G6). Canada would still be the smallest economy in the current G7 grouping by 2050.

### IV. Are There More ‘BRICs’ Out There? A Look at the N-11

The BRICs story is not simply about developing country growth successes. What makes the BRICs special is that they have the scale and the trajectory to challenge the major economies in terms of influence on the world economy. Looking across the developing world today, the BRICs nations clearly stand out on both their economic and demographic size. Thinking back to the original purpose of the BRICs analysis—an attempt to highlight those economies that could provide a challenge to the major developed economies in terms of their weight—these two criteria provide the basic foundations for the potential we map out.

Of course, this is not to say that we will not see other important growth success stories outside of the BRICs—and we expect to—but not with the scale to match the BRICs. Our 2003 paper included a similar long-term growth exercise for South Africa, in which we found real GDP growth to average roughly 3.5% over the projection period. Measures such as income per capita move rapidly towards G6 levels; however, we found that by 2050 South Africa’s GDP would be much smaller than the smallest BRIC, making it difficult for the country to become a global economic heavyweight.

In thinking about other countries that might have BRICs-like potential, we focused on demographic profiles, which drive much of the analysis. Without a substantial population, even a successful growth story is unlikely to have a global impact. Hong Kong will never be a global power nor Luxembourg, despite the very high levels of income and living standards that they have achieved.

We call this larger developing-country set the Next Eleven (N-11), though whether they will ‘emerge’ is still an open question for many. This group shows broad representation by region and includes Bangladesh, Egypt, Indonesia, Iran, Korea, Mexico, Nigeria, Pakistan, Philippines, Turkey, Vietnam.¹

We have chosen to include Korea and Mexico here, which as OECD members we excluded from our initial study. Korea and Mexico have the highest income levels of the N-11 group by some margin (roughly US$17,000 in Korea and US$7,000 in Mexico). Korea, in particular, is unique in this group. Income per capita is already at

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¹ Some of the smaller Central European economies come up frequently in discussions. With much higher income levels than the BRICs—and smaller populations—they have the capacity to be dynamic growth stories, but not to have the same kind of global impact. We also looked at Ethiopia and Thailand, which are on the verge of the same population bracket as the N-11, but both remain smaller than this group under most assumptions. For this reason, we chose to exclude them from the final N-11 set.
high-income levels, and across the components in our Growth Environment Score, Korea resembles more of a developed country than a developing one. However, both Korea and Mexico are important to include in any complete projection of the largest economies over the next 50 years. The fact that income per capita is already high somewhat limits their growth potential in our model of productivity convergence, which is driven by the income gap with the US. Korea’s working-age demographics, which show a sharp fall-off after 2010, also pose a significant challenge to future growth.

V. Even With the N-11, Still Largely a BRICs Story

We ran projections of US$GDP, real GDP growth, income per capita, incremental demand and exchange rate paths for each of these economies. Similar to our original analysis, about two-thirds of the increase in US$GDP comes from the higher real GDP growth we project, with the balance coming from real currency appreciation.

The composite projections reinforce the notion that, by 2050, the largest economies in US Dollar terms will look very different from today. China would still become the largest economy, followed by the US, India, Japan and Brazil. Mexico, however, now becomes the sixth-largest economy, slightly ahead of Russia, though Russia still emerges as the wealthiest BRIC nation in terms of GDP per capita. Indonesia, Nigeria and Korea could overtake Italy and Canada by 2050, but the other N-11 members do not ‘catch up’ with the current G7 group. Other than Mexico and perhaps Korea, the rise of the rest of the N-11—while potentially significant in absolute terms—would contribute quite modestly on a global basis. Although Korea does not overtake the BRICs economies by 2050, it is more likely to achieve its potential based on its solid growth environment. Korea overtakes Italy by 2020, while Indonesia overtakes Italy only in 2044 and Nigeria outpaces Italy by 2048.

In terms of income per capita, the picture is slightly different. By 2050, Korea’s income per capita is higher than each of the G7, except for the US. Russia and Mexico also converge to developed country income levels at roughly US$55,000. Brazil, China and Turkey have incomes per capita similar to that of the US today.
India’s income per capita in 2050 looks more like Korea’s today. By 2025, most of the BRICs and N-11 would be entering (or have crossed) the US$3,000 threshold, a crucial sweet spot for consumption. By 2050, all of the BRICs and seven of the N-11 (Egypt, Iran, Korea, Mexico, Philippines, Turkey and Vietnam) cross the high-income US$15,000 threshold. At the end of the period, Bangladesh’s income remains by far the lowest of the entire group at US$4,500.

