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# The New Resilience of Emerging Market Countries: Weathering the Recent Crisis in the Global Economy

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Asian Development Bank

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## I. Introduction

The financial crisis that had been developing in the United States for several years became evident to all in 2007 and worsened significantly in 2008. In the aftermath of the collapse of Lehman Brothers, the crisis spread rapidly to other countries, especially in Europe, where banks and other institutions were exposed to the same toxic assets that lay at the core of the problems in the US and where real estate prices had registered the biggest gains over the previous decade. The impact of the crisis on the entire global economy was swift and severe – spreading through the contraction of global liquidity and capital flows, an almost unprecedented collapse in trade, and a major softening of commodity prices. The prospects for global growth were repeatedly revised downward as the dimensions of the crisis became increasingly evident. At their low point, projections by the IMF saw global GDP declining by 1.3 percent in 2009, then rebounding to an expansion of 1.9 percent for 2010.[1]

More specifically, the advanced economies were expected to contract 3.8 percent in 2009 before recovering in 2010. Growth in the emerging market and developing countries (referred to as the EMCs in this paper) was expected to slow to 1.6 percent in 2009 and then rebound to 4.0 percent in 2010. Some of the fastest growing emerging market economies, such as PRC and India, were projected to see their growth rates cut by about one third – in 2009 as compared to their experience in the immediately preceding years. The world economy looked to be on a precipice, and indeed it was! The outcome to date has seen economic conditions in many countries, especially in the more advanced economies, deteriorate more than had been observed at any time since the depression of the 1930s, and the recovery in the advanced economies remains halting and uneven.

While by any measure the crisis has had a devastating impact on the global economy, things have not turned out quite as bad as most observers had forecast in 2009. Activity in the global economy and in the advanced economies declined slightly less than originally forecast. But the big surprise came in the EMCs.

Growth in most of EMCs held up better than expected and in many cases, it performed much better. This group of countries grew by 2.4 percent in 2009, and is expected to expand by 6.3 percent in 2010,[2] near their immediate pre-crisis growth rates. Still, the impact of the global crisis on the EMCs was severe, with trade declining dramatically, capital flows interrupted, remittances and tourism falling, currencies depreciating markedly, equity and commodity prices dropping sharply, and fear gripping all sectors of these economies. The prospects for these countries were expected to be closely tied to activity in the more advanced economies, as had been the historical experience. However, this turned out not to be the case. The largest EMCs – led by PRC, India, Indonesia, and Brazil – surprised most international observers as they became the first to rebound and continue to experience robust growth.

As the emerging market countries have grown and matured, there has been much debate about whether their own performance had in some ways become less dependent on conditions in the industrial countries, i.e., whether they had "decoupled". In an earlier paper discussed at the 2008 Emerging Markets Forum, it was argued that, if anything, the inter-linkages between the industrial and emerging world have become far more complex and multi-dimensional in recent years and that "the very concept of decoupling seems almost quaint".[3] Despite this increased interdependence, it has been argued in that paper and elsewhere that, while remaining

1 IMF World Economic Outlook, April 2009.

2 IMF, World Economic Outlook Update, April 2010.

3 See: Emerging Market Economies and the Global Financial Crisis: Resilient or Vulnerable in Turbulent Times, by Jack Boorman, Anupam Basu, Manu Bhaskaran and Claudio Loser, Emerging Markets Forum, October 2008.
IMF World Economic Outlook, April 2007, "Chapter 4. Decoupling the Train? Spillovers and Cycles in the Global Economy".

"coupled", the capacity of EMCs to offset the impact of events originating in the industrial world might have increased, most importantly through the power of their own policy reactions . The recent crisis appears to have demonstrated that resilience with surprising clarity.

The policy space enjoyed by many emerging market countries, and their confidence to employ that space, derived in large part from the reforms introduced in the wake of the crises that engulfed so many of the emerging market economies between about 1994 and 2003. In particular, these crises demonstrated all too clearly the fragility of international capital flows, the massive pressures that could be put on exchange rates from interruptions in such flows, and the dramatic impact that these reversals could have on the domestic economy. One response on the part of many countries was to accumulate large stocks of international reserves to help insure themselves against such volatility in the future. Perhaps even more importantly, these crises made all too evident the weaknesses in the economic and financial structures and institutions in many of these countries and the self-aggravating dynamics set in motion by such institutional weakness. As a result, many emerging economies introduced significant reforms in macroeconomic policy-making frameworks, in regulatory and supervisory regimes, in accounting standards, legal frameworks, and data-reporting standards, and in transparency more generally. In the aftermath of the 1994-2003 crises, these crisis-prevention reforms were pursued with a vigour not seen before.[4]

As a result of these reforms, many emerging market countries had a much enhanced capacity to respond to the contagion spreading across the global economy – a capacity that had not existed before. What policy actions were taken by the emerging market countries to help counter the impact of the latest financial crisis and subsequent recession in the advanced economies? What specific reforms contributed to the capacity of those countries to successfully design and implement such policies? What can be inferred from the changes made to the economic and financial institutions in those countries and from the other policy reforms introduced over the past decade or longer about the resilience of these countries to problems that develop elsewhere in the global system?

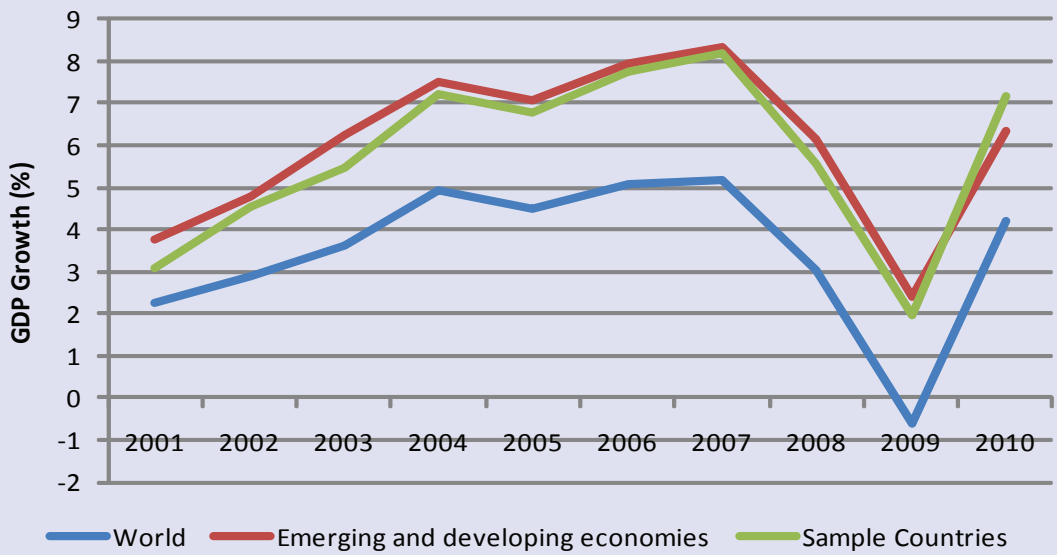
It is important to note that the rebound, as measured by actual economic growth since the second half of 2009 and projected GDP growth for the remainder of 2010, varies substantially across EMCs. Some have grown very fast and are expected to grow at around 10 percent in 2010-2011, while others are expected to register barely any growth. What helps explain the different speeds of recovery across EMCs? This paper examines these questions. It begins with a review of the initial impact of the crisis on some 59 selected emerging market countries[5] and its transmission channels, and then addresses each of these questions in turn.

The results of this analysis point to the critical role played by the substantive reforms made by many of the emerging market countries in the wake of earlier crises. The *Centennial Resilience Index* developed in this paper suggests that those countries that had strengthened the underlying institutions and structural aspects of their economies, and created policy space through cautious monetary and fiscal policies, were in a position to counter the impact of the shock that originated in the global financial system. They had successfully created both the room for policy adjustment and the capacity to design and implement policies that – after the initial shock – sharply limited the negative impact of the crisis on their economies.

4 See "Crisis Prevention: Lessons From Emerging Markets For Advanced Economies" by Jonathan T. Fried and James A Haley In M. Giovanoli and D. Devos, International Monetary and Financial Law, Oxford 2010.

5 In selecting a sample of representative EMCs, two important considerations were taken into account: that the group reflects all geographical regions and that data limitations affecting individual countries do not constrain the construction of the Resilience index. Manageability of a very large data set was also a consideration. The sample comprises Argentina, Azerbaijan, Bahrain, Bangladesh, Bolivia, Botswana, Brazil, Chile, PRC, Colombia, Costa Rica, Côte d'Ivoire, Czech Republic, Dominican Republic, Ecuador, Egypt, Ethiopia, Georgia, Ghana, Hong Kong, China, Hungary, India, Indonesia, Israel, Jordan, Kazakhstan, Kenya, Republic of Korea, Latvia, Lithuania, Malaysia, Mexico, Morocco, Nigeria, Pakistan, Panama, Peru, Philippines, Poland, Romania, Russia, Saudi Arabia, Senegal, Singapore, Slovak Republic, Slovenia, South Africa, Sri Lanka, Tanzania, Thailand, Tunisia, Turkey, Uganda, Ukraine, Uruguay, Venezuela, Viet Nam, Zambia.

Figure 1 **GDP Growth**




*Source:* IMF World Economic Outlook Database. April 2010.

## II. The Impact of the Crisis on Emerging Market and Developing Countries[6]

The emerging global crisis in 2007 and early 2008 was initially expected by most analysts and economists to result in a shallow recession in the US. However, the turmoil in the major financial centers, and the slowdown in activity in the advanced economies that followed the seizing up of the market for securitized credit and, most dramatically, the collapse of Lehman Brothers, rapidly spread around the world. Global growth contracted sharply from over 5 percent in 2007 to -0.6 percent in 2009, marking the worst global decline since the Great Depression.

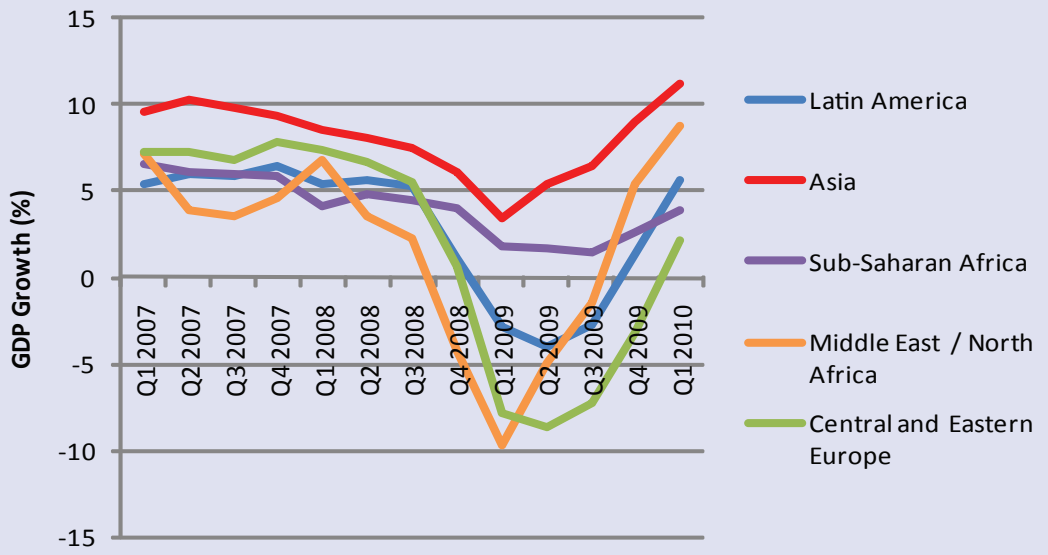
However, this collapse hides significant differences between countries and regions. Growth in the advanced economies declined from 2.7 percent in 2007 to -3.2 percent in 2009. The emerging market countries in the sample employed in this paper experienced a decline in real GDP growth from 5.6 percent in 2008 to 2.0 percent in 2009. The emerging economies in Eastern Europe were affected most severely, with GDP contracting by 3.7 percent; those in Latin America experienced a decline of 1.8 percent; but EMCs in Asia, Africa and the Middle East avoided a recession, with developing Asia growing as fast as 6.6 percent in 2009. Moreover, Figure 2 shows the considerable variation across a number of EMCs of the decline in GDP growth during the period in which the shock was felt the most severely, from the third quarter of 2008 to the second quarter of 2009.

The transmission of the crisis from the advanced economies to the EMCs came through a number of channels:

**The Financial Channel.** Financial institutions in most EMCs were not significantly exposed to the toxic assets that affected banks in many of the advanced economies, and the use of derivatives was much more limited as financial institutions in most EMCs either shied

6 From this section onward, the paper refers to the group of 59 selected countries listed in footnote 5, unless indicated otherwise.

Figure 2 **GDP Growth of Sample Emerging Market Countries, by Region**




*Source:* IMF International Financial Statistics.

away from engaging in the more exotic transactions or were prevented from doing so by regulations affecting such transactions, which, in many cases, had not been liberalized in previous years. However, the EMCs were not immune to sudden stops or reversals of capital flows. Some global banks withdrew funds from their subsidiaries in EMCs to rebuild their liquidity or capital base in the home countries; credit flows through international banks and global bond markets to EMCs all but dried up (severely affecting emerging Europe); the major uncertainties about the likely impact of the crisis led to collapses in export credit to EMCs and portfolio investments; and even foreign direct investment (with some lag, as one would expect) contracted sharply. The seizing up of international credit markets was followed by a similar process in domestic financial systems: interbank markets froze and domestic credit expansion came to a virtual standstill in many EMCs. The financial freeze, in turn, contributed to a collapse in domestic demand and economic activity. Moreover, the sudden stop (or reversal in some cases) of capital inflows, including export financing, led to significant currency depreciations and some international reserve losses (for the latter, see Figure 5). Table 1 and Figure 2 show these financial developments.

**The Real Activity Channel.** As demand in the advanced economies collapsed, so did ***exports*** from EMCs, although with considerable variation in terms of timing and intensity. The speed and severity of the export collapse was almost unprecedented! First, there was a major drop in exports from those EMCs that had become the largest exporters of manufactured goods to the advanced economies and from those EMCs that supplied those countries exporting to the advanced economies. Soon thereafter, exporters of commodities and intermediate goods experienced a similar shock; In this context, the IMF's index of commodity prices dropped by 56% percent from the peak experienced in mid-2008 to the trough in early 2009.

