

Quantitative Analysis of the Growth Potential and Resilience of Emerging Markets in the G-20

by Kokichiro Mio
Economic Research Group
mio@nli-research.co.jp

Emerging markets have shown such amazing growth in recent years as to cause the forum for international cooperation to expand from the G-8 into the G-20. Meanwhile, Japanese multinationals are shifting their competitive energies away from Europe and toward the emerging markets. We attempt to assess the growth prospects for the 12 emerging markets in the G-20 based on a quantitative analysis of selected indicators of growth potential and resilience to unforeseen exogenous shocks.

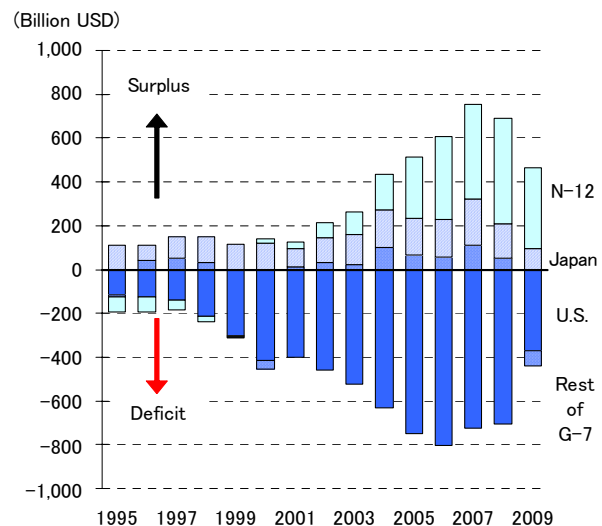
1. Analytical Framework

In 1975, six advanced countries first met to jointly tackle the global recession following the first oil shock. The group then came to be known as the G-7 in 1976 when Canada joined, and the G-8 in 1998 when Russia officially joined as the group's first emerging market. With the Lehman Brothers collapse in September 2008 and ensuing global financial crisis, 11 other major emerging markets were summoned to the G-20 Financial Summit in November 2008 as an acknowledgement of their growing presence in the world economy. Although it was unclear at first whether the G-20 would meet regularly, now that the worst of the financial crisis has passed, expectations are rising for the G-20 to meet to address the persistent current account imbalances of the world economy (Exhibit 1).

The origin of the structural imbalance can be traced back to the late 1990s and to U.S. economic policies that sought to strengthen the dollar. The policies attracted large fund inflows from abroad, which heated up the housing market and stimulated excessive borrowing and consumption by households, leading to persistent and large current account deficits. On the other side, emerging markets profited from the large U.S. current account deficits and ran persistent and large current account surpluses.

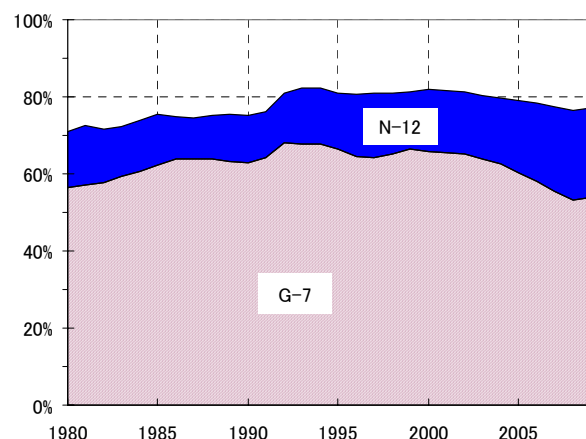
Leaving aside the G-7 and European Union, the other 12 members of the G-20 (referred to below as the 12 newcomers, or N-12 emerging markets including Russia) have achieved remarkable growth over this period. From 2000 to 2008, the G-7 share of the world economy fell from 66% to 53%, while the N-12 share rose from 16% to 23%, reducing the gap between the two from 50% to 30%. Altogether, the G-20 countries now account for over 70% of the world economy (Exhibit 2).