These expanded projections reinforce our initial 2003 conclusion, Korea and Mexico aside, that the BRICs really are different. For the N-11 ex-Korea and Mexico, the productivity catch-up potential is even more important, as their demographics alone will not allow growth of BRICs-type proportions. The next section underlines how cautious we are about the current likelihood of many of these countries being in a position to reach their potential, as well as underscoring the significant tasks ahead for each of the BRICs nations.

VI. Getting Conditions Right—the Growth Environment Score (GES)

Deciding how plausible the N-11 might be as candidates for a BRICs-type story once again highlights the centrality of getting growth conditions right in understanding the scenarios we have mapped out, both for the BRICs and the broader grouping. There is no doubt that the BRICs are currently performing well and the near-term outlook looks quite favourable. The big question is whether they can keep growing over the longer horizon that our projections map out.

In our original projections, we argued that getting the conditions for growth in place—and keeping them there—was critical to whether the scenario we described would in fact occur. We showed that running the same model from 1960 would have accurately predicted growth for the developed economies, and some key emerging Asian economies (except India), but not others.
It helps to think of a country’s growth performance as a combination of its potential and its conditions. In general, developed countries have lower potential (they are already developed), but the chances of meeting that modest potential are good. Developing countries have much higher potential for rapid growth, but the difficulty is to achieve and sustain the conditions that allow that potential to be realised.\(^2\)

We are often asked to rank the BRICs and assess their prospects of staying on the projected path. In our previous research we resorted to a number of ways to tackle this challenging question, but largely stuck with a qualitative assessment of the growth environment, identifying the most probable risks the BRICs might face in the future. We try to answer this question now in a more fundamental way.

In order to rank countries’ abilities to meet their growth potential more formally and to monitor growth conditions over time, we have developed a Growth Environment Score (GES) that aims to summarise the overall environment in an economy, emphasising the dimensions that are important to economic growth.

Relying on the large body of research on the determinants of economic growth, we have constructed our GES using 13 sub-indices, which can be divided into five basic areas:

- **Macroeconomic stability**
  - Inflation; government deficit; external debt

- **Macroeconomic conditions**
  - Investment rates; openness of the economy

- **Technological capabilities**
  - Penetration of PCs; phones; internet

- **Human capital**
  - Education; life expectancy

- **Political conditions**
  - Political stability; rule of law; corruption

Appendix 2 describes the methodology in greater detail, but the basic notion is that strong growth is best achieved with a stable and open economy, healthy investment, high rates of technology adoption, a healthy and well-educated workforce, and a secure and rule-based political environment. We rank a country’s performance on each measure on a 0-10 scale and create an overall score, the GES, which also ranges from a possible minimum of 0 (poor conditions) to a possible maximum of 10 (perfect conditions).

The GES is consistent across countries and over time, can be easily updated and tracked on an ongoing basis, and is based on hard evidence.

**VII. How the BRICs and N-11 Score on Growth Environments**

The GES shows how the BRICs and N-11 fit into the broader picture. Appendix 3 sets out the full list and rankings across 170 countries. In general, not surprisingly, the most developed economies are better at maintaining the conditions for growth and score more highly. This means that they are more likely to deliver stable growth and meet their potential, though, as our BRICs projections have shown, that potential is itself much lower than for the BRICs economies. For this reason, we also divided economies relative to their peer group and split the GES into a developing and developed country sample to allow like-for-like comparisons.

How do the BRICs fare? Encouragingly, the BRICs themselves are all in the top half of the rankings for developing countries and above the developing country mean. China ranks most highly (16th), followed by Russia (44th), while Brazil and India are further behind (58th and 60th, respectively, out of a total of 133 developing countries). This validates our decision in our BRICs projections to use a lower convergence speed in the initial period projections for Brazil and India. Importantly, China clearly tops the list of the big-population developing economies (BRICs plus N-11), and by a sizeable margin.

The GES sub-components highlight the strengths and weaknesses of each of the BRICs, and where there is room for improvement:

- **Brazil** scores relatively well on measures of political stability, life expectancy and technology adoption, but quite poorly on investment, education levels, openness to trade and government deficit.

- **Russia** also scores well in terms of education, fiscal position, external debt position, openness to trade,
technology adoption and life expectancy, but it does less well in terms of political measures (political stability, corruption), investment rates and inflation.