The fall in export earnings and the accompanying slowdown in economic activity led to concerns about the

Table 1 **Portfolio Inflows, FDI, Export Financing, Growth of Real Credit to Private Sector, by Region**

| | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|
| Asia | | | | |
| Portfolio Inflows (% change) | 32.7% | 46.5% | -39.0% | 2.1% |
| FDI (% change) | 31.6% | 36.0% | -5.8% | -7.5% |
| Flow of Export Credits (USD bil) | 12.6 | 16.6 | 29.0 | -29.5 |
| Domestic Credit (% change) | 13.3% | 31.7% | 15.6% | |
| Latin America | | | | |
| Portfolio Inflows | 19.6% | 39.5% | -29.8% | -48.5% |
| FDI | 13.6% | 21.8% | 2.9% | -27.6% |
| Flow of Export Credit | 5.4 | 8.4 | 9.6 | -14.0 |
| Domestic Credit | 13.3% | 13.9% | 19.4% | |
| Eastern Europe | | | | |
| Portfolio Inflows | 39.4% | 33.1% | -47.3% | 21.8% |
| FDI | 48.9% | 60.2% | -22.8% | 13.5% |
| Flow of Export Credit | 8.0 | 12.0 | 13.2 | -19.8 |
| Domestic Credit | 30.5% | 36.7% | 28.2% | |
| Sub-Saharan Africa | | | | |
| Portfolio Inflows | 25.2% | 29.8% | -31.5% | 3.5% |
| FDI | 13.0% | 23.7% | -22.0% | 11.7% |
| Flow of Export Credit | 0.2 | 0.3 | 0.3 | 0.6 |
| Domestic Credit | 34.1% | 65.5% | 49.7% | |
| Middle East/North Africa | | | | |
| Portfolio Inflows | 4.9% | 23.2% | -12.5% | 30.8% |
| FDI | 34.0% | 22.5% | 8.2% | 9.5% |
| Flow of Export Credit | 4.7 | 0.3 | 0.6 | -9.7 |
| Domestic Credit | 7.9% | 59.2% | 48.8% | |

**Limited data available FDI and portfolio investment data available for PRC and the African countries.*

quality of the banks' loan portfolios, further intensifying the freeze in the domestic credit markets. The decline in export activity was compounded by a contraction in domestic demand, reflecting consumer fears, the large loss of wealth caused by the drop in stock market prices, and the postponement of investment plans. In turn, the decline in activity led to a significant drop in government revenue, weakening public finances. This posed a serious challenge to policy makers, given the tightness of financing availability in some EMCs, including financing from the global markets. Commodity exporters were further affected by the sharp decline in commodity prices that followed the collapse of global demand.

Similarly, ***remittances and tourism*** were considerably affected, although with a lag in the case of the former. The magnitude of the decline in remittance receipts appears to have been closely linked to the fall in activity in the countries of origin. For instance, remittances from the US to

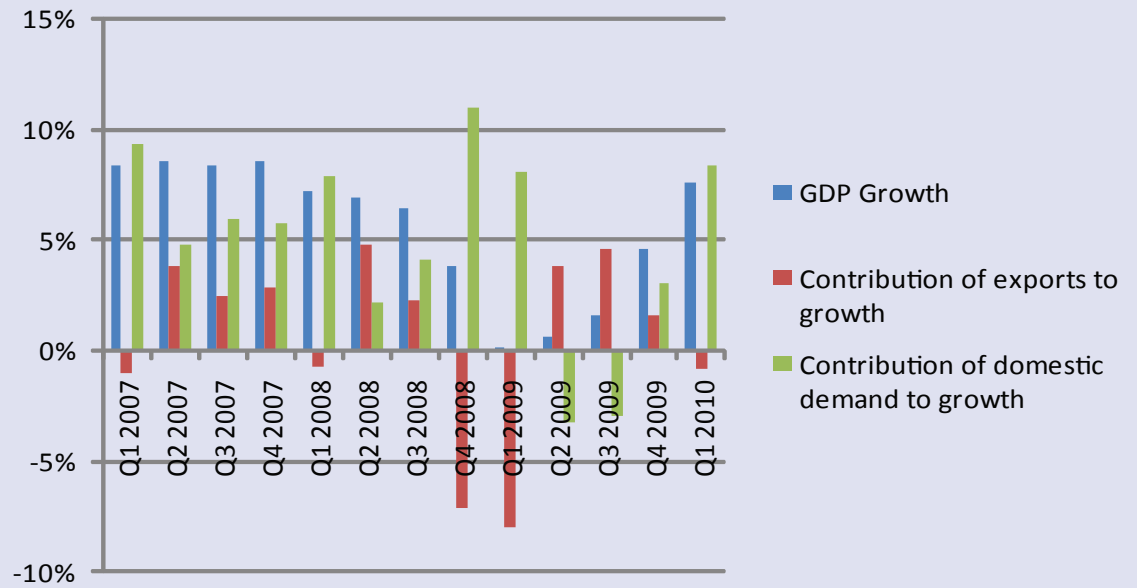
Table 2 **Exports Growth Rates, by region (Quarter-over-quarter)**

| | Q2 2006 | Q3 2006 | Q4 2006 | Q1 2007 | Q2 2007 | Q3 2007 | Q4 2007 | Q1 2008 |
|---|---|---|---|---|---|---|---|---|
| Central and Eastern Europe | 11.4% | 2.9% | 9.6% | -0.2% | 9.9% | 3.4% | 12.9% | 6.2% |
| Sub-Saharan Africa | 8.2% | 6.9% | -6.3% | 2.6% | 9.2% | 5.0% | 16.9% | 3.6% |
| Developing Asia | 11.7% | 11.8% | 2.1% | -4.4% | 11.8% | 10.3% | 3.5% | -4.6% |
| Middle East and North Africa | 8.3% | 5.1% | -7.7% | 0.4% | 10.5% | 6.5% | 12.2% | 16.1% |
| Western Hemisphere | 9.7% | 5.7% | -3.7% | -1.3% | 11.2% | 4.7% | 5.8% | -1.8% |
| | **Q2 2008** | **Q3 2008** | **Q4 2008** | **Q1 2009** | **Q2 2009** | **Q3 2009** | **Q4 2009** | **Q1 2010** |
| Central and Eastern Europe | 10.4% | -2.7% | -24.4% | -15.6% | 5.3% | 10.9% | 10.4% | -8.4% |
| Sub-Saharan Africa | 16.3% | 7.8% | -31.2% | -34.5% | 14.7% | 23.4% | 10.8% | -1.6% |
| Developing Asia | 15.0% | 9.4% | -16.6% | -24.3% | 9.3% | 15.3% | 8.6% | -4.2% |
| Middle East and North Africa | 12.5% | 9.9% | -30.9% | -35.7% | 10.6% | 16.8% | 7.9% | 3.8% |
| Western Hemisphere | 15.5% | 4.2% | -20.7% | -24.8% | 10.4% | 11.7% | 5.0% | -1.0% |

*Source:* IMF, Direction of Trade Statistics.

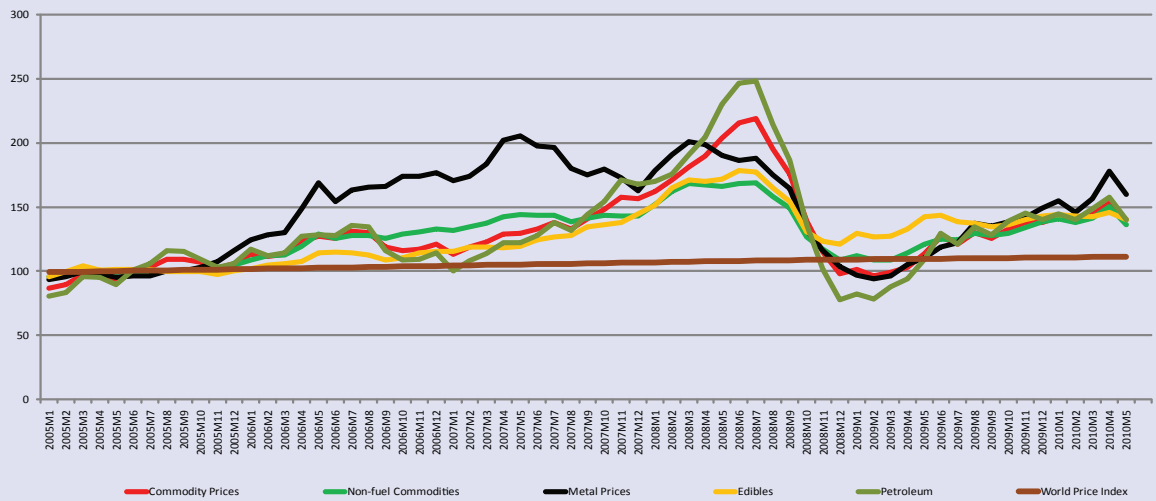
**Limited data available FDI and portfolio investment data available for PRC and the African countries.*

Figure 3 **Contribution to Growth**




*Source:* IMF World Economic Outlook, April 2010. IMF Direction of Trade Statistics.

Figure 4 **Commodity Prices**




*Source:* IMF Indices.

Table 3 **Remittances to Emerging and Developing Countries (In USD millions)**

| Worker's Remittances | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 (estimated) |
|---|---|---|---|---|---|---|
| East Asia and Pacific | 40,336 | 50,460 | 57,598 | 71,309 | 86,115 | 84,785 |
| Europe and Central Asia | 20,955 | 30,089 | 97,341 | 50,777 | 57,801 | 49,279 |
| Latin America and Caribbean | 43,330 | 50,122 | 59,199 | 63,239 | 64,717 | 58,481 |
| Middle-East and North Africa | 23,034 | 24,958 | 26,112 | 31,364 | 34,696 | 32,212 |
| South Asia | 28,694 | 33,924 | 42,523 | 54,041 | 73,293 | 71,955 |
| Sub-Saharan Africa | 8,021 | 9,379 | 12,629 | 18,646 | 21,139 | 20,525 |

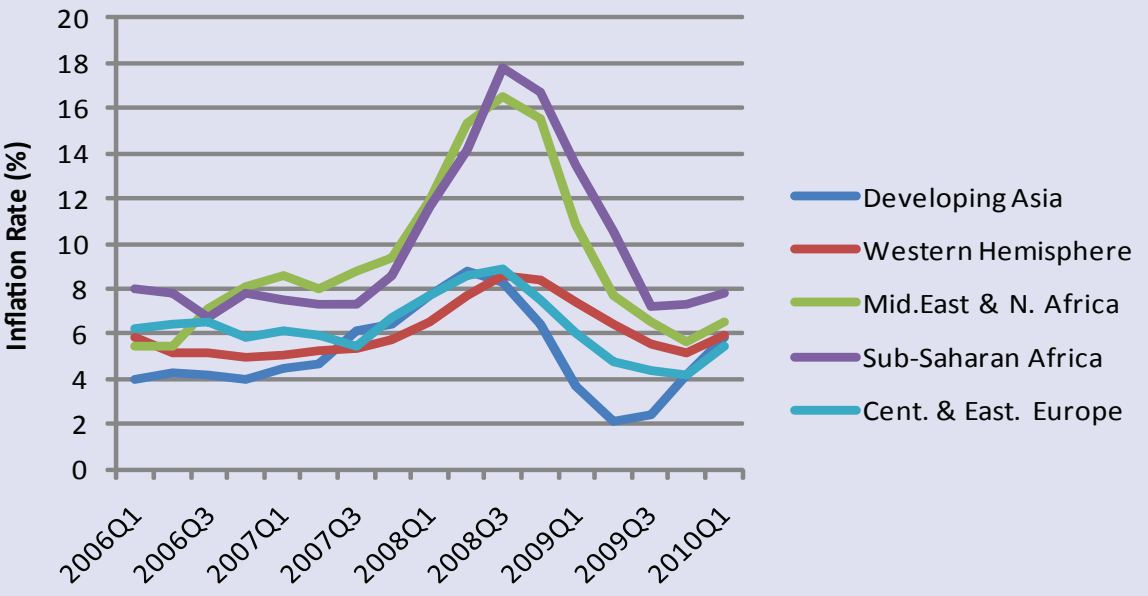
*Source:* Migration and Development Brief 12, World Bank. April 23, 2010.

*Note: This table presents data for all Emerging Market and Developing Countries, as specific data for the sample countries were not readily available for the entire time period.*

Figure 5 **Foreign Exchange Reserves**

*Source:* IMF International Financial Statistics.

Figure 6 **Inflation**




*Source:* IMF World Economic Outlook Database, April 2010.

Table 4 **Changes in Stock Market Indices and Exchange Rates**

| | Stock Market Indices (% change) | | | | Exchange Rate Changes (% change in terms of USD) | | |
|---|---|---|---|---|---|---|---|
| | 2008 | 2009 | 2010 | Peak to Trough | 2008 | 2009 | 2010 |
| Hong Kong, China | -46.9% | 42.9% | 2.7% | -58.3% | 6.0% | 0.1% | 0.4% |
| India | -58.1% | 90.2% | 16.69% | -62.4% | -23.8% | 6.0% | 0.0% |
| Indonesia | -50.6% | 87.0% | 38.15% | -53.2% | 18.5% | -15.3% | -3.5% |
| Philippines | -48.3% | 63.0% | 34.31% | -51.4% | 15.2% | -1.9% | -5.9% |
| PRC | -65.4% | 80.0% | -18.96% | -71.0% | 6.0% | 0.2% | 0.4% |
| Republic of Korea | -40.7% | 49.7% | 11.29% | -48.5% | -34.6% | 8.7% | -2.5% |
| Thailand | -47.6% | 63.3% | 32.78% | -55.7% | 16.7% | -0.4% | -13.1% |
| | | | | | | | |
| Brazil | -41.2% | 82.7% | 1.23% | -49.6% | -29.8% | 25.2% | -0.4% |
| Israel | -46.4% | 78.8% | 5.52% | -48.3% | -1.7% | 0.2% | -3.5% |
| Mexico | -25.7% | 45.3% | 4.87% | -43.8% | -25.3% | 5.9% | -0.2% |
| Turkey | -51.6% | 96.6% | 24.51% | -58.3% | 30.4% | -1.5% | -3.7% |
| United States | -40.9% | 24.8% | 1.34% | -55.2% | | | |

*Source:* World Federation of Exchanges. OANDA.

**2010 numbers are through September*

Mexico have experienced an exceptional drop. A similar development seems to have affected tourism, with tourist arrivals in Asia and the Pacific, as well as in the Americas, falling considerably in early 2009, but subsequently recovering.

The freeze of international capital flows and the collapse in exports, as well as in tourist arrivals and remittances, in some cases led to considerable currency depreciations and significant losses in international reserves in those countries that used their foreign exchange holdings to buffer the external shock. The currency depreciations and reserve losses have been subsequently reversed in a number of countries, in some cases by a considerable resumption of portfolio capital inflows.

Inflation in many EMCs had risen considerably in 2007 and early 2008 in line with increases in commodity prices, particularly food and fuel, and booming credit and monetary expansion. However, that pattern was reversed in late 2008 as the price pressures receded with the collapse in global demand. While currency depreciations precluded a faster decline in local prices in a number of countries, lower exogenous inflationary pressures facilitated the adoption of expansionary macroeconomic policies to stimulate domestic demand and help limit the downturn in activity.

## III. The Policy response

The magnitude of the external shock to export-dependent EMCs clearly underscored the need for action to stimulate domestic demand. In addition, the strong G-20 call for a coordinated policy response likely increased pressure on policymakers of the larger EMCs to take action, while simultaneously providing additional confidence to embark on stimulus packages. Policy actions included measures in the fiscal, monetary, and financial sectors. The ability of policy makers to react quickly (and in a somewhat coordinated fashion) in the design

## Box 1 International Reserves

The factor analysis in this paper, as well as work by others, suggests that many emerging market countries were able to moderate the impact on their economies of the global recession triggered by the financial crisis in the U.S. The capacity to design and implement policies that helped offset the impact of the current crisis was created by the reforms adopted by these countries in response to earlier crises to strengthen the macroeconomic fundamentals of their economies, to bolster their financial systems and, more generally, to improve their policy making institutions. This was the silver lining to the crises that had ravaged many of their economies during the 1980s and 1990s.
One of the key factors that explains both the resilience that had been created by the changed policy and performance of these economies over the previous decade or so, and the confidence to take the measures needed to help counter the external shock from the global crisis, was the accumulation of large – historically unprecedented – stocks of international reserves (figure 5).