Exhibit 1 Current Account Balances of G-20 Countries



Source: IMF

Exhibit 2 Share of Global Nominal GDP (G-7 and N-12)



Source: IMF

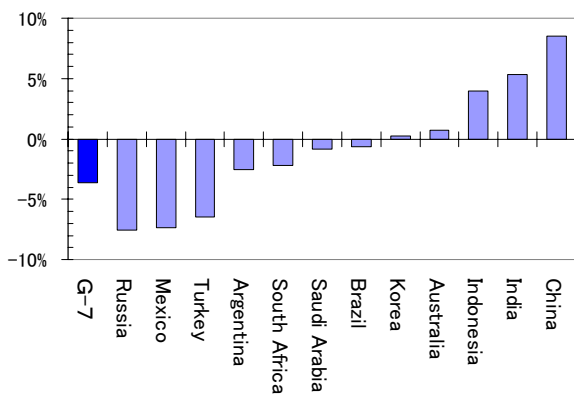
Entering 2009, as excessive consumption abated in the U.S., its current account deficit fell significantly, as did the current account surpluses of the N-12 countries. In addition, economic growth in the N-12 began diverging into two camps—Russia, Mexico and Turkey have underperformed the G-7, while China, India and Indonesia have continued to expand (Exhibit 3).

This dual result from the global financial crisis reflects the diversity of N-12 countries as a group. Indeed, they occupy a broad spectrum from being the world’s largest in land area (Russia) and population (China and India), to countries with small land area such as Korea and small populations such as Saudi Arabia and Australia (Exhibit 4).

By per capita GDP, the group ranges from Australia, whose income level surpasses even Japan, down to low income countries such as India and Indonesia. The N-12 countries thus clearly defy neat and easy classifications (Exhibit 5).

By global share of nominal GDP (which affects the overseas revenue of multinational companies), the N-12 share still remains less than half that of the G-7. However, in terms of the amount of annual increase in nominal GDP, the N-12 caught up with the G-7 in 2005 and surged ahead in 2008, and are expected to stay ahead (Exhibit 6). Multinational companies are already locked in heated competition to capture market share in emerging markets, which will likely continue in the future. Thus below we assess the prospects for growth in each country based on two factors—the potential for growth, and the resilience to overcome unforeseen exogenous shocks that could derail growth.

Exhibit 3 Real GDP Growth (2009 estimate)



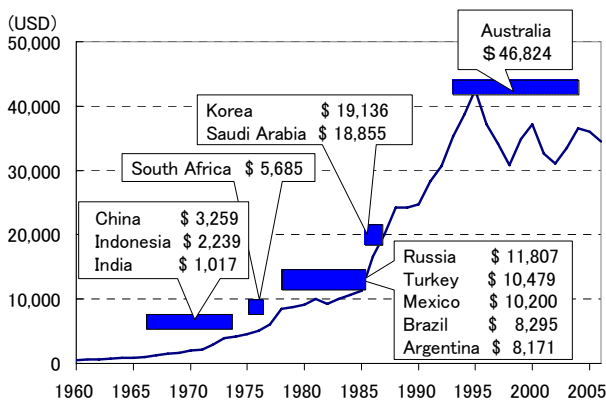
Source: IMF

Exhibit 4 Country Profiles of the N-12

	Land area (1,000 km ²)	Rank	Population (million)	Rank	Nominal GDP (bil. USD)		per capita (USD)	
					2008	Rank	(USD)	Rank
Argentina	2,780	6	41	10	325	11	8,171	8
Australia	7,741	4	21	12	1,013	6	46,824	1
Brazil	8,515	3	199	4	1,573	3	8,295	7
China	9,597	2	1,339	1	4,327	1	3,259	10
India	3,287	5	1,166	2	1,207	4	1,017	12
Indonesia	1,905	9	240	3	512	9	2,239	11
Korea	100	12	49	9	929	7	19,136	2
Mexico	1,964	8	111	6	1,088	5	10,200	6
Russia	17,098	1	140	5	1,677	2	11,807	4
Saudi Arabia	2,150	7	29	11	469	10	18,855	3
South Africa	1,219	10	49	8	277	12	5,685	9
Turkey	784	11	77	7	730	8	10,479	5

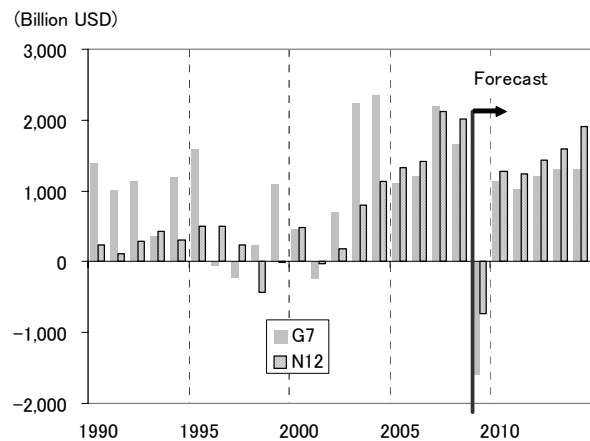
Sources: IMF, CIA

Exhibit 5 2008 per Capita GDP in the N-12 (mapped onto Japan’s historical growth pattern)