- **India** scores relatively well in terms of rule of law, external debt and inflation, but quite poorly in terms of levels of secondary education, technology adoption, fiscal position and openness.

- **China** ranks well above the mean on macro stability, investment, openness to trade and human capital. Its rankings on technology adoption are more mixed (PC usage is still quite low) and corruption measures are also a little worse than the mean.

The GES also shows that some of the N-11 are quite well-placed. Korea is the standout, highlighting how different it is to the rest of the group. But Mexico and Vietnam (and to a lesser extent Iran, Egypt and Philippines) also score relatively well currently in terms of growth conditions. At the other end of the spectrum, Nigeria, Bangladesh and Pakistan all score poorly. Nigeria’s standing, in particular, highlights the large amount of work that will be needed if it is to have a serious claim in achieving the potential growth outlined in the new 2050 projections. Turkey and Indonesia lie somewhere in between. Turkey’s low score is somewhat surprising. If macroeconomic stability (its biggest weakness in the GES) continues to improve, however, its score could rise substantially. Even given an optimistic view of the path for some of the better-placed members of the N-11, the overall picture suggests that only Korea and Mexico are serious candidates that are both large enough and plausible enough to lay claim to a BRICs-like impact.

While the BRICs and N-11 have been our main focus, a few other highlights from the broader scores are also interesting:

- Within the developed countries, Luxembourg ranks first and Canada (in 8th place) is the highest of the current G7, with the US close behind (in 10th place).

- Of the G7, Italy is currently the lowest ranked (in 37th place), while Poland is the lowest ranked of the ‘developed’ group (though still very favourably ranked compared with developing economies). In 17th place, Korea ranks more highly than the UK, Japan, France and Italy.
Africa is unsurprisingly heavily represented in the worst-ranked economies, while Asia’s developing economies fair relatively well. Zimbabwe is currently the lowest ranked economy in the group, while Iraq and Afghanistan are the only countries in the bottom 15 that are outside of Africa.

Among the developing economies, as well as Asian economies (Malaysia, Thailand), several Latin American and Central European economies score well (Chile, Costa Rica, Bulgaria, Romania). The richer oil-producers are also at the very top of the ‘developing country’ list.

The GES suggests that the BRICs as a whole are doing a reasonable job in keeping favourable growth conditions in place, but that more work needs to be done. For India and Brazil in particular, more progress is needed if they are to continue to deliver the best possible outcomes over a longer period of time.

VIII. The BRICs: A Lasting Global Theme

Three key points emerge from our research:

- Since our initial reports, the BRICs’ impact on the world has grown substantially across a broad range of areas. Given their importance to a wide range of global economic issues, the case for including them more actively in policy-making is overwhelming.

- Other economies may be able to share in a ‘BRICs-like’ story, but (Mexico aside, perhaps) the probability of their having a similar impact is small, at least as individual markets. Strong regional growth themes may emerge—Brazil and Mexico in Latin America for instance; China, India, Korea and Vietnam in Asia; or possibly India, Pakistan and Bangladesh in South Asia. But the BRICs are likely to remain the only ones at the core of truly global growth themes.

- There is quite wide variation in setting the conditions that should allow countries to stay on course for the ‘dream’ projections we set out. The BRICs are generally doing a reasonable job now, but there are clear weaknesses in each case. Dealing with them remains critical.

The BRICs theme continues to have major implications for investments in local markets. It does not (and never did) necessarily follow that due to the BRICs’ potential, investing in the BRICs stock markets is the best investment theme. However, BRICs equity markets have performed extremely well, except for China. Even after strong recent performances, on current P/E ratios, the BRICs markets do seem cheap relative to their more developed competitors. If BRICs’ potential is fulfilled, then local stock markets will probably continue to be good investments over the long haul.

So will their currencies, probably. Our 2050 projections, and the specific dramatic forecast that the BRICs’ GDP will exceed the G6 by 2041, depend on an assumption of real FX appreciation for one-third of the potential. While there are some fast-growing economies of the past 40 years that did not see real currency appreciation, the fastest-rising of them all, Japan, did. We think the case for further appreciation in BRICs currencies is very good, if their strong growth continues.

Local market opportunities are only a small part of the story. In fact, what distinguishes the BRICs theme from an ‘emerging markets’ story is that they appear to be a crucial driver of markets and investment opportunities outside those countries also. The ongoing bull run in commodities is the most striking example of global trends being driven in part by BRICs’ growth.