This is the upside of that development. However, the conclusion to be drawn should not be to welcome that development as an unmitigated blessing and to encourage a continuation of such hoarding of reserves. The reserve accumulation by many of these countries was by almost any measure excessive. While there may be a tendency to welcome the self-insurance provided by large reserve holdings, and the policy space that they create, the high cost of accumulating and holding these reserves should not be ignored. Beyond some limit, this is a costly and inefficient way to provide insurance – both for the countries themselves and for the global system.

For individual countries, the return on reserve holdings beyond a certain limit is likely to be lower than the returns to be made elsewhere – both in the real economy and in alternative financial assets. Similarly, the risks involved in the lack of diversification generally seen in such holdings can be large.

The preference of countries to self-insure themselves through excessive reserve holdings is also problematic for the global economic and monetary system. The recent crisis has taught us a great deal about the impact of perverse incentives in the financial markets.[1] The result of so many actors in the financial system operating under perverse incentives is now all too clear.

But the international monetary system as currently constructed contains its own questionable and ineffective incentives. On the one hand, countries with fixed or heavily managed exchange rates that elect to drive growth in their economies through export promotion have an incentive to keep their currencies undervalued through one-way intervention in the exchange markets. The rationale of providing self-insurance helps provide cover for such countries. On the other hand, for the countries providing the global system with the major reserve assets, policy discipline can be weakened. It can be argued that the choice of the U.S. dollar as the primary reserve asset by most countries is made because of the long track record of U.S. policies that – at least until recently - have created reasonable macroeconomic and financial stability. Combined with the unparalleled depth and breadth of U.S. financial markets and its open capital account, this choice seemed reasonable. However, it can also be argued that the incentive to excessive accumulation of reserves by emerging market countries in recent years has weakened policy discipline in the U.S, permitting unsustainable deficits in both the public and private sectors. These somewhat perverse incentives in the current global system – operating on both the reserve accumulating countries and the primary reserve supplying country - can thus be seen, at least in part, as causal factors in the recent crisis.

An additional causal factor, of course, has been the absence of rules in the international monetary system to prevent the development of large and prolonged imbalances in countries' external accounts. In the absence of rules, which all but disappeared with the collapse of the Bretton Woods system in the 1970s, surveillance of countries' exchange rate and other economic and financial policies was supposed to supplant the earlier rules-based system. Unfortunately, surveillance by the IMF has not been up to the task assigned to it – at least not for the largest advanced economies nor for some of the emerging market countries. This failure is not unique to the IMF. None of the other organizations or groupings involved in surveillance – the G7, the OECD, and others - have had much success.

This reality calls for a serious effort to reconsider the structure and the rules in the current international monetary system – or non-system, as it is referred to by many.

1 Those perverse incentives operated at all levels of the mortgage markets in the U.S. and in some other countries. Mortgage originators who profited from immediate fee income had little interest in the credit quality of the loans they made; those institutions that bundled the mortgages with the primary objective of selling off to investors the securities so-created had a similar disinterest in quality; the rating agencies were for the most part ignorant of the risks embodied in the instruments they were rating and were driven, like the originators and the banks that created the securities, primarily by fee income; and investors were lulled into complacency by the confidence placed in the ratings attached to the subject securities.

and implementation of such packages is testament to the increasing strength of the fundamentals of their economies. The size and extent of these packages varied significantly across the EMCs, depending on the available scope for policymakers to maneuver in these areas. This room for maneuver was, in part, dependent upon the reforms pursued in previous years. For example, the stronger and deeper the improvement in institutions and in macroeconomic fundamentals, the more ambitious the package could be. Indeed, from statements of policymakers launching these packages, it is clear that in determining the size of the fiscal stimulus, policy makers balanced what they perceived was needed to achieve their objectives against the constraints imposed by those fundamentals, such as the stock of public debt in relation to GDP. Individual policymakers also took into account the relaxation of the fiscal stance resulting from automatic stabilizers. As a result, the overall deficits of the EMCs rose by an average of 4 percentage points of GDP, of which nearly 3 percentage points represented increased spending and 1 percentage point reflected lower revenue.

It is important to note that a number of EMCs have withdrawn part of the stimulus packages as the economies recovered faster-than-expected.

In determining the nature and extent of the monetary stimulus, the same issues taken into account when considering the fiscal stimulus, as well as the expectation that the drop in global demand would result in receding inflationary pressures, seem to have prevailed. Specific

Table 5 **Fiscal Stimulus Packages Adopted by some EMCs**

| Country | Size of Stimulus (USD billions) | Calculated % of 2008 GDP |
|---|---|---|
| Argentina | 3.85 | 1.27% |
| Chile | 4 | 2.84% |
| PRC | 585.26 | 13.30% |
| Czech Republic | 3.91 | 2.04% |
| India | 38.39 | 3.56% |
| Indonesia | 6.3 | 1.40% |
| Israel | 2.8 | 1.47% |
| Kenya | 0.28 | 1.04% |
| Republic of Korea | 53.35 | 6.56% |
| Malaysia | 12.12 | 5.67% |
| Mexico | 13.32 | 1.49% |
| Nigeria | 1.55 | 0.82% |
| Peru | 3.2 | 2.69% |
| Philippines | 6.95 | 4.40% |
| Poland | 10.64 | 2.49% |
| Russia | 53.64 | 3.78% |
| Singapore | 10.21 | 5.71% |
| South Africa | 9.9 | 4.03% |
| Thailand | 44.92 | 17.22% |
| Viet Nam | 8.42 | 9.68% |

*Source:* UNDP, Y. Zhang, N. Thelen, and A. Rao, Social protection in Fiscal Stimulus Packages: some Evidence, 2010.

actions varied widely across countries and included the following:

- *Cuts in policy rates and steps to raise credit.* To stimulate domestic demand, in addition to cuts in policy interest rates, many central banks reduced reserve requirements (India), and engaged in direct lending through repos (Czech Republic, Hungary, India), direct purchases of bank debt, and newly created windows to help increase bank credit.
- *Unfreezing of Interbank Markets.* These measures were supplemented by measures to unfreeze interbank markets, including central banks' provisions of liquidity to larger banks to buy loan portfolios of smaller or weaker banks, guarantees of interbank loans (Brazil, Hungary, India, Republic of Korea, Malaysia, Mexico, Russia), and the recapitalization of banks (Hungary, Republic of Korea).
- *Extension of Deposit Insurance.* Many central banks and regulatory agencies raised or extended prevailing deposit insurance ceilings to guard against potential deposit runs (Czech Republic, Hungary, Indonesia, Latvia, Malaysia, Poland, Philippines, Russia, Singapore, Thailand), and guaranteed certain types of bank loans (Hungary).
- *Provision of External Financing.* To address the sudden stop in external financing, many central banks established special credit lines in foreign exchange, including export financing (Brazil, Republic of Korea); entered into swap operations or reciprocal currency arrangements with other central banks (Brazil, Hungary, Republic of Korea, Latvia, Mexico, Singapore); restricted (currency) derivative operations (Indonesia); lowered ceilings on foreign exchange purchases; eased open foreign exchange positions (Philippines); and guaranteed local banks' external debt (Republic of Korea).
- *Forbearance of Credit Risk and Additional Liquidity.* In some cases, regulators introduced some forbearance, for example on credit risk assessment (especially for loans to clients severely affected by the crisis) and provisioning requirements.

## IV. The Centennial Resilience Index

While the crisis affected individual EMCs in varying degrees, the ability of many of those countries to absorb and recover from the shock has been impressive, even if some still face a difficult road ahead. Clearly, the capacity of many of these countries to offset the impact of events originating in the industrial world has increased. In an attempt to understand this phenomenon, we have built a Resilience Index. In contrast to the traditional vulnerability indicators, which can help explain a country's susceptibility to shocks, the Resilience Index intends to identify factors that have increased the capacity of many EMCs to absorb external shocks, and to respond effectively. Put differently, while individual EMCs may be confronted with similar external shocks, the more resilient ones will be expected to be able to absorb the shock, respond effectively, and recover faster than the others.

In addition to the typical "fundamentals," i.e., the strength or soundness of fiscal and monetary policies and the soundness of the financial system, the Centennial Resilience Index created for this paper includes important "structural aspects" of the economy, e.g., the quality of its civil service, governance, export dependency, external robustness, the extent to which private sector debt is externally financed, and the relative size of its international reserves (see Box 2).[7] These fundamentals give a measure of the capacity and the space that policymakers have to design and implement needed adjustment measures, the confidence to implement such measures, and the credibility they have with the public and markets regarding their likely effectiveness. Some of the structural aspects also provide the capacity or flexibility for the economy itself to respond effectively to those policy

7 See Appendix I for a full description of the Resilience index.

## Box 2 The Centennial Resilience Index and the Rationale for Each Element

The Centennial Resilience Index provides inter alia a measure of the capacity of an economy to bounce back after having been hit by an external shock.

The rationale for each of its elements and components is briefly described below:

**Fiscal Policy Soundness**
This represents the space policy makers have to adopt fiscal measures. Its components are the stock of public debt in relation to GDP as well as the rate (and direction) of change of this variable as a measure of the overall deficit. Beyond some thresholds a higher debt ratio or overall deficit decreases the space.

**Monetary Policy Soundness**
The greater the credibility the central bank has built up – for example, by such actions as controlling inflation, the more room the central bank has to ease monetary policy in a slowdown, thereby supporting activity in the economy. Its components are the difference between domestic inflation and G-7 inflation, whether an inflation targeting framework is in place (as they are typically associated with increased credibility), and a measure of the unpredictability of inflation, estimated by its historical standard deviation.

**Government Effectiveness**
The stronger the capacity of government officials to react and design policies, the better and faster will be the implementation of these policies and thus the response of the economy. The greater the capacity of the government to follow through with its plans, the more likely the private sector will respond positively to stimulus measures, and thus the higher the country's resilience. Its components are the quality of the bureaucracy and the ability to consistently implement forward-looking policies.

**Overall Governance**
Good governance is generally seen as a necessary underpinning to an efficient economy, with reliable and independent institutions, adherence to the rule of law (confidence in contracts, property rights, etc.), transparency, limits to corruption, press freedom, required bank and credit ratings, accounting disclosure, shareholder rights, and availability of both private- and public-sector standardized data. Its components are indices of corporate governance, legal system, and policy transparency, and are taken from the Index of Financial Development and Strength developed by Centennial Group International (see methodology).

**Bank Soundness**
A sounder financial system with less risk of default, a strong capital base, well-provisioned assets, non-volatile income sources, and high profitability is less likely to amplify an external shock and thus make the economy more resilient. Although this element represents predominantly banks, it also includes some non-bank financial institutions, and therefore measures the broader financial sector. Its components—all derived from the IMF's Financial Soundness Indicators Compilation Guide[1] — are asset quality, capital base, and income risk, and are also taken from the Index of Financial Development and Strength developed by Centennial Group International.

**Export Diversity**
The more diversified the export base, the more resilient the economy is likely to be. Although this should apply to both export destinations and products, appropriate data for the latter is not readily available. Its component is the coefficient of variation of export shares by destination.

**Export Independence**
The greater the dependence on exports, the less resilient to an external shock an economy is likely to be. Its component is the ratio of exports to GDP.

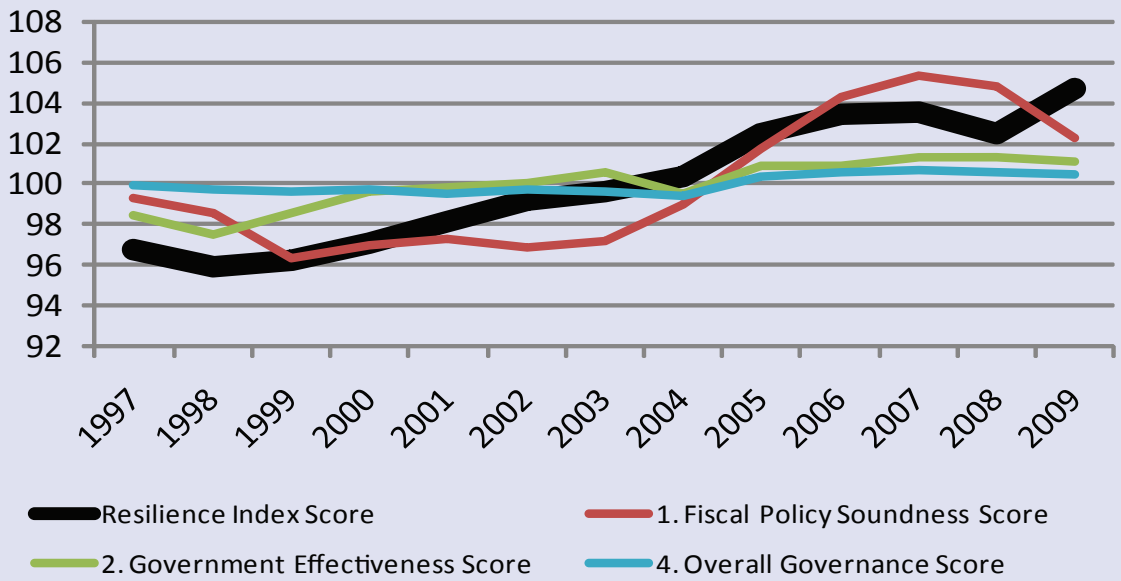
**External Robustness**
The stronger the external sector, the more resilient an economy is likely to be. Its components are the current account balance as a proportion of GDP, the ratio of international reserves to short term debt, the stock of reserves in terms of months of imports, and a classification of the exchange rate regime.

**Private External Debt**
The faster the expansion of externally financed credit to the private sector, the less resilient an economy is likely to be to a sudden stop in capital flows. (Externally financed credit should not be seen as financial deepening, which involves credit growth mainly financed by domestic financial savings.) Its components are the change in the ratio of loans from foreign banks to private credit by domestic banks, the ratio of claims on the country's residents by foreign banks to GDP, and the change in this ratio. It would have been helpful and appropriate to include currency composition of private sector debt, but the relevant data was not available.

**International Reserves**
At least up to some limit, the higher the reserve holdings the stronger the self-insurance they offer; in addition, a high stock of reserves provides policy makers with room for maneuver and confidence to adopt expansionary policies in a downturn. Thus, a high stock of reserves constitutes a buffer against external shocks. While it would appear that the higher the stock of reserves, the better off the country is, Box 1 notes the costs of such an approach. Moreover, a recent IMF study shows that the self-insurance aspect tapers off after a certain level of reserves. The measure of this element of the resilience index is the ratio of international reserves to GDP.