Sources: Cabinet Office of Japan, System of National Accounts; IMF

Exhibit 6 Annual Change in Nominal GDP



Source: IMF

2. Measuring the Growth Potential of N-12 Countries

1. Population Dynamics

Expressed in terms of population dynamics, the economic growth rate is the sum of the population growth rate and the per capita GDP growth rate. While the population growth rate projection is straightforward and needs no further explanation, the per capita GDP growth rate is difficult to predict with accuracy. Thus we approximate it with productivity growth, which can be captured in large part by projecting the growth rate of the productive-age population (labor force growth leads to more productively employed workers) and change in urbanization rate (urban wages are higher than rural wages).

Exhibit 7 shows the 2009 population estimates of G-20 countries, and lists the 5-year projections of countries from 2009 to 2014 in descending order. Although China and India currently have the largest populations by a wide margin, growth projections are highest among the N-12 for Saudi Arabia, India, and Turkey. Meanwhile, China's population growth is projected to trail behind the U.S. due to the one-child policy, while Russia's population will decline the most due to aging. Low population growth reduces the growth potential.

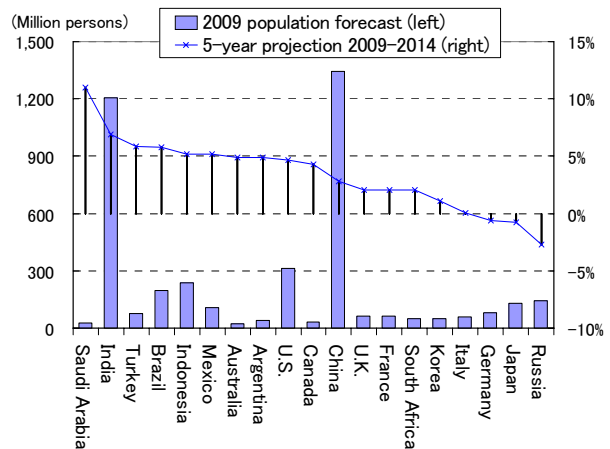
Exhibit 8 uses the same format to present data on the productive-age population (age 15 to 64), again in descending order of 5-year projected growth. Interestingly, the productive-age population of all G-7 countries is projected to grow less than their total population, compared to only two of the N-12 countries (Russia and Australia). The other ten N-12 countries are thus set to enjoy a "population bonus period" in which the growing productive-age population will boost per capita GDP, thereby increasing the growth potential.

Exhibit 9 shows the urbanization rate of G-20 countries in 2010, and projected percentage-point change from 2010 to 2015 in descending order. Asian countries that currently have low urbanization rates such as India, China and Indonesia stand to benefit most from further urbanization, which will boost per capita GDP growth and thereby increase the growth potential.

2. Infrastructure Development

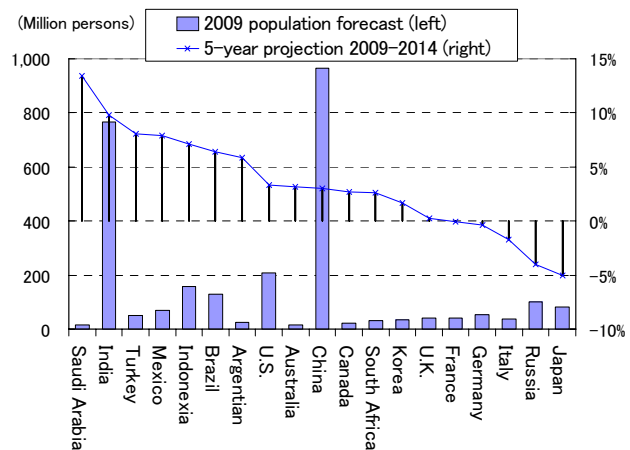
By infrastructure development, we refer to construction of the vast array of public facilities that underpin all economic activity