The interplay between the four BRICs economies, especially in terms of commodities, has been, and is increasingly likely to be during the next decade, the critical aspect of developments in the energy and commodity markets. Related to this, and as we suggested in 2003, the commodity investment theme is likely to remain a strong one for much of the next decade.

Just as commodity investments have been an excellent BRICs-related theme, investing in other non-BRICs located companies might become a more rewarding experience in the near future, such as the luxury goods market leaders of today or the big consumer products areas. Our earlier work showed that the natural sequence of opportunities is likely to move from basic materials to consumer products to services, but there will be plenty of variation around that broad trend.

There are a multitude of risks to all of these projections, as we continually point out. But with the BRICs continuing to grow in importance and their inter-relationship with each other and the world still rising, we think they will remain a critical factor in the global investment theme of today and for many years to come.
As we have argued in this paper, the capacity for countries to catch up or converge on developed country income levels is highly dependent on underlying conditions. Even in setting out ‘optimistic’ projections, it is important to take some account of these differences, and in the past we have varied our convergence assumptions in our research, both within the BRICs and when looking at other non-BRICs regions, such as Africa.

To capture this systematically across the N-11, we use our Growth Environment Score (GES) as a gauge. The GES is designed explicitly to capture factors that the growth literature shows affect that convergence process. Benchmarking to the assumptions that already underpinned our BRICs projections, we vary convergence speeds systematically across the N-11 on a similar scale.

- Countries that score highest on the GES (Korea, China, Mexico, Vietnam and Russia) have a higher convergence speed, which is consistent with strong developing country performers throughout their growth phase (and with the assumptions we have always used for China and Russia in our BRICs projections).

- Countries ranging around the GES average (Iran, Egypt, Brazil, Philippines and India) have a convergence speed set at a slower rate in the early part of the projection period. By the middle of the period, we make the assumption that these countries converge to speeds seen in the higher group. These are the assumptions we have always used for Brazil and India in our BRICs projections.

- Indonesia, our transitional country, has a convergence speed that stays at mid-level throughout the period.

- We set Pakistan, Bangladesh and Nigeria, the lowest performers on the GES, at an even slower convergence speed, gradually moving up to the average performers by mid-period.

Of course, this is an exercise that is flexible. We built this in a way that, given the different views on these economies, we can see resulting changes in potential growth paths.
Appendix 2: Measuring Conditions: How the GES is Compiled

The GES aims to capture the principal factors that are known to affect an economy’s ability to grow. We based our choice of the components on the extensive literature on the determinants of growth. Each of the variables we include has been found to have a significant and relatively robust effect on growth in various cross-country growth regressions. We also favoured the variables that are available for a large number of countries and updated on a regular basis. Our main source is the World Bank’s World Development Indicators database, though some data (such as schooling, political environment indices and, partially, government consumption) come from other sources.

The 13 variables are:

**Inflation**—high inflation discourages investment and erodes growth performance.

**Government deficit** (as % of GDP)—high budget deficits can hurt economic stability and push up borrowing costs.

**External debt** (as % of GDP)—large foreign borrowing raises the risk of external crises and tends to push up real interest rates.

**Investment rates**—high investment rates encourage capital accumulation and growth, though investment should be productive.

**Openness of the economy**—proxied by the share of trade as a proportion of GDP (adjusted for population and geographical area). A wide range of studies find that more open economies have tended to show greater tendency for ‘convergence’.

**Penetration of phones**—proxied by mainlines per 1,000 people. Telephone penetration is a basic proxy for technology adoption. Communications technology may help the transfer of broader technology and techniques that aid growth.

**Penetration of PCs**—estimates of Personal Computers per 1,000 people are another dimension of communications technology.

**Penetration of internet**—estimates of internet usage per 1,000 people, like PC usage, provide another important measure of technology adoption and interconnectedness.

**Average years of secondary education**—higher levels of education aid the growth process, with secondary education most consistently identified.

**Life expectancy**—as a basic measure of health conditions, higher life expectancy has been shown to have been powerfully associated with growth performance.

**Political stability**—stable political regimes promote confidence and therefore entail higher investment and growth.

**Rule of law**—well-defined property rights and generally well-functioning institutions are believed to be conducive to higher investment and growth.