1 International Monetary Fund. (2006). Financial soundness indicators : compilation guide. Washington, D.C., International Monetary Fund.

Figure 7a **Evolution of the Centennial Resilience Index and its Elements during 1997-2009**




*Source:* Centennial Group International.

actions.

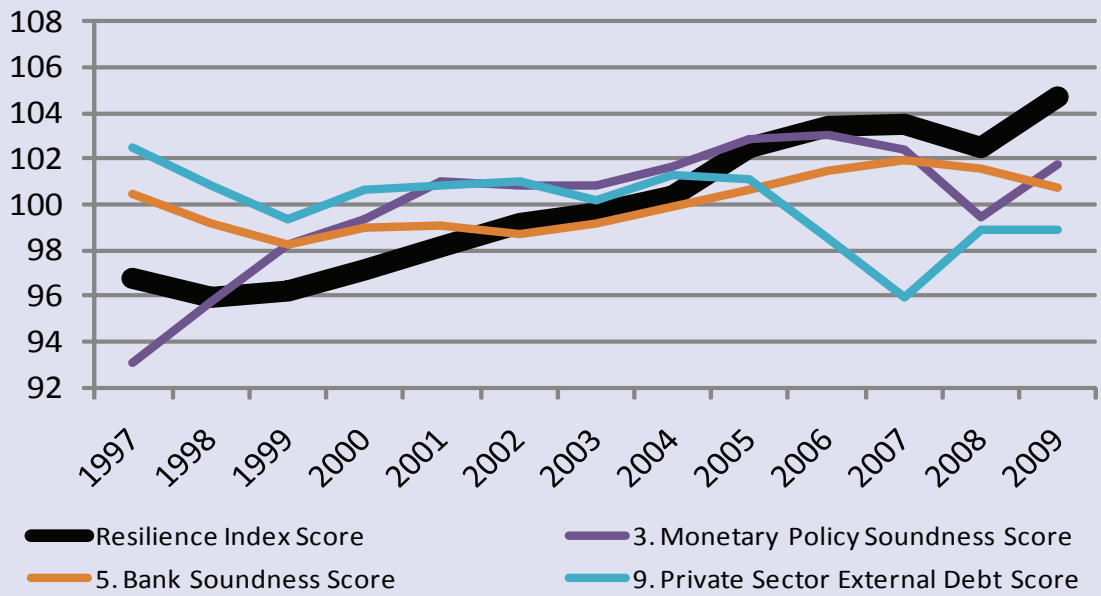
The potential attractiveness of the Index is that it gives a comprehensive, general-equilibrium type of view of the resilience of an economy; it shows how all the relevant factors interact and reinforce (or weaken)[8] each other. For instance, the resilience index of a country with strong fundamentals but weak structural aspects (e.g., fast-growing externally financed private debt, or highly concentrated export destinations) may be lower than the index of a country with average fundamentals but strong structural aspects. Importantly, the elements of the Index can give policymakers a good idea of the sources of their country's resilience and where they need to consider focusing further reform efforts.

The Index suggests that the resilience of many of the EMCs was considerably stronger at the onset of the recent global crisis than it had been in the past (Figure 7).[9] This reflects the significant reforms that many EMCs have implemented with considerable rigor since the mid-1990s to strengthen macroeconomic policymaking frameworks, regulatory and supervisory regimes, accounting standards, legal frameworks, and data reporting systems, and in transparency more generally. On this basis, it is likely that these countries' performances would have been much weaker had policymakers not introduced such reforms and not increased the resilience of their countries beyond what it had been in 1997. It is worth noting that even if the shock itself resulted in some decline in the Centennial Resilience Index for 2008, e.g., by reducing reserves, increasing fiscal deficits and debt levels, and the like, policymakers in many of these countries (notably in PRC, Colombia, Hungary, Indonesia, Israel, Jordan, South Africa, and Thailand) quickly responded and, as a result, their economies recovered

8 This comprehensive approach is what differentiates the Centennial Resilience Index from the traditional vulnerability measures as they tend to be more of a partial-equilibrium nature..

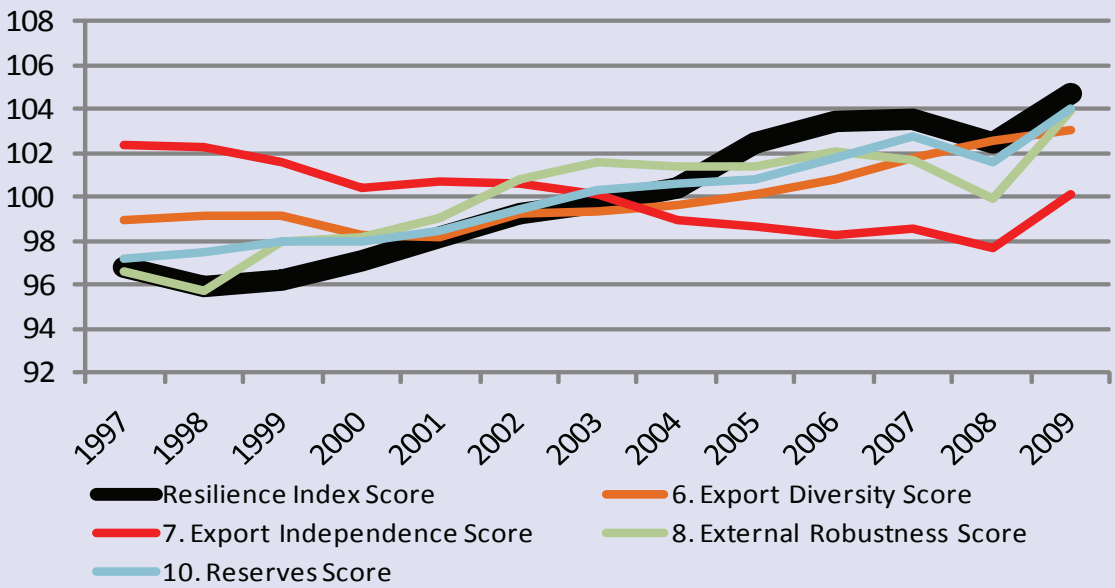
9 Given the complexities of the various elements of the Resilience Index and of the statistical methodology (factor analysis), it is important to stress that the individual numbers are influenced by the sample of countries under review, i.e., they indicate relative positions or values across only those countries and years included in the sample.

Figure 7b **Evolution of the Centennial Resilience Index and its Elements during 1997-2009**




*Source:* Centennial Group International.

Figure 7c **Evolution of the Centennial Resilience Index and its Elements during 1997-2009**




*Source:* Centennial Group International.

Table 6 **The Centennial Resilience Indices and their Elements for 2007**

| Country | Resilience Index Score | Resilience Index Standard Error | 1. Fiscal Policy Score | 1. Fiscal Policy Standard Error | 2. Government Effectiveness Score | 2. Government Effectiveness Standard Error | 3. Monetary Policy Soundness/ Credibility Score | 3. Monetary Policy Soundness/ Credibility Standard Error | 4. Overall Governance Score | 4. Overall Governance Standard Error |
|---|---|---|---|---|---|---|---|---|---|---|
| Asia | | | | | | | | | | |
| Azerbaijan | 104.5 | 0.2 | 114.5 | 0.0 | 87.9 | 0.3 | 90.8 | 0.2 | 85.2 | 0.5 |
| Bangladesh | 90.4 | 0.2 | 102.5 | 0.0 | 91.1 | 0.5 | 98.2 | 0.1 | 89.1 | 0.5 |
| PRC | 109.8 | 0.2 | 108.5 | 0.0 | 97.4 | 0.1 | 100.9 | 0.1 | 92.8 | 0.3 |
| Georgia | 109.7 | 0.2 | 111.3 | 0.0 | 107.7 | 0.3 | 98.9 | 0.1 | 94.9 | 0.5 |
| Hong Kong, China | 104.5 | 0.4 | 115.8 | 0.0 | 119.3 | 0.7 | 103.9 | 0.2 | 116.5 | 0.9 |
| India | 108.8 | 0.2 | 94.4 | 0.0 | 104.7 | 0.2 | 103.3 | 0.2 | 101.3 | 0.2 |
| Indonesia | 104.0 | 0.2 | 105.8 | 0.0 | 95.3 | 0.2 | 104.4 | 0.4 | 96.9 | 0.2 |
| Kazakhstan | 97.0 | 0.2 | 114.6 | 0.0 | 91.1 | 0.5 | 91.8 | 0.1 | 99.6 | 0.7 |
| Rep. of Korea | 111.3 | 0.2 | 104.5 | 0.0 | 115.2 | 0.5 | 109.9 | 0.4 | 109.8 | 0.2 |
| Malaysia | 110.1 | 0.2 | 101.7 | 0.0 | 115.2 | 0.5 | 105.3 | 0.2 | 104.8 | 0.3 |
| Pakistan | 101.9 | 0.2 | 99.8 | 0.0 | 95.3 | 0.2 | 102.3 | 0.2 | 96.9 | 0.5 |
| Philippines | 112.0 | 0.2 | 103.0 | 0.0 | 108.9 | 0.2 | 109.2 | 0.4 | 101.4 | 0.5 |
| Singapore | 109.7 | 0.3 | 91.5 | 0.0 | 128.8 | 0.9 | 103.3 | 0.1 | 115.7 | 0.5 |
| Sri Lanka | 92.2 | 0.2 | 92.8 | 0.0 | 95.3 | 0.2 | 92.3 | 0.1 | 104.5 | 0.5 |
| Thailand | 110.7 | 0.2 | 104.2 | 0.0 | 101.6 | 0.1 | 109.6 | 0.4 | 104.0 | 0.2 |
| Viet Nam | 90.4 | 0.2 | 99.5 | 0.0 | 97.4 | 0.1 | 97.5 | 0.1 | 87.2 | 0.5 |
| Emerging Europe/CIS | | | | | | | | | | |
| Czech Republic | 98.3 | 0.2 | 105.7 | 0.0 | 115.2 | 0.5 | 107.8 | 0.4 | 107.7 | 0.3 |
| Hungary | 93.3 | 0.2 | 94.0 | 0.0 | 113.1 | 0.4 | 106.7 | 0.4 | 111.0 | 0.3 |
| Latvia | 91.5 | 0.2 | 114.1 | 0.0 | 105.2 | 0.1 | 95.9 | 0.1 | 105.8 | 0.3 |
| Lithuania | 98.2 | 0.2 | 110.0 | 0.0 | 111.5 | 0.5 | 100.2 | 0.1 | 112.9 | 0.3 |
| Poland | 103.4 | 0.2 | 100.7 | 0.0 | 113.1 | 0.4 | 108.9 | 0.4 | 105.1 | 0.3 |
| Romania | 95.2 | 0.2 | 109.0 | 0.0 | 96.3 | 0.3 | 107.3 | 0.4 | 102.3 | 0.2 |
| Russia | 115.8 | 0.2 | 114.8 | 0.0 | 90.0 | 0.3 | 99.2 | 0.1 | 97.6 | 0.2 |
| Slovak Republic | 97.1 | 0.2 | 107.2 | 0.0 | 115.2 | 0.5 | 105.1 | 0.2 | 107.1 | 0.3 |
| Slovenia | 98.8 | 0.3 | 108.0 | 0.0 | 117.3 | 0.6 | 107.9 | 0.4 | 107.8 | 0.4 |
| Turkey | 108.2 | 0.2 | 105.1 | 0.0 | 103.6 | 0.2 | 107.1 | 0.4 | 99.8 | 0.2 |
| Ukraine | 92.8 | 0.1 | 113.2 | 0.0 | 87.9 | 0.3 | 95.3 | 0.1 | 90.8 | 0.3 |
| Latin America | | | | | | | | | | |
| Argentina | 112.4 | 0.2 | 103.6 | 0.0 | 102.6 | 0.3 | 92.4 | 0.1 | 108.2 | 0.5 |
| Bolivia | 106.8 | 0.3 | 107.1 | 0.0 | 93.2 | 0.4 | 97.3 | 0.1 | 102.2 | 0.5 |

*Source:* Centennial Group International.