Exhibit 7 Population (G-20 Countries)



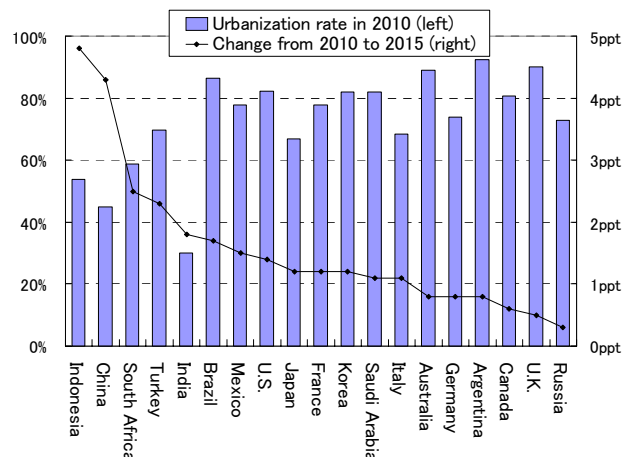
Source: U.N.

Exhibit 8 Productive-Age Population (G-20)



Source: U.N.

Exhibit 9 Urbanization Rate in the G-20



Source: U.N.

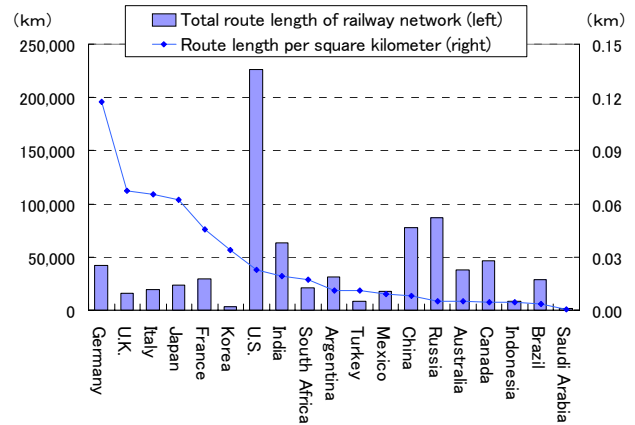
and raise the standard of living, including dams, roads, railways, ports, power plants, communications, schools, hospitals, water supply and sewerage, parks, and public housing. Current low levels of infrastructure development increase the growth potential by providing room for further development. Infrastructure development can also promote economic growth by facilitating technological innovation and growth of service industries. As indicators of growth potential, we chose the current infrastructure status of three representative components.

Transportation—While differences arise due to geography and the location of major cities, the transportation infrastructure of roads and railways indicates the logistical capacity to move goods from the most efficient production sites to where they are consumed. The capacity to move people is also important as a prerequisite for productivity growth. Exhibit 10 shows the total length of railway networks of G-20 countries, and ranks countries in descending order by length per square kilometer of land area. Exhibit 11 presents data on road networks arranged in the same format. In both cases, G-7 countries rank the highest, indicating that N-12 countries overall have significant room for future growth in this area.

Electricity production—Growth of electricity production not only increases productive capacity, but is indispensable to improving the standard of living. Exhibit 12 shows the total annual electricity production of G-20 countries and per capita electricity production of each country in descending order. Among the G-7 countries, Italy ranks the lowest in per capita electricity production at 5,000 KWH, which is even lower than the four N-12 countries of Australia, Korea, Russia and Saudi Arabia. Eight other N-12 countries including Argentina trail behind Italy, indicating room for further infrastructure development in this area.

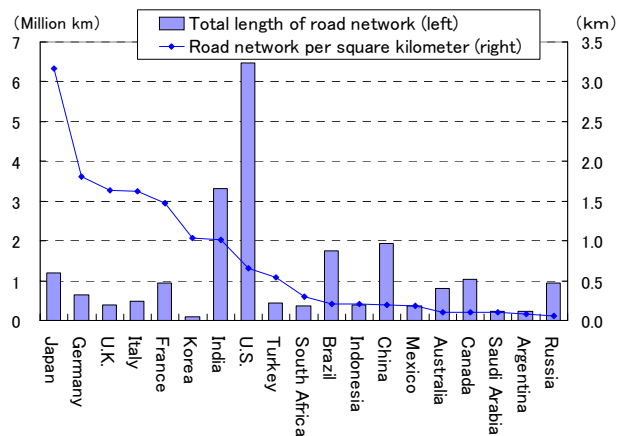
Communications—While telephone, mobile phone, and the Internet infrastructure come to mind, we chose the Internet to represent this component because of its especially large contribution to productivity growth and standard of living. Exhibit 13 shows the number of Internet users in G-20 countries, and lists the Internet diffusion rate of each country in descending order. Among the N-12 countries, only Korea and Australia have reached the diffusion rates of the G-7 countries, leaving much room for further development among the rest.