**Corruption**—increased corruption is likely to have an adverse effect on growth via distorting incentives.

The latest available data points (mostly for 2002 and 2003) are converted to a 0-10 scale (from 0=bad for growth to 10=good for growth) in the following way:

\[
\text{Sub-index} = 10 \times \frac{\text{actual observation} - \text{sample minimum}}{\text{sample maximum} - \text{sample minimum}}
\]

Those variables where higher values are **bad** for growth (external debt, inflation) are also inverted so that the scales work in the opposite direction (high observations give lower scores). In addition, to prevent extreme outliers from skewing the distribution of some variables, we chose cut-off points to replace the sample maxima and/or minima, as necessary (for instance, we used a maximum of 120% for external debt as a percentage of GDP; a 0 to 40% range for inflation; and a 100% of GDP cut-off for openness).

The total score is then calculated by finding a simple average of all 13 sub-indices of the components. We tried alternative weighting schemes, such as aggregating the technological capability variables into one component, or assigning weights implied from the estimated coefficients in Barro’s cross-country regressions. Those alternatives do not alter the overall picture much and the strategy of equal-weighting reduces the risks associated with overplaying any one particular factor.

We also considered including other variables, such as railway passengers carried, container port traffic and mobile phone penetration as part of the technological

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5. As large countries tend to be less open because their large internal markets serve as substitutes for international markets, openness and country size are related. We filter out this relationship by regressing openness on population and geographical area variables; the residual of this regression is the adjusted openness variable reflecting the policy-specific effects (tariffs, trade restrictions) on international trade, and therefore growth.
capabilities group, and customs and other import duties as one of the macroeconomic conditions variables. However, due to limited availability we could not use these data in the score. Admittedly, mobile phone penetration would be a better substitute for the telephone mainlines component (which we ended up using), as for most low income countries in Africa, mobile phones are having an increasingly important effect on growth. As more data becomes available over time, we might replace the mainlines series with this one.

We also considered using government consumption as one of the macroeconomic stability indicators but decided against it. In growth literature, government consumption is considered to be non-productive and leading to distortions of private decisions, directly (crowding out) and indirectly through negative impacts on public finances. It is thus assumed that a higher ratio of government consumption reduces the growth rate, all other things being equal. In our view, however, this inverse relationship is not clear-cut and likely to be non-linear, in the sense that in a low income country low government consumption does not necessarily mean higher private productivity-augmenting expenditures, but rather a sign of unhealthy public finances.

The GES has some commonality with the World Economic Forum’s Growth Competitiveness Index (and the correlation between the two indices is quite high – around 87%). The underlying variables are not identical, however, and in some cases the scores are quite different. The use of life expectancy in our index, for instance, which is critical to growth performance, has the effect of downgrading several economies, particularly in Africa.

The GES is designed as a simple representation of the conditions necessary for convergence (i.e. catch-up growth) to occur. For an equivalent GES, less developed countries should grow faster. Some simple regressions of growth on income per capita and the index show and suggest that one point on the index adds about 0.6% to a country’s growth rate and there is also evidence that it increases the convergence speed significantly.

The fact that developed countries score well highlights the notion that good conditions tend to reinforce each other. In general, countries that score very well in some areas do so in most areas.

We stress that any attempt to quantify these types of conditions has the advantage of providing a consistent framework across countries. However, it is important to keep in mind that this type of measure may also be overly rigid at times in capturing and quantifying macro and policy variables.

Macroeconomic Stability Variables

![Graph showing Inflation and Mean (Developing Countries)]

![Graph showing Government Deficit and Mean (Developing Countries)]

![Graph showing External Debt and Mean (Developing Countries)]
Global Economics Paper
Goldman Sachs Economic Research

Macroeconomic Conditions Variables

Investment

Openness

Technological Capabilities Variables

PCs

Telephones

Internet
## Appendix 3: The GES Across All Countries

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Appendix 4: Our Projections in Detail

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### US$ GDP Per Capita
Appendix 4: Our Projections in Detail (cont.)

### Projected Real GDP Growth

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<tr>
<th>Avg %yoy</th>
<th>Brazil</th>
<th>China</th>
<th>India</th>
<th>Russia</th>
<th>Canada</th>
<th>France</th>
<th>Germany</th>
<th>Italy</th>
<th>Japan</th>
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### Projected Real GDP Growth

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<td>11-Nov-05</td>
<td>Hong Liang and Eva Yi</td>
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<td>Mike Buchanan and Themistoklis Fiotakis</td>
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