Table 6 **The Centennial Resilience Indices and their Elements for 2007**

| Country | 5. Bank Soundness Score | 5. Bank Soundness Standard Error | 6. Export Diversity Score | 6. Export Diversity Standard Error | 7. Export Independence Score | 7. Export Independence Standard Error | 8. External Robustness Score | 8. External Robustness Standard Error | 9. Private External Debt Score[1] | 9. Private External Debt Standard Error | 10. Reserves Score | 10. Reserves Standard Error |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Asia | | | | | | | | | | | | |
| Azerbaijan | 102.9 | 0.1 | 104.0 | 0.0 | 105.5 | 0.0 | 117.6 | 0.4 | 111.0 | 0.2 | 96.6 | 0.0 |
| Bangladesh | 83.6 | 0.4 | 98.3 | 0.0 | 107.6 | 0.0 | 99.5 | 0.2 | 103.9 | 0.1 | 92.6 | 0.0 |
| PRC | 94.7 | 0.2 | 105.2 | 0.0 | 98.2 | 0.0 | 120.5 | 0.6 | 101.7 | 0.1 | 114.4 | 0.0 |
| Georgia | 115.7 | 0.3 | 106.6 | 0.0 | 108.5 | 0.0 | 87.7 | 0.4 | 106.1 | 0.1 | 96.8 | 0.0 |
| Hong Kong, China | 100.9 | 0.1 | 84.4 | 0.0 | 60.3 | 0.0 | 104.1 | 0.2 | 82.2 | 0.4 | 128.3 | 0.0 |
| India | 98.0 | 0.2 | 114.3 | 0.0 | 108.0 | 0.0 | 107.7 | 0.4 | 96.3 | 0.1 | 103.0 | 0.0 |
| Indonesia | 104.1 | 0.1 | 104.1 | 0.0 | 101.4 | 0.0 | 102.3 | 0.1 | 103.5 | 0.1 | 96.4 | 0.0 |
| Kazakhstan | 105.5 | 0.1 | 105.3 | 0.0 | 93.4 | 0.0 | 94.2 | 0.2 | 95.9 | 0.1 | 98.1 | 0.0 |
| Rep. of Korea | 99.4 | 0.2 | 104.1 | 0.0 | 98.0 | 0.0 | 103.2 | 0.2 | 91.7 | 0.1 | 104.1 | 0.0 |
| Malaysia | 95.7 | 0.1 | 105.5 | 0.0 | 77.9 | 0.0 | 112.9 | 0.3 | 97.2 | 0.1 | 119.5 | 0.0 |
| Pakistan | 101.2 | 0.1 | 107.7 | 0.0 | 108.3 | 0.0 | 100.1 | 0.2 | 100.6 | 0.1 | 94.5 | 0.0 |
| Philippines | 102.1 | 0.2 | 101.2 | 0.0 | 98.2 | 0.0 | 103.9 | 0.1 | 112.6 | 0.2 | 101.6 | 0.0 |
| Singapore | 101.2 | 0.1 | 107.2 | 0.0 | 59.7 | 0.0 | 112.3 | 0.4 | 78.5 | 0.3 | 135.8 | 0.0 |
| Sri Lanka | 97.1 | 0.2 | 98.6 | 0.0 | 102.9 | 0.0 | 94.2 | 0.2 | 99.9 | 0.1 | 94.9 | 0.0 |
| Thailand | 96.2 | 0.1 | 110.0 | 0.0 | 88.0 | 0.0 | 110.2 | 0.3 | 104.2 | 0.1 | 109.5 | 0.0 |
| Viet Nam | 94.2 | 0.2 | 103.6 | 0.0 | 86.0 | 0.0 | 96.2 | 0.2 | 95.9 | 0.1 | 108.7 | 0.0 |
| Emerging Europe/CIS | | | | | | | | | | | | |
| Czech Republic | 98.8 | 0.1 | 98.3 | 0.0 | 82.5 | 0.0 | 94.3 | 0.2 | 82.7 | 0.3 | 101.0 | 0.0 |
| Hungary | 102.4 | 0.1 | 101.4 | 0.0 | 86.0 | 0.0 | 88.7 | 0.4 | 73.9 | 0.4 | 99.4 | 0.0 |
| Latvia | 101.6 | 0.2 | 104.8 | 0.0 | 101.4 | 0.0 | 81.2 | 0.5 | 59.4 | 0.5 | 100.6 | 0.0 |
| Lithuania | 98.9 | 0.2 | 107.3 | 0.0 | 94.6 | 0.0 | 88.0 | 0.3 | 69.5 | 0.4 | 100.7 | 0.0 |
| Poland | 100.6 | 0.1 | 102.7 | 0.0 | 99.4 | 0.0 | 96.4 | 0.1 | 87.4 | 0.2 | 97.8 | 0.0 |
| Romania | 101.2 | 0.1 | 105.1 | 0.0 | 103.1 | 0.0 | 89.6 | 0.4 | 66.9 | 0.5 | 102.2 | 0.0 |
| Russia | 109.6 | 0.1 | 113.9 | 0.0 | 101.4 | 0.0 | 116.4 | 0.6 | 102.5 | 0.1 | 110.2 | 0.0 |
| Slovak Republic | 99.0 | 0.1 | 103.7 | 0.0 | 83.1 | 0.0 | 92.7 | 0.2 | 73.1 | 0.4 | 103.4 | 0.0 |
| Slovenia | 98.6 | 0.1 | 106.0 | 0.0 | 90.1 | 0.0 | 89.5 | 0.4 | 72.7 | 0.4 | 97.8 | 0.0 |
| Turkey | 106.2 | 0.1 | 115.0 | 0.0 | 106.3 | 0.0 | 94.3 | 0.2 | 95.9 | 0.1 | 95.5 | 0.0 |
| Ukraine | 98.0 | 0.1 | 103.8 | 0.0 | 98.3 | 0.0 | 98.3 | 0.1 | 86.5 | 0.2 | 102.4 | 0.0 |
| Latin America | | | | | | | | | | | | |
| Argentina | 105.3 | 0.2 | 108.4 | 0.0 | 104.1 | 0.0 | 109.2 | 0.3 | 110.6 | 0.1 | 99.2 | 0.0 |
| Bolivia | 102.0 | 0.0 | 86.8 | 0.0 | 98.7 | 0.0 | 121.8 | 0.7 | 105.6 | 0.1 | 109.3 | 0.0 |

*1. This indicator overestimates the actual private sector externally financed debt in countries considered as international financial centers, such as Singapore, Panama, Hong Kong, China and Bahrain.*

Table 6 **The Centennial Resilience Indices and their Elements for 2007**

| Country | Resilience Index Score | Resilience Index Standard Error | 1. Fiscal Policy Score | 1. Fiscal Policy Standard Error | 2. Government Effectiveness Score | 2. Government Effectiveness Standard Error | 3. Monetary Policy Soundness/ Credibility Score | 3. Monetary Policy Soundness/ Credibility Standard Error | 4. Overall Governance Score | 4. Overall Governance Standard Error |
|---|---|---|---|---|---|---|---|---|---|---|
| Brazil | 113.5 | 0.2 | 95.8 | 0.0 | 99.5 | 0.0 | 109.0 | 0.4 | 104.3 | 0.2 |
| Chile | 117.5 | 0.3 | 115.5 | 0.0 | 117.3 | 0.6 | 105.9 | 0.4 | 125.0 | 0.6 |
| Colombia | 106.2 | 0.2 | 105.6 | 0.0 | 101.6 | 0.1 | 108.9 | 0.4 | 101.5 | 0.2 |
| Costa Rica | 101.5 | 0.1 | 107.4 | 0.0 | 103.6 | 0.2 | 99.0 | 0.1 | 109.0 | 0.3 |
| Dominican Republic | 91.3 | 0.2 | 109.0 | 0.0 | 92.1 | 0.2 | 100.4 | 0.1 | 99.1 | 0.2 |
| Ecuador | 95.4 | 0.3 | 108.3 | 0.0 | 91.1 | 0.5 | 104.9 | 0.2 | 105.2 | 0.5 |
| Mexico | 100.9 | 0.2 | 103.1 | 0.0 | 108.9 | 0.2 | 110.2 | 0.4 | 110.4 | 0.5 |
| Panama | 81.4 | 0.3 | 102.2 | 0.0 | 105.7 | 0.4 | 101.7 | 0.1 | 94.3 | 0.2 |
| Peru | 113.0 | 0.2 | 106.9 | 0.0 | 99.5 | 0.0 | 109.1 | 0.4 | 110.3 | 0.5 |
| Uruguay | 115.1 | 0.2 | 99.7 | 0.0 | 105.7 | 0.4 | 100.7 | 0.1 | 121.5 | 0.5 |
| Venezuela | 94.2 | 0.2 | 106.6 | 0.0 | 85.9 | 0.4 | 91.7 | 0.1 | 91.1 | 0.6 |
| Middle East & North Africa | | | | | | | | | | |
| Bahrain | 98.3 | 0.3 | 111.1 | 0.0 | 105.7 | 0.4 | 104.0 | 0.2 | 100.4 | 0.3 |
| Egypt | 101.6 | 0.2 | 93.6 | 0.0 | 97.4 | 0.1 | 100.6 | 0.1 | 103.6 | 0.5 |
| Israel | 108.5 | 0.2 | 94.9 | 0.0 | 120.4 | 0.5 | 109.2 | 0.4 | 108.4 | 0.3 |
| Jordan | 105.9 | 0.2 | 96.6 | 0.0 | 101.6 | 0.1 | 102.7 | 0.1 | 102.6 | 0.2 |
| Lebanon | 97.4 | 0.2 | 74.2 | 0.0 | 91.1 | 0.5 | 100.7 | 0.1 | 92.5 | 0.5 |
| Morocco | 107.6 | 0.1 | 98.9 | 0.0 | 101.6 | 0.1 | 105.3 | 0.2 | 99.7 | 0.2 |
| Saudi Arabia | 120.3 | 0.3 | 116.3 | 0.0 | 99.5 | 0.0 | 101.2 | 0.1 | 96.0 | 0.5 |
| Tunisia | 99.6 | 0.1 | 101.4 | 0.0 | 103.6 | 0.2 | 103.4 | 0.2 | 102.1 | 0.3 |
| Sub-Saharan Africa | | | | | | | | | | |
| Botswana | 126.0 | 23.6 | 113.7 | 0.0 | 105.7 | 0.4 | 101.0 | 0.1 | 104.4 | 0.3 |
| Côte d'Ivoire | 87.6 | 0.7 | 93.8 | 0.0 | 78.5 | 0.6 | 105.8 | 0.2 | 83.9 | 0.3 |
| Ethiopia | 102.4 | 0.8 | 113.4 | 0.0 | 89.5 | 0.4 | 97.2 | 0.1 | 87.8 | 2.6 |
| Ghana | 108.5 | 0.5 | 105.0 | 0.0 | 105.2 | 0.1 | 103.9 | 0.4 | 98.6 | 1.7 |
| Kenya | 100.6 | 0.2 | 100.1 | 0.0 | 93.2 | 0.4 | 102.7 | 0.2 | 84.7 | 0.3 |
| Nigeria | 105.3 | 0.3 | 117.2 | 0.0 | 87.9 | 0.3 | 101.2 | 0.1 | 84.8 | 0.3 |
| Senegal | 96.5 | 0.1 | 110.4 | 0.0 | 87.9 | 0.3 | 101.5 | 0.1 | 92.7 | 0.2 |
| South Africa | 104.9 | 0.2 | 107.1 | 0.0 | 107.8 | 0.5 | 105.3 | 0.4 | 108.2 | 0.3 |
| Tanzania | 104.6 | 0.1 | 106.5 | 0.0 | 90.0 | 0.3 | 102.6 | 0.2 | 87.4 | 0.3 |
| Uganda | 109.2 | 0.2 | 115.9 | 0.0 | 93.2 | 0.4 | 101.9 | 0.1 | 84.3 | 0.3 |
| Zambia | 96.8 | 0.2 | 128.9 | 0.0 | 87.9 | 0.3 | 98.6 | 0.1 | 85.7 | 0.3 |

*Source:* Centennial Group International.

Table 6 **The Centennial Resilience Indices and their Elements for 2007**

| Country | 5. Bank Soundness Score | 5. Bank Soundness Standard Error | 6. Export Diversity Score | 6. Export Diversity Standard Error | 7. Export Independence Score | 7. Export Independence Standard Error | 8. External Robustness Score | 8. External Robustness Standard Error | 9. Private External Debt Score | 9. Private External Debt Standard Error | 10. Reserves Score | 10. Reserves Standard Error |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Brazil | 111.8 | 0.2 | 111.5 | 0.0 | 108.7 | 0.0 | 109.5 | 0.5 | 100.5 | 0.0 | 96.7 | 0.0 |
| Chile | 103.2 | 0.1 | 106.1 | 0.0 | 95.6 | 0.0 | 97.1 | 0.3 | 101.0 | 0.1 | 94.8 | 0.0 |
| Colombia | 105.4 | 0.1 | 92.5 | 0.0 | 107.5 | 0.0 | 100.9 | 0.1 | 103.4 | 0.1 | 94.5 | 0.0 |
| Costa Rica | 107.2 | 0.1 | 99.5 | 0.0 | 97.9 | 0.0 | 92.9 | 0.2 | 90.5 | 0.1 | 98.3 | 0.0 |
| Dominican Republic | 107.9 | 0.1 | 76.3 | 0.0 | 111.4 | 0.0 | 87.8 | 0.4 | 93.3 | 0.1 | 92.0 | 0.0 |
| Ecuador | 97.1 | 0.5 | 88.1 | 0.0 | 100.0 | 0.0 | 94.4 | 0.4 | 102.5 | 0.1 | 92.0 | 0.0 |
| Mexico | 111.2 | 0.2 | 68.2 | 0.0 | 101.7 | 0.0 | 97.5 | 0.2 | 98.3 | 0.0 | 93.6 | 0.0 |
| Panama | 103.6 | 0.1 | 91.2 | 0.0 | 111.7 | 0.0 | 81.8 | 0.8 | 48.1 | 0.7 | 94.5 | 0.0 |
| Peru | 106.6 | 0.1 | 104.4 | 0.0 | 102.0 | 0.0 | 108.5 | 0.4 | 94.5 | 0.1 | 104.1 | 0.0 |
| Uruguay | 104.9 | 0.1 | 109.2 | 0.0 | 105.3 | 0.0 | 101.4 | 0.2 | 105.4 | 0.1 | 99.3 | 0.0 |
| Venezuela | 110.3 | 0.2 | 78.7 | 0.0 | 100.0 | 0.0 | 108.0 | 0.2 | 112.4 | 0.2 | 95.1 | 0.0 |
| Middle East & North Africa | | | | | | | | | | | | |
| Bahrain | 102.1 | 0.1 | 113.7 | 0.0 | 84.5 | 0.0 | 99.0 | 0.7 | 68.3 | 0.6 | 105.3 | 0.0 |
| Egypt | 88.2 | 0.2 | 109.1 | 0.0 | 108.3 | 0.0 | 107.6 | 0.4 | 94.4 | 0.1 | 103.0 | 0.0 |
| Israel | 95.4 | 0.2 | 94.2 | 0.0 | 99.3 | 0.0 | 104.9 | 0.2 | 104.0 | 0.1 | 99.2 | 0.0 |
| Jordan | 107.3 | 0.3 | 99.6 | 0.0 | 99.3 | 0.0 | 96.2 | 0.3 | 101.2 | 0.1 | 113.7 | 0.0 |
| Lebanon | 96.9 | 0.3 | 101.2 | 0.0 | 108.9 | 0.0 | 103.7 | 0.4 | 103.5 | 0.1 | 118.3 | 0.0 |
| Morocco | 97.2 | 0.1 | 96.2 | 0.0 | 105.4 | 0.0 | 109.7 | 0.4 | 104.7 | 0.1 | 108.1 | 0.0 |
| Saudi Arabia | 110.4 | 0.3 | 104.4 | 0.0 | 88.5 | 0.0 | 131.2 | 0.9 | 93.1 | 0.2 | 130.7 | 0.0 |
| Tunisia | 91.1 | 0.1 | 92.4 | 0.0 | 96.7 | 0.0 | 102.3 | 0.2 | 104.3 | 0.1 | 101.2 | 0.0 |
| Sub-Saharan Africa | | | | | | | | | | | | |
| Botswana | 100.0 | 0.1 | 103.6 | 82.9 | 95.0 | 0.0 | 136.2 | 1.3 | 101.3 | 0.0 | 130.6 | 0.0 |
| Côte d'Ivoire | 96.0 | 0.1 | 105.8 | 0.0 | 95.9 | 0.0 | 100.7 | 2.5 | 99.5 | 0.1 | 96.4 | 0.0 |
| Ethiopia | 98.7 | 0.2 | 109.8 | 0.0 | 111.3 | 0.0 | 102.9 | 0.7 | 105.5 | 0.1 | 92.3 | 0.0 |
| Ghana | 109.1 | 0.2 | 112.3 | 0.0 | 100.8 | 0.0 | 90.3 | 0.2 | 105.2 | 0.1 | 99.5 | 0.0 |
| Kenya | 105.7 | 0.1 | 109.6 | 0.0 | 107.5 | 0.0 | 97.7 | 0.1 | 105.2 | 0.1 | 95.7 | 0.0 |
| Nigeria | 109.0 | 0.5 | 86.6 | 0.0 | 96.4 | 0.0 | 121.7 | 0.6 | 106.2 | 0.1 | 107.5 | 0.0 |
| Senegal | 96.1 | 0.1 | 102.6 | 0.0 | 107.3 | 0.0 | 95.1 | 0.2 | 96.4 | 0.1 | 97.7 | 0.0 |
| South Africa | 101.1 | 0.2 | 111.6 | 0.0 | 102.7 | 0.0 | 93.1 | 0.2 | 85.3 | 0.2 | 94.9 | 0.0 |
| Tanzania | 103.9 | 0.1 | 113.0 | 0.0 | 108.5 | 0.0 | 99.5 | 0.2 | 105.3 | 0.1 | 99.3 | 0.0 |
| Uganda | 113.6 | 0.2 | 107.6 | 0.0 | 108.0 | 0.0 | 104.4 | 0.3 | 101.4 | 0.1 | 102.0 | 0.0 |
| Zambia | 108.5 | 0.2 | 89.3 | 0.0 | 95.2 | 0.0 | 92.8 | 0.2 | 107.5 | 0.1 | 94.3 | 0.0 |

*Source:* Centennial Group International.

much of their resilience in 2009.