Exhibit 10 Railway Infrastructure in the G-20



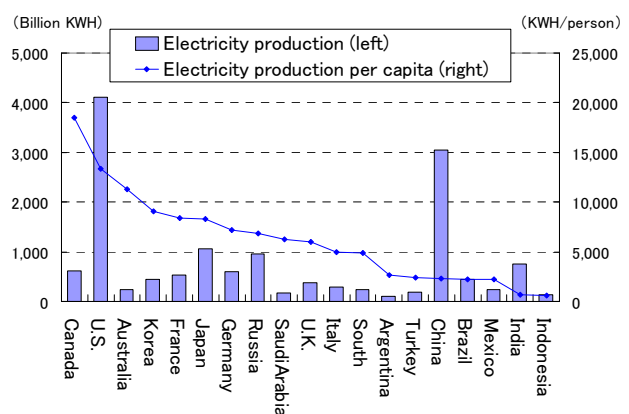
Note: Shows total route length of the railway network in 2006 for Russia, 2007 for the U.S. and India, and 2008 for other countries. Source: CIA, *World Fact Book*.

Exhibit 11 Road Infrastructure in the G-20



Note: Shows total length of the road network in 2002 for South Africa, 2004 for Argentina, Australia and Brazil, 2005 for China, Indonesia and Italy, 2007 for the U.S., 2008 for Korea, and 2006 for other countries. Source: CIA

Exhibit 12 Electricity Production in the G-20



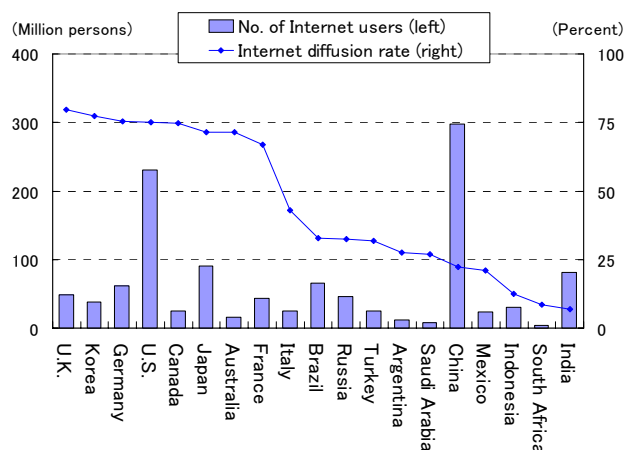
Note: Based on 2009 population estimate, and 2008 electricity production estimate for the U.S., Mexico, and Korea, and 2007 estimate for others. Source: CIA

3. Growth Potential Ranking

Based on the above indicators, below we assess the growth potential of N-12 countries. Ideally, technological innovation should be included here due to its prominent role in economic growth. However, based on the premise that technological innovation is driven by people, we include it indirectly in the sense that infrastructure development expands the possibility for technological innovation. Assessments are relative and based on the mean and variance of the overall N-12 data.

The ranking results are shown in Exhibit 14. The top tier countries who receive an A-rank for growth potential are Indonesia, India, Saudi Arabia, Mexico, Brazil and China. The middle tier or B-ranked countries are Argentina, South Africa, and Turkey. Finally, the bottom tier or C-ranked countries are Russia, Australia and Korea. Although these results tend to mirror the per capita GDP ranking order, there are notable exceptions. For example, while both Russia and Mexico have a per capita GDP of approximately 10,000 USD, Russia is ranked C for growth potential while Mexico is ranked A.