Table 6 and Figure 7 present the resilience indices and their elements for the individual countries in the sample for 2007, the year prior to the external shock. It is possible to see that different strengths contribute to the highest resilience indices, and vice versa. For example, while for Chile most of the elements contributed roughly equally to the strength of its resilience, for PRC and Russia, the index suggests that their resilience derives primarily from fiscal policy soundness, external robustness, and international reserves. For Brazil, the key elements are bank soundness and export robustness. For India, they are large and stable domestic consumption, export independence, external robustness, and conservative banking practices. For Malaysia and Singapore, they are government effectiveness, external robustness, and international reserves. And for Uruguay, governance, private sector external indebtedness, and bank soundness are key. By contrast, despite their strong fiscal policy soundness, Latvia's and Romania's resilience was lowered mainly by the growing private sector external indebtedness and low external robustness. Similarly, Mexico's resilience was considerably reduced by the large concentration of exports to the US and internal market rigidities, despite strong fiscal policy and bank soundness; Viet Nam's resilience was low despite relatively sound fiscal and monetary policies and high international reserves.

Over the past twelve years, all regions have improved their resilience scores, with a temporary dip in 2008 (see Figures A61 – A71). Until 2004, Asia and the Middle East and North Africa shared the highest scores in the index and trended in the same direction. But since 2004, the Middle East has outperformed even Asia, in addition to the others. The laggard throughout the past twelve years has been Latin America, which has trailed all other regions. Emerging Europe and Sub-Saharan Africa have been trending upward, but their resilience scores remain below average.

Figure 8 shows the Asian countries' distance from the mean 2009 resilience score in terms of standard deviations. The majority of the Asian countries in the sample have above average resilience scores. Figures 9 through 24 show how each Asian country's resilience index elements compare to the 2009 means for those elements, also in terms of standard deviations. These measurements can be used to determine the areas in which countries are succeeding or lagging.

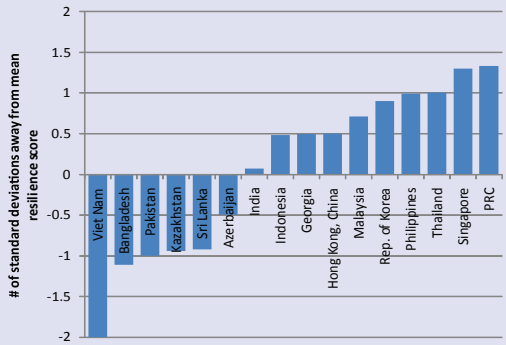
The index results for PRC raise a number of interesting questions. The overall score is above average, as one would expect, and it is bolstered by relatively very high scores for reserves and external robustness. However, the extremely large build-up of reserves may have other costs not captured by the Index – and may not be sustainable; similarly, the measure of external robustness may reflect, in part, an unsustainable current account position. In contrast, PRC's capacity to implement policies is recognized by many as exceptionally strong. But that is not fully reflected in some of the other elements included in the Index, such as those for government effectiveness. Similarly, the scores on banking soundness pull down the overall index measure. Further work is needed to determine if the way in which some of the elements are constructed and measured fully captures the strengths of a system like PRC's that differs in many ways from the systems in which, and for which, many of the underlying measures were developed.

## V. The Resilience Index's Application to the Crisis

Does the Centennial Resilience Index help explain why the rebound in growth in the wake of the crisis, as measured by the actual economic growth for the individual countries since late 2009 or early 2010,[10] has

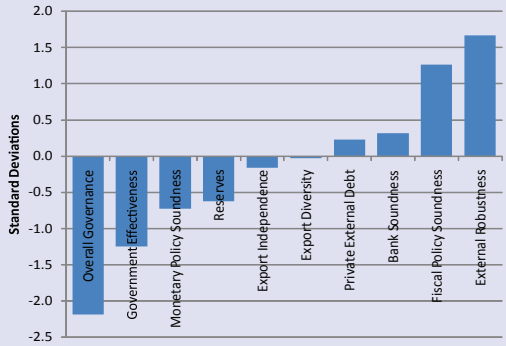
10 This is measured as the annualized growth rate for the two quarters following the first four quarters that began with the onset of the crisis in each country. In this paper, those two quarters are referred to as the "recovery" or "post-crisis" period. The four quarters that began with the onset of the crisis in each country are referred to as the "during-crisis" period. The four quarters before the during-crisis period are termed the "pre-crisis" period. For 12 of the countries—Argentina, Azerbaijan, Jordan, Kazakhstan, Lithuania, Peru, the Philippines, Russia, South Africa, Uruguay, Venezuela, and Viet Nam—the during-crisis period was defined as 2009 Q1 to 2009 Q4 and the second period as 2010 Q1 to 2010 Q2. For 26 countries—Brazil, Chile, PRC, Colombia, Costa Rica, Czech Republic, Ecuador, Hong Kong, China, Hungary, India, Indonesia, Israel, Kenya, Republic of Korea, Latvia, Malaysia, Mexico, Morocco, Nigeria, Poland, Romania, Singapore, Slovakia, Slovenia, Thailand, and Turkey—the during-crisis period was defined as 2008 Q1 to 2009 Q3 and the second period as 2009 Q4 to 2010 Q1. Data was not available for the other 20 countries.

Figure 8 **Resilience Index: Deviation from the Mean**



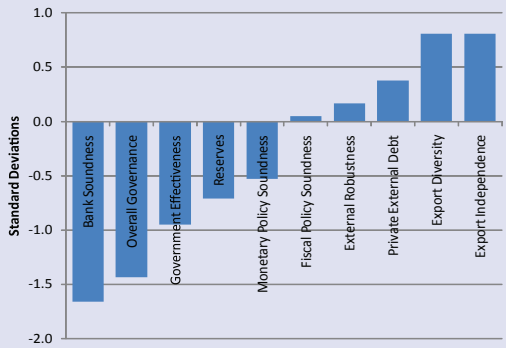

*Source:* Centennial Group International.

Figure 9 **Azerbaijan: Elements' Deviation from the Mean**



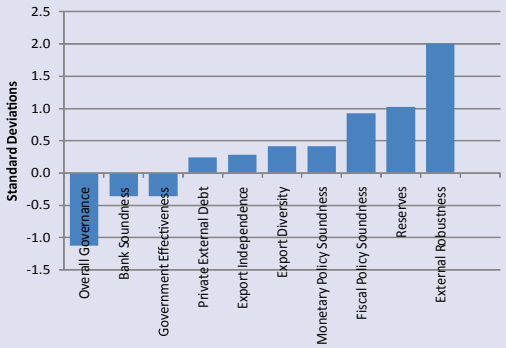

*Source:* Centennial Group International.

Figure 10 **Bangladesh: Elements' Deviation from the Mean**



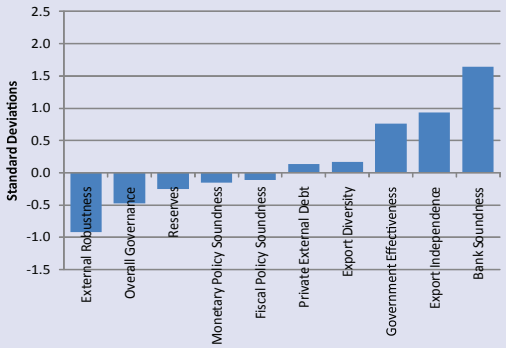

*Source:* Centennial Group International.

Figure 11 **PRC: Elements' Deviation from the Mean**



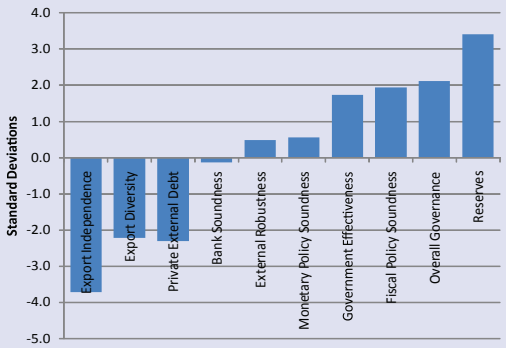

*Source:* Centennial Group International.

Figure 12 **Georgia: Elements' Deviation from the Mean**



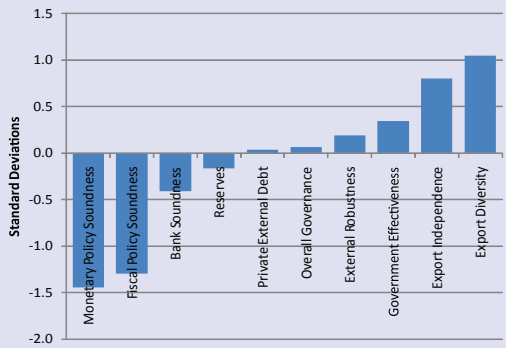

*Source:* Centennial Group International.

Figure 13 **Hong Kong, China: Elements' Deviation from the Mean**



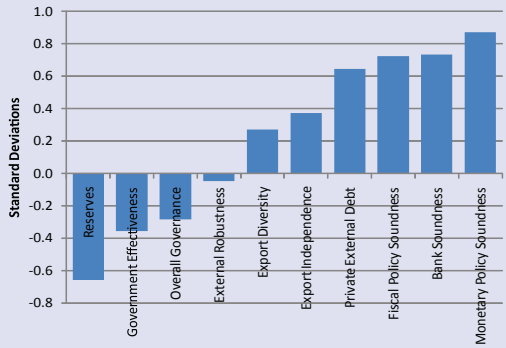

*Source:* Centennial Group International.

Figure 14 **India: Elements' Deviation from the Mean**



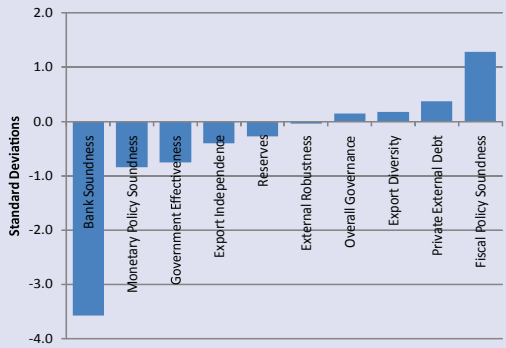

*Source:* Centennial Group International.

Figure 15 **Indonesia: Elements' Deviation from the Mean**



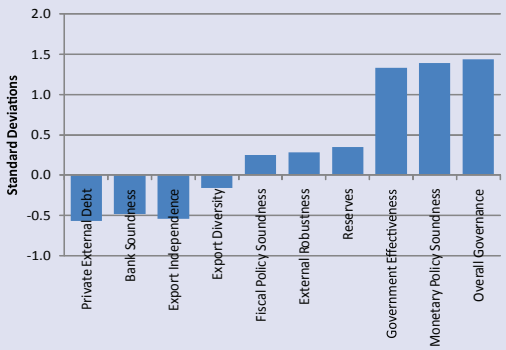

*Source:* Centennial Group International.

Figure 16 **Kazakhstan: Elements' Deviation from the Mean**



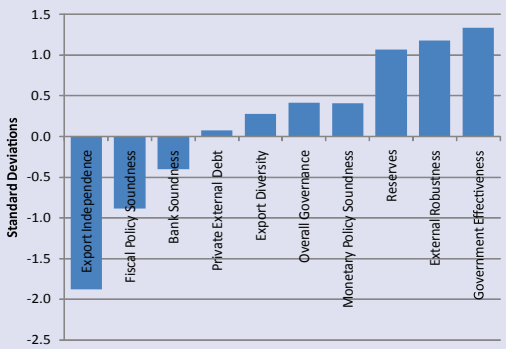

*Source:* Centennial Group International.

Figure 17 **Republic of Korea: Elements' Deviation from the Mean**



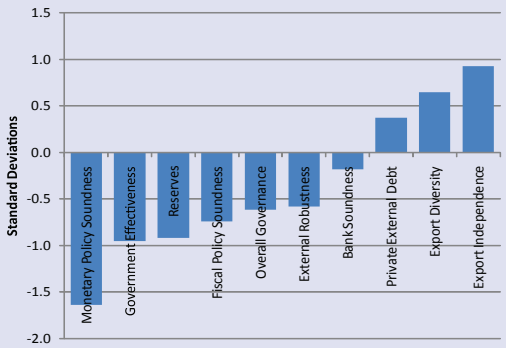

*Source:* Centennial Group International.

Figure 18 **Malaysia: Elements' Deviation from the Mean**



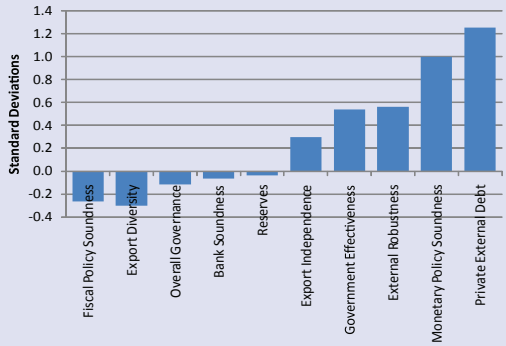

*Source:* Centennial Group International.

Figure 19 **Pakistan: Elements' Deviation from the Mean**



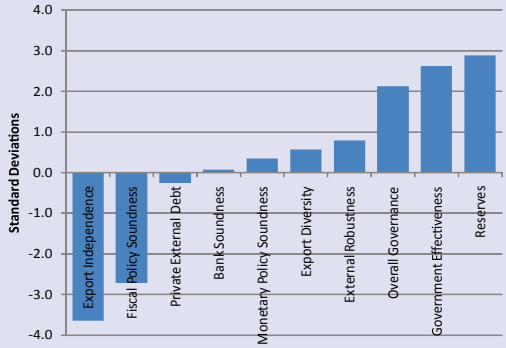

*Source:* Centennial Group International.

Figure 20 **Philippines: Elements' Deviation from the Mean**



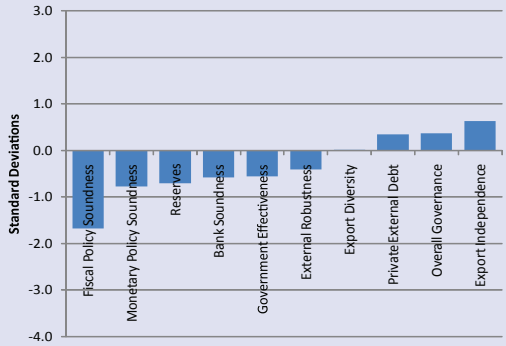

*Source:* Centennial Group International.

Figure 21 **Singapore: Elements' Deviation from the Mean**



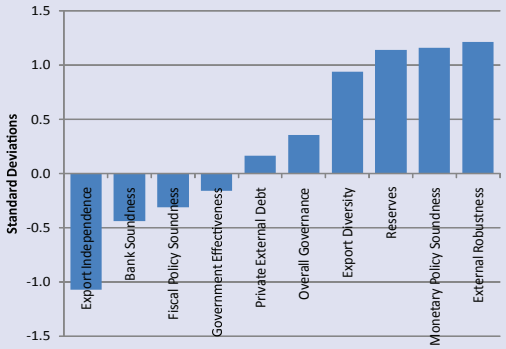

*Source:* Centennial Group International.