Exhibit 13 Internet Access in the G-20



Note: Based on estimated number of Internet users in 2008 and population as of July 2009.
Source: CIA

Exhibit 14 Growth Potential Ranking

Country	Rank	Population dynamics				Infrastructure development				
		Rank	Population change (2009-2014)	Productive-age pop. change (2009-2014)	Urbanization rate change (2010-2015)	Rank	Railway network (km)	Road network (km)	Electricity production (KWH)	Internet diffusion rate
Argentina	B	B	4.9%	5.9%	0.8 ppt	B	0.011	0.083	2,676	27.4%
Australia	C	C	4.9%	3.1%	0.8 ppt	C	0.005	0.105	11,283	71.3%
Brazil	A	B	5.7%	6.4%	1.7 ppt	A	0.003	0.206	2,208	32.7%
China	A	B	2.8%	3.0%	4.3 ppt	A	0.008	0.201	2,272	22.3%
India	A	A	6.9%	9.8%	1.8 ppt	B	0.019	1.009	653	6.9%
Indonesia	A	A	5.2%	7.1%	4.8 ppt	A	0.004	0.205	559	12.5%
Korea	C	C	1.1%	1.7%	1.2 ppt	C	0.034	1.033	9,070	77.3%
Mexico	A	B	5.2%	7.9%	1.5 ppt	A	0.009	0.182	2,203	20.9%
Russia	C	C	-2.7%	-4.0%	0.3 ppt	B	0.005	0.055	6,841	32.3%
Saudi Arabia	A	A	11.0%	13.4%	1.1 ppt	B	0.001	0.103	6,243	26.8%
South Africa	B	C	2.0%	2.6%	2.5 ppt	B	0.017	0.297	4,899	8.5%
Turkey	B	A	5.8%	8.0%	2.3 ppt	B	0.011	0.545	2,368	31.9%

Note: Data for land area, population, railway & road network, electricity production, and Internet were downloaded from the *World Factbook* in November 2009.
Sources: U.N., CIA

3. Measuring Resilience to Unforeseen Exogenous Shocks

However, high growth potential alone is insufficient to ensure successful growth. Emerging markets are also vulnerable to unforeseen exogenous shocks that can derail economic development. Below we consider two further conditions necessary to overcome unforeseen exogenous shocks—the economy’s inherent resistance to exogenous shocks, and the capacity to implement aggressive fiscal, monetary, and exchange rate policies.

1. Shock Resistance

A major cause of economic stagnation in emerging markets is the impact of unforeseen exogenous financial shocks. When advanced economies or other emerging markets succumb to a financial crisis or stock market plunge, foreign investors will quickly repatriate funds to limit their exposure, causing the local economy to stagnate. Resistance to such exogenous financial shocks increases if a country has relatively low external debt and ample foreign reserves. Thus as indicators of resistance, we chose the ratio of external debt to GDP, and ratio of foreign reserves to external debt (Exhibit 15).

Another source of exogenous shock relates to trade. In the event that major advanced economies fall into recession, export-dependent emerging markets sometimes suffer even greater economic damage than their trade partners. Resilience to trade-related shocks increases if a country is less dependent on exports, and is less influenced by economic conditions of G-7 countries. Thus as indicators of resistance to trade-related shocks, we chose export dependence (as measured by the ratio of export value to GDP), and the economic growth correlation with respect to the G-7. As Exhibit 16 shows, emerging markets with a high correlation to the G-7 have tended to suffer a larger decline in economic growth rate in 2009.

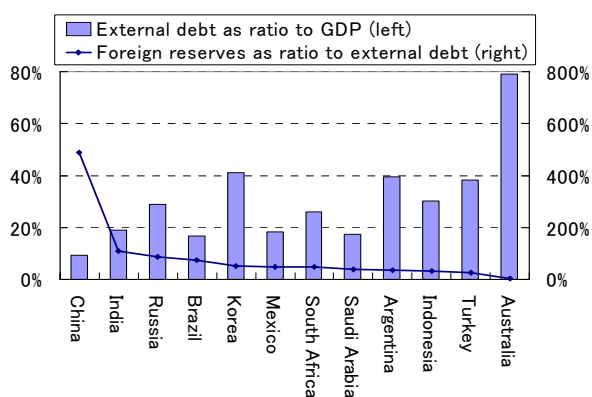
2. Policy Potency

The negative impact of trade, financial, or other exogenous shocks can be mitigated to some extent by aggressive fiscal, monetary and exchange rate policy actions. Policy potency, which refers to the economy's capacity to conduct aggressive policy responses against unforeseen exogenous shocks, increases when public debt levels are relatively low, real interest rates are relatively low, and the currency is not undervalued. Thus as indicators of policy potency, we chose the ratio of outstanding public debt to GDP for fiscal policy, the real interest rate (policy interest rate – CPI inflation rate) for monetary policy, and exchange rate undervaluation with respect to purchasing power parity for exchange rate policy.

3. Resilience Ranking

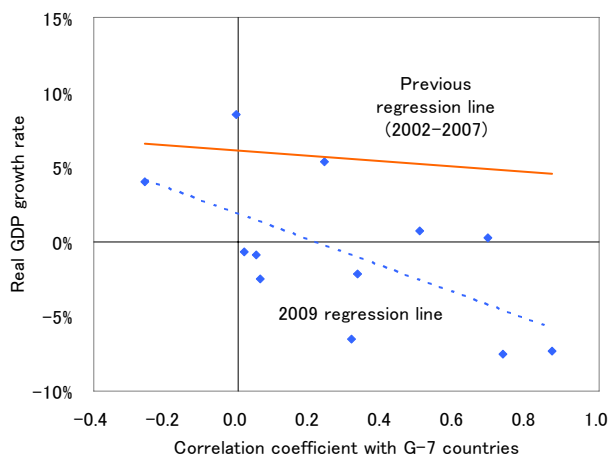
Based on the above indicators, N-12 countries are ranked by shock resistance and policy potency in Exhibit 18. As with the growth potential ranking, rankings are relative and derived using the same method.

Exhibit 15 External Debt & Foreign Reserve Ratios (2008)



Sources: IMF, CIA

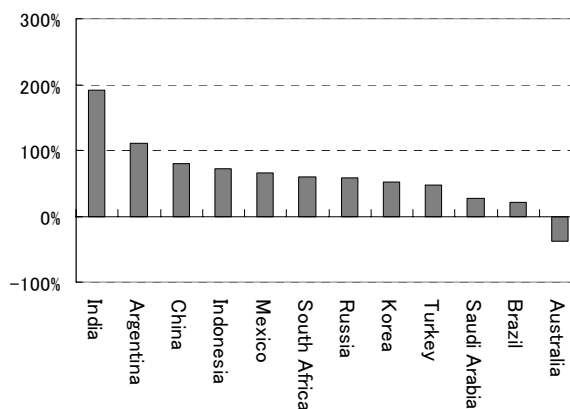
Exhibit 16 Growth Correlation with G-7 Countries



Notes: Data points plot 2009 real GDP growth rates of N-12 countries as forecast by the IMF, against correlation coefficients with respect to G-7 countries for the previous decade. The previous regression line plots average real GDP growth rates of each country for 2002-2007 against the same correlation coefficients as above.

Source: IMF

Exhibit 17 Exchange Rate Undervaluation



Notes: Purchasing power parity estimates are by the IMF. Exchange rate quotes are as of November 2009.

Source: IMF

Among A-ranked countries, China exhibits strong resilience to financial shocks due to its low external debt and large foreign reserves. Furthermore, the small public debt provides significant leeway to ramp up fiscal policy if necessary, and the high real interest rate leaves room to implement aggressive monetary easing if necessary. Although the high export dependence is of concern, the G-7 correlation coefficient is low. Thus taken as a whole, China receives the highest ranking, although the significantly undervalued yuan warrants caution because of the risk that trade friction could flare up and impede the economy's sustained high growth.

Second-ranked Brazil is low in both export dependence and G-7 correlation coefficient, and the currency's slight undervaluation raises no serious trade concerns. While the large public debt warrants caution, inflation is stabilizing, increasing the leeway to implement aggressive monetary policy if necessary.

At the opposite end of the ranking, bottom-ranked Mexico has a moderate export dependence, but its G-7 correlation coefficient is highest due to a strong dependence on the U.S. economy. In addition, while the external debt is not very large, foreign reserves are uncomfortably low. Korea, ranked second lowest, scores below average in all resilience indicators, suggesting that the country is vulnerable to both financial and trade shocks. Like Mexico, Korea is also strongly influenced by the health of G-7 countries. Of course, this can also work in its favor when the G-7 countries are doing well.

The resilience and policy potency ranking should be viewed as a relative measure of each country's capacity in two areas—to withstand unforeseen financial or trade-related exogenous shocks, and to implement aggressive policy actions that mitigate the effect of shocks. Taken together, they describe the likelihood of overcoming unforeseen external shocks and ultimately realizing the growth potential.