Figure 22 **Sir Lanka: Elements' Deviation from the Mean**



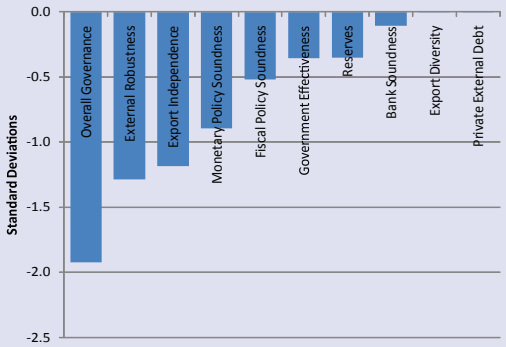

*Source:* Centennial Group International.

Figure 23 **Thailand: Elements' Deviation from the Mean**




*Source:* Centennial Group International.

Figure 24 **Viet Nam: Elements' Deviation from the Mean**




*Source:* Centennial Group International.

varied across EMCs? This will be one key test of the usefulness of the index. Some of these countries have grown very fast and are expected to grow at around 10 percent annually in 2010 and 2011 while others are expected to register barely any growth. Thus, in an attempt to link the recovery that followed the shock to the countries' resilience as measured by the Centennial Resilience Index, we first regress the average annualized growth rate during the two-quarter recovery period[10] as a function of the Resilience Index of 2007 (i.e., just prior to the crisis), as shown in Table 7 and Figure 25. In this regression, illustrated by Figure 25, the coefficient for the index is quite robust, significant at the 99 percent level, and the R-squared indicates that the index alone explains some 45 percent of the variation in the rate of real GDP growth. Moreover the coefficient of the index suggests that raising a country's index by one point would lead to an increase of nearly one half of one percent in real GDP growth in the period following the crisis.

In the second regression, we added the real GDP growth rate during the crisis[10] as an explanatory variable. During a crisis, one would be able to use this information in addition to the resilience index to predict post-crisis growth. Its coefficient is significant at the 99 percent level, while the coefficient for the Index remains significant at the same level. Here, an increase in the resilience index of one point is associated with an increased recovery growth rate of over one third of a percentage point. Although the latter coefficient is somewhat lower than in the previous regression, the explanatory power of this regression increases: now the model explains almost two thirds of the variation in the recovery-period real GDP growth.

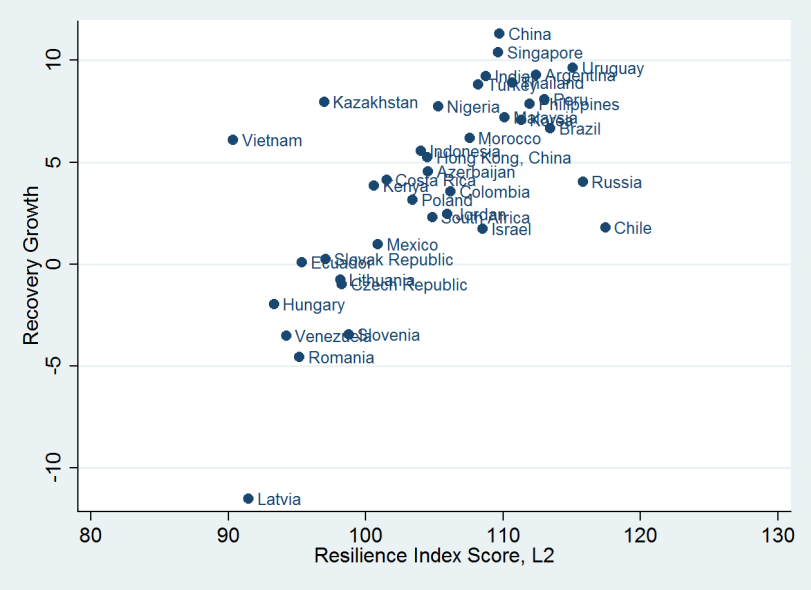
In the third regression, we add the monetary stimulus (as measured by the change in the ratio to GDP of credit to the private sector in 2009) and the pre-crisis growth. The explanatory power of this regression increases further, to 80 percent, while the resilience coefficient suggests that an increase of one point in the index is associated with an increased post-crisis GDP growth of a country of almost half of one percent. The coefficients for the resilience index, for the during-crisis growth, and for the monetary stimulus are robust, significant at the 99 percent level. We include the pre-crisis growth rate among the explanatory variables both to test that it is not significant as a predictor of post-crisis growth and as a point of comparison for the next set of regressions, in which it is included. Although not shown, a regression using pre-crisis growth as a second explanatory variable in addition to only resilience also shows that pre-crisis growth is not significant as a predictor of post-crisis growth.

This regression also shows the positive relationship between monetary expansion and post-crisis growth. We have also tried to add the fiscal stimulus (as measured by the change in the ratio to GDP of the government's total expenditure) but its coefficient was not significant. This is a puzzling result; perhaps it reflects the limited available time series of data for the recovery period (two quarters), which may be too short a period for the effects of the stimulus packages to materialize, given the typical lags in the effects of macroeconomic policy actions.

For the second set regressions (4 through 7), the dependent variable is defined as the difference between the average real GDP growth rate for the two quarters after the crisis and the average growth rate for the four quarters before the crisis. Although the regressions lose some explanatory power, they remain robust. As shown in regression 4, using the resilience index as a sole independent variable explains about 30 percent of the variation in the change in growth. Here, an increase of one point in the resilience score corresponds to an increase, relative to pre-crisis growth, of over a third of a point in post-crisis real GDP growth.

Adding the pre-crisis growth as a second explanatory variable (regression 5) increases the explanatory power of the model, which now explains about 43 percent of the variation in the difference between post- and pre-crisis growth. The resilience coefficient remains robust, significant at the 99 percent level, and suggests that an increase of a country's resilience index by one point is associated with an increase of over four-tenths of a

Figure 25 **GDP Growth after the Crisis and the Centennial Resilience Index**




*Source:* Centennial Group International.

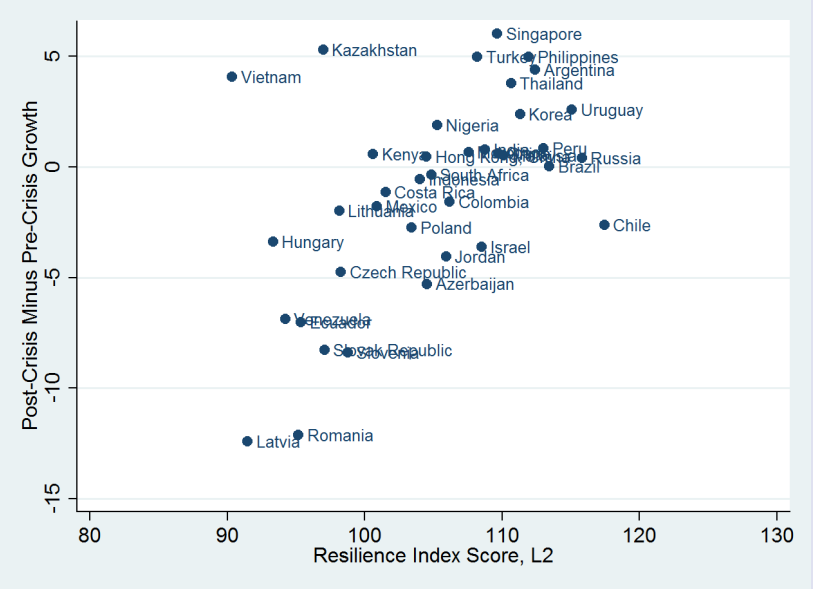
Table 7 **GDP Growth after the Crisis: Regressions**

| | Regression 1 | Regression 2 | Regression 3 |
|---|---|---|---|
| *Resilience Score* | .455*** | .377*** | .444*** |
| | (.084) | (.071) | (.069) |
| *Pre-Crisis Growth* | — | — | -.260 |
| | | | (.261) |
| *During-Crisis Growth* | — | .422*** | .521*** |
| | | (.098) | (.112) |
| *Private Credit Expansion* | — | — | .204*** |
| | | | (.072) |
| Number of observations | 38 | 38 | 30 |
| Adj R-squared | .435 | .620 | .768 |
| R-squared | .450 | .641 | .801 |

Notes: Standard errors shown in parentheses. All regressions include a constant term. The dependent variable is the annualized growth rate for the two quarters that followed the first four quarters that began with the onset of the crisis in the country (see footnote 10). Resilience Score is the value of the overall Resilience Index in the year 2007. During-Crisis Growth is the annualized growth rate during the first four quarters that began with the onset of the crisis in the country. Pre-Crisis Growth is the annualized growth rate for the four quarters that preceded the during-crisis period. Private Credit Expansion is the difference between the ratios in 2008 and 2009 of private credit by deposit money banks to GDP. Country data availability for these regressions and and the timing of the pre-crisis, during-crisis, and post-crisis periods for each country are given in footnote 10. Azerbaijan, Costa Rica, Ecuador, Kazakhstan, Lithuania, Slovak Republic, Slovenia, and Turkey were included in the first two regressions but excluded from the third because their 2009 data for private credit from deposit money banks was not yet available.

***Significant at the 1% level.

Figure 26 **Difference between pre- and post- Crisis GDP Growth**




*Source:* Centennial Group International.

Table 8 **GDP Growth after the Crisis minus GDP Growth before the Crisis: Regressions**

| | Regression 4 | Regression 5 | Regression 6 | Regression 7 |
|---|---|---|---|---|
| *Resilience Score* | .346*** | .412*** | .372*** | .422** |
| | (.089) | (.084) | (.068) | (.067) |
| *Pre-Crisis Growth* | — | -.733*** | -1.278*** | -1.185*** |
| | | (.254) | (.236) | (.250) |
| *During-Crisis Growth* | — | — | .487*** | .504*** |
| | | | (.107) | (.107) |
| *Private Credit Expansion* | — | — | — | .193** |
| | | | | (.069) |
| Number of observations | 38 | 38 | 38 | 30 |
| Adj R-squared | .276 | .399 | .614 | .709 |
| R-squared | .296 | .431 | .646 | .749 |

Notes: Standard errors shown in parentheses. All regressions include a constant term. The dependent variable is the difference between the post-crisis and pre-crisis growth rates, defined as follows: The post-crisis growth rate is the annualized rate for the two quarters (post-crisis period) that followed the first four quarters (during-crisis period) that began with the onset of the crisis in the country (see footnote 10). The pre-crisis growth rate is the annualized rate for the the four quarters that preceded the during-crisis period. Resilience Score is the value of the overall Resilience Index in the year 2007. During-Crisis Growth is the annualized growth rate for the above-mentioned during-crisis period. Pre-Crisis Growth is the growth rate for the above-mentioned pre-crisis period. Private Credit Expansion is the difference between the ratios in 2008 and 2009 of private credit by deposit money banks to GDP. Country data availability for these regressions and and the timing of the pre-crisis, during-crisis, and post-crisis periods for each country are given in footnote 10. Azerbaijan, Costa Rica, Ecuador, Kazakhstan, Lithuania, Slovak Republic, Slovenia, and Turkey were included in the first two regressions but excluded from the third because their 2009 data for private credit from deposit money banks was not yet available.

**Significant at the 5% level; ***Significant at the 1% level.

percent in the change in GDP. Note that the coefficient for pre-crisis growth here, also significant, is negative. This suggests that in the sample of countries considered, those countries that grew faster than others before the crisis experienced a sharper drop in post-crisis growth relative to their pre-crisis levels..

The sixth regression, similar to the fifth, adds during-crisis growth (defined in footnote 10) as an explanatory variable. As before, the resilience coefficient and pre-crisis growth coefficient are significant at the 99 percent level, as is the coefficient for the during-crisis growth. As in regression 5, the coefficient for the pre-crisis growth is negative, suggesting that, on average, the countries that grew faster before the crisis experienced, after the crisis, larger falls relative to their pre-crisis levels. And as in regression 2 and 3, the coefficient for the during-crisis growth is significant and positive, showing that the better countries did during the crisis, the better they did after the crisis. The explanatory power of this sixth model jumps further compared to the previous two regressions for this dependent variable: This model explains almost two-thirds of the variation in the difference between post- and pre-crisis real GDP growth.

In the last regression, as in regression 3, we add the monetary expansion, which is also significant at the 99 percent level. The explanatory power of this model rises further: it explains about 75 percent of the change in growth. The coefficient for the resilience score is also strong: here, a one-point increase in the index corresponds to an increase in GDP growth, relative to the pre-crisis growth rate, of about .42 percent after the crisis.

## VI. Conclusion

Perhaps the most important conclusion of this study is that the significant reforms introduced in many emerging market countries in the wake of the crises of the 1990s and early 2000s have paid significant dividends. And these dividends have redounded not only to those economies but to the global system. Without such reforms, the capacity of many of the EMCs to confront the challenges posed by the current crisis would have been much weaker. In turn, the significant contributions made by the EMCs to stabilizing the global economy and bolstering the strength of the global recovery would also have been much weaker.

This experience has opened a new chapter in the role of the EMCs in the global system. In the past, a shock wave from the advanced economies typically hit the shores of the emerging market and developing countries, with significant negative impact on their economies. As waves are carried back across the seas, the weakening of the EMCs from the initial shock redounded back to aggravate the slowdown in the more developed economies. Another self-aggravating dynamic of crises! However, that dynamic appears now to be much more limited, or even reversed. The new policy capacities of the EMCs allows them to absorb the shock and even to counter and help reverse the global impact of the original disturbance in the more developed world.

The Resilience Index developed for this paper helps explain and quantify the forces behind this new reality. It should help provide guidance both to the EMCs that have already made significant strides in strengthening their economies as well as to those lagging in such reforms. Further work may help to better identify those particular areas in which the greatest return can be expected from further reform efforts.

This happy story helps explain the significant contribution of the EMCs to moderating the global impact of the financial crisis and helping to spur the recovery. However, much remains to be done. While many of the EMCs – especially the largest ones – have recovered to near their pre-crisis rates of growth, the underlying imbalances in the global system are reappearing. Thus, while the strength of their contribution to the global recovery is to be welcomed, the reemergence of unsustainable imbalances is surely problematic. Together with other developments, these imbalances are manifesting themselves in exchange rate tensions that, if left uncorrected, could threaten the recovery.