Exhibit 18 Resilience Ranking of N-12 Countries

Country	Rank	Shock resistance					Policy potency			
		Rank	External debt (GDP ratio)	Foreign reserves (ratio to external debt)	Export dependence (GDP ratio)	Correlation with G-7 (past decade)	Rank	Public debt (GDP ratio)	Real interest rate (CPI adjusted)	Exchange rate under-valuation (versus PPP)
			2008	2008	2008	1999–2008		2008	2009/12/4	2009/11/30
Argentina	C	B	39.5%	36.2%	21.7%	0.06	C	48.6%	4.2%	111%
Australia	B	C	78.9%	4.1%	18.3%	0.50	A	14.7%	2.1%	-38%
Brazil	A	A	16.7%	73.7%	12.6%	0.02	A	38.8%	3.9%	21%
China	A	A	9.3%	488.0%	33.0%	0.00	A	15.6%	5.4%	80%
India	B	A	19.0%	110.8%	15.0%	0.24	C	56.4%	-3.9%	192%
Indonesia	A	B	30.3%	33.3%	28.8%	-0.26	B	29.3%	1.5%	72%
Korea	C	C	41.0%	52.8%	45.4%	0.69	B	24.4%	-0.6%	53%
Mexico	C	C	18.4%	47.6%	26.8%	0.87	C	35.8%	-0.9%	66%
Russia	C	C	28.8%	88.3%	28.1%	0.73	B	6.5%	-3.3%	59%
Saudi Arabia	B	B	17.5%	37.3%	70.1%	0.05	B	18.9%	-2.5%	26%
South Africa	C	B	25.9%	47.5%	30.6%	0.33	B	31.6%	-0.2%	60%
Turkey	C	B	38.1%	26.5%	18.0%	0.31	B	40.0%	0.3%	47%

Source: IMF

4. Conclusion

Based on the results of our quantitative analysis, Exhibit 19 plots growth potential on the vertical axis, and resilience on the horizontal axis. The upper right quadrant denotes high scores in both areas, and includes China, Brazil, and Indonesia. The upper left denotes high growth potential but vulnerability to shocks, and includes India, Mexico, and Turkey. The lower right denotes low growth potential but strong resilience, and includes Australia. Finally, the lower left denotes low growth potential and low resilience, and includes Russia, South Africa, and Korea.

Obviously, our quantitative analysis does not provide complete information for implementing a business or securities investment strategy in emerging markets. However, as an approach based on objective data, we believe it can be useful for grasping the situation of N-12 countries and highlighting their differences.

We conclude with some final thoughts regarding the analysis. First, growth potential is a difficult concept to quantify. We chose population dynamics and infrastructure development as two key factors of economic growth, based on the assumption that technological innovation occurs in proportion to them. However, history also clearly shows that intangible factors such as passion can play an important role in technological innovation. Thus in assessing the growth potential of N-12 countries, we must also watch closely to see whether all necessary conditions are present to optimize private sector activity.

Second, there is a special need to focus on N-12 countries whose performance is relatively uncorrelated with the G-7 countries. This includes China, Brazil, India, and Indonesia, as opposed to countries with a high correlation such as Mexico, Korea, Russia, and Australia. High-correlation countries will tend to outperform the others whenever the G-7 is doing well, meaning that their performance can largely be predicted by watching the G-7. On the other hand, low-correlation countries tend to be unpredictable—for example, they may cause a positive effect by taking up slack when G-7 countries fall into a slump, or they may trigger a crisis that spills over to G-7 countries. Thus as their economic presence and autonomy grows in the future, domestic political and economic trends will need to be closely monitored.

Third, the analysis offers important implications for Japan. Japan is now struggling from aging and the decline of the total population and labor force. Moreover, urbanization and infrastructure development have reached saturation levels, leaving little room for further growth. Yet if we shift our attention, it also becomes clear that new infrastructure is urgently needed—for example, infrastructure to support child care and boost the labor participation rate of women, as well as to promote the low-carbon revolution. These potentially represent new pillars of domestic demand-led growth. In addition, Japan is in the fortuitous position of being in close proximity to many autonomous emerging markets with a high growth potential. This must be taken advantage of without delay by devising and promoting new policy imperatives.

Exhibit 19 Growth Mapping of N-12 Countries