## Appendix I

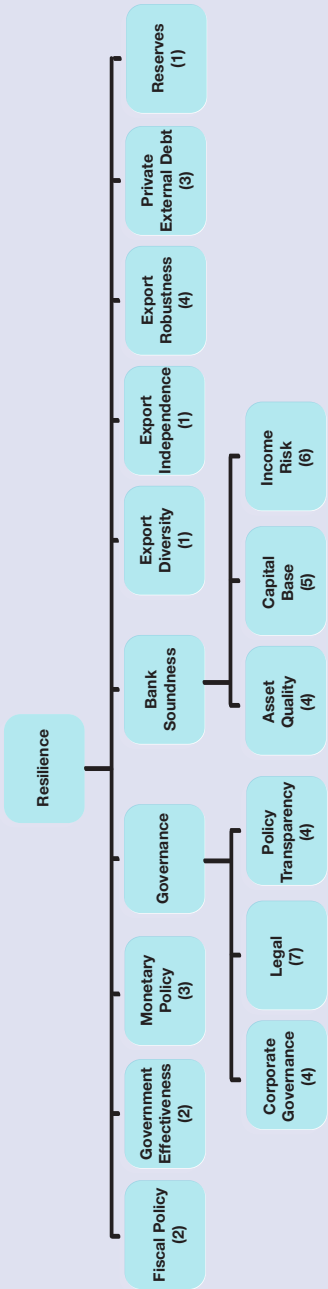
As shown in the diagram on the next page, the Resilience index is calculated by aggregating ten subindices known as elements, each of which aggregates underlying variables. In the diagram, the number in parentheses states how many underlying variables are used to compute that element. (Where there is no number in parentheses, that element equals the average of the sub-elements beneath it, which have been normalized.)

Unless there is only one variable in an element, factor analysis is used to generate the score. The data sample for which scores are calculated and later analyzed (59 countries from 1997–2009) is the same as the sample used to generate the factors. We use the principal-component factor method to identify the unobserved latent variables, with the constraint that the factor analysis should not use more than two such factors. Then, except in the case of income risk, we perform a varimax rotation. We then drop the second factor and take the first factor to be our score for the element.

We also generate standard errors for each measurement so that users may identify which differences in scores are meaningful and which are not. For all of these, we use a maximum-likelihood factor analysis, a varimax rotation, and a bordered information matrix with analytic derivatives. These standard errors incorporate two uncertainties: The first reflects our imperfect estimates to fill in missing data. The second reflects how well the factor model fits the indicators: this derives from the intrinsic problem, even with perfect data, of measuring such difficult-to-pin-down concepts as resilience on a single numerical scale with necessarily imperfect indicators.

For a more detailed explanation of the statistical methodology and coding, see the Centennial Index of Financial Development and Strength, from which these are taken.[11]

Figure A1 **Structure of the Resilience Index**




(Numbers in parentheses indicate how many variables (components) of raw data go into each element.)

11 Sundararajan, V. S., H. A. Kohli, C. Loser, H. Kohli, & A. Goldstein. (2008). "Centennial Group and Emerging Markets present The 2008 FDS Index: Index of Financial Development and Stability." Emerging Markets Newspaper, Euromoney, 2008/10/10.

Kohli, H. (2009). "Centennial Group & Emerging Markets present The 2009 FDS Index: Index of financial development & strength." Emerging Markets Newspaper, Euromoney, 2009/10/06.

Kohli, H. A., V. S. Sundararajan, et al. (2012). Unpublished. "An Index of Financial Development: Measuring and Comparing Financial Depth, Efficiency, and Openness Across Countries and Years."

## Box A1 Resilience Index Variables and Sources (Sorted by Element)

*Abbreviations for data sources*

| | |
|---|---|
| BIS | BIS Quarterly Review |
| BKSC | Bankscope |
| CBI | Central Bank of Iceland: "New Inflation Targeting Countries" |
| CIRI | Cingranelli Richards Human Rights Database |
| DB | Doing Business |
| DOT | IMF's Direction of Trade Statistics |
| EIU | Economist Intelligence Unit |
| ERF | Economic Research Forum: Working Paper 395 |
| EST | Centennial Estimate |
| EV | Econviews |
| FHFP | Freedom House's Freedom of the Press |
| FIEFW | Fraser Institute's's Economic Freedom of the World |
| FSD | World Bank's "A New Database on Financial Development and Structure" |
| GFSR | IMF's Global Financial Stability Report |
| GIBR | Global Insight Business Risk and Conditions |
| HBSB | Harvard Business School Case: "Brazil 2003: Inflation Targeting & Debt Dynamics" |
| HF | Heritage Foundation's Index of Economic Freedom |
| IAERTR | International Advances in Economic Research: "Taylor Rule in Practice: Evidence from Turkey " (2008) |
| IFS | IMF's International Financial Statistics |
| IMFDSBB | IMF's Dissemination Standards Bulletin Board |
| IMFFX | IMF's Classification of Exchange Rate Arrangements and Monetary Frameworks |
| IMF267 | IMF's Occasional Paper 267 |
| IMFS | IMF Survey Magazine |
| IRAE | International Review of Applied Economics: J. Jim (2008) |
| ITK | Yangu: Inflation Targeting in Kenya? |
| JMIB | Journal of Money, Investment, & Banking 2009: "Is Nigeria Ready for Inflation Targeting?" |
| PAC | Packard 2007: "Monetary Policy in Viet Nam" |
| PRS | Political Risk Services |
| RJEF | Romanian Journal of Economic Forecasting: Daianu & Kallai (2008) |
| ROU | Roubini Global Economics |
| SG | Siregar & Goo 2008: "Inflation Targeting Policy" |
| TI | Transparency International |
| WBBR | World Bank's Banking Regulation Survey |
| WDI | World Bank's World Development Indicators |
| WEO | IMF's World Economic Outlook (April 2010) |
| WGI | Worldwide Governance Indicators |

* / ** indicates that a log transformation was applied to the variable: * represents $\log_{10}(1+x)$ and ** represents $\log_{10}(x)$

**Fiscal Policy Soundness**

- WEO, EIU, IFS, WDI, & EST: Public debt to GDP*
- WEO, EIU, IFS, WDI, & EST: Change in Ratio of Public debt to GDP (Average over past 3 years)*

**Government Effectiveness**

- PRS: Score for Bureaucratic Quality, as calculated by the WGI for their Government Effectiveness subindex
- GIBR: Average of 2 scores: Policy Consistency/Forward Planning and Bureaucracy, as calculated by the WGI, as above

**Monetary Policy**

- WEO & EV: Inflation (Year-End CPI) minus the Average Inflation in G7 Countries*
- WEO & EV: Standard Deviation of Inflation (Year-End CPI) over past 3 years*
- IMFS, IMF267, ITK, CBI, HBSB, PAC, IRAE, SG, RJEF, ROU, ERF, IAERTR, IMFFX, & EST: Is the country inflation targeting?

**Corporate Governance**

- WBBR: Sum of 2 questions: Must Banks Disclose Their Risk Management Procedures or Off-Balance Sheet Items to the Public?
- WBBR: Do Regulations Require Credit Ratings for Commercial Banks?
- DB: Credit Depth of Information Index
- FHFP: Sum of two Press Freedom Indicators: Economic Environment and Political Environment
- WBBR: Are the Following Bank Activities Rated? Bonds Issuance, Commercial Paper Issuance, Other activity (Certificates of Deposit, Pension & Mutual Funds, Insurance Companies, Financial Guarantees, etc)

## Box A1 Resilience Index Variables and Sources (Sorted by Element)

**Legal**
- GIBR: Red Tape & Bureaucratic Corruption score, as calculated by WGI for their Corruption sub-index
- GIBR: Average of 2 scores: Business Legislation & Tax Effectiveness, as calculated by WGI for their Regulatory Quality sub-index
- GIBR: Average of 2 scores: Judicial Independence & Business Crime Risk, as calculated by WGI for their Rule of Law sub-index
- CIRI: Independence of Judiciary
- DB: Legal Rights of Borrowers and Lenders Index
- HF: Property Rights
- FIEFW: Legal Structure and Security of Property Rights
- DB: Sum of two Doing Business Indicators: Shareholder Suits & Director Liability

**Policy Transparency**
- TI: Corruption Perceptions Index
- FHFP: Laws & Regulations Influence on Media Content
- IMFDSBB: Does the country subscribe to the IMF's Special or General Data Dissemination Standards

**Asset Quality**
- BKSC, GFSR, & WDI: Bank Nonperforming Loans to Total Loans*
- BKSC: Impaired Loans to Equity*
- BKSC, GFSR, & WDI: Bank Nonperforming Loans Net of Provisions to Total Loans* (floor set at -20%)
- BKSC, GFSR: Impaired Loans Net of Provisions to Equity* (floor set at -20%)

**Capital Base**
- WBBR: Does accrued, though unpaid, interest/principal enter the income statement while the loan is still non-performing?
- BKSC: Equity to Total Assets*
- BKSC: Equity to Net Loans*
- BKSC: Equity to Liabilities*
- BKSC: Equity to Deposits and Short-Term Funding*

**Income Risk**
- FSD, GFSR, & BKSC: Bank Return on Assets
- BKSC: Pre-Tax Operating Income to Average Assets*
- BKSC: Other Operating Income to Average Assets*
- BKSC: Net Interest Revenue to Average Assets*
- BKSC: Interest Margin to Gross Income*
- FSD & BKSC: Net Interest Margin (Accounting value of bank's net interest revenue as a share of its interest-bearing assets)*

**Export Diversity**
- DOT & EST: Coefficient of Variation of Export Shares by Destination

**Export Independence:**
- IFS & WEO: Exports to GDP*

**External Robustness**
- WEO: Current Account Balance to GDP*
- BIS, IFS, & EST: Reserves to Short-Term Debt**
- IFS & EIU: Import Cover: Total Reserves Minus Gold to Months of Imports**
- IMFFX, WEO: Measure of Exchange Rate Regime's Ability to Weather Crisis (Exchange Rate Regime adjusted for Reserves)

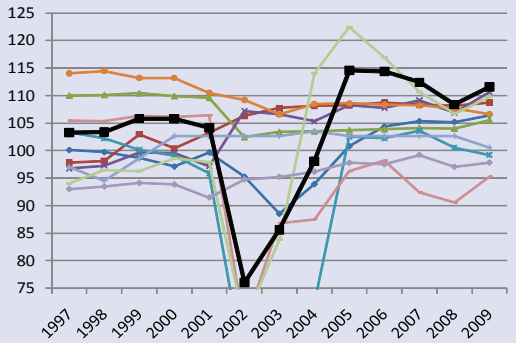
**Private External Debt**
- BIS & WEO: Change Over 3 Years in the Ratio of Total Foreign Claims of BIS-Reporting Banks to GDP* (floor set at -20%)
- BIS & WEO: Total Foreign Claims of BIS-Reporting Banks to GDP*
- BIS, IFS, & EST: Change Over 2 Years in the Ratio of Loans from BIS-Reporting Banks to Private Credit by Domestic Deposit Money Banks* (floor of -20%)

**Reserves**
- IFS, WEO, & EIU: Total Reserves Minus Gold to GDP*

Note: A two-year moving average was applied to all Asset Quality, Capital Base, and Income Risk variables.A three-year moving average was applied to the first and third Private External Debt variables.
Note: The types of financial firms included in the Bankscope search criteria used for for all Bankscope data are Commerical Banks, Savings Banks, Cooperative Banks, Real Estate and Mortgage Banks, Islamic Banks, Other Non-Banking Credit Institutions, Micro-Financing Institutions, and Credit Card, Factoring, and Leasing Finance Companies.

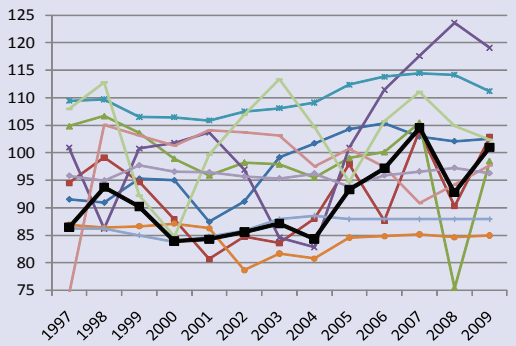
## Annex A | Resilience Index and Element Scores by Country over Time

### Figure A2 | Argentina



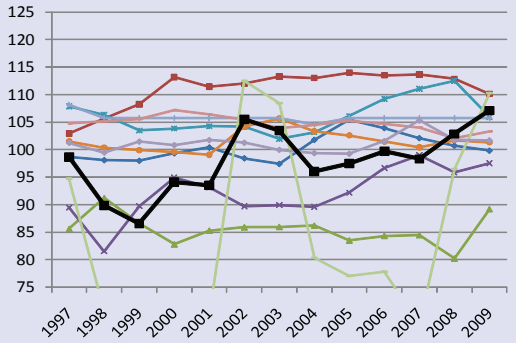

*Source:* Centennial Group International.

### Figure A3 | Azerbaijan



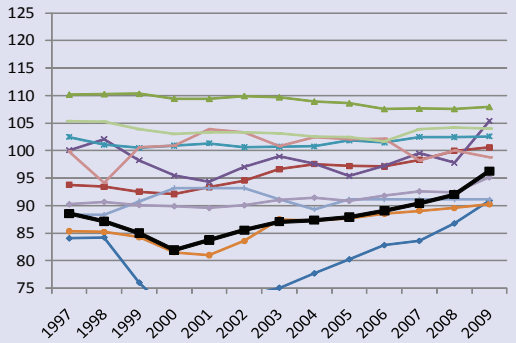

*Source:* Centennial Group International.

### Figure A4 | Bahrain



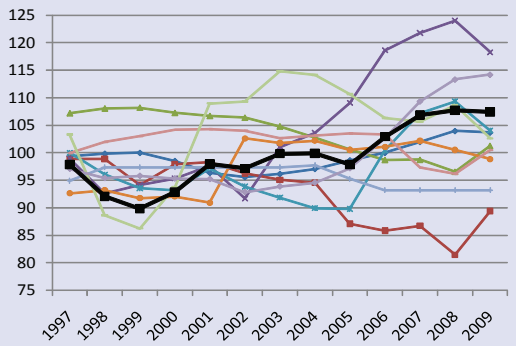

*Source:* Centennial Group International.

### Figure A5 | Bangladesh



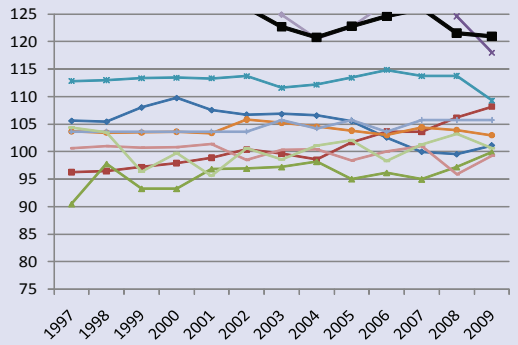

*Source:* Centennial Group International.

### Figure A6 | Bolivia



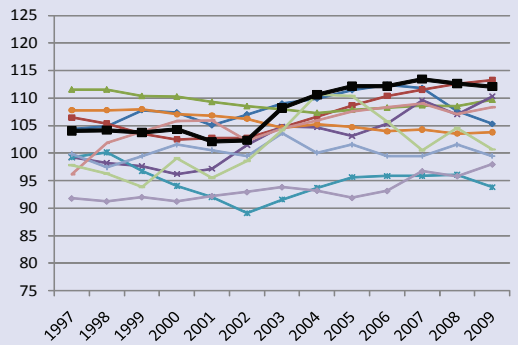

*Source:* Centennial Group International.

Figure A7 **Botswana**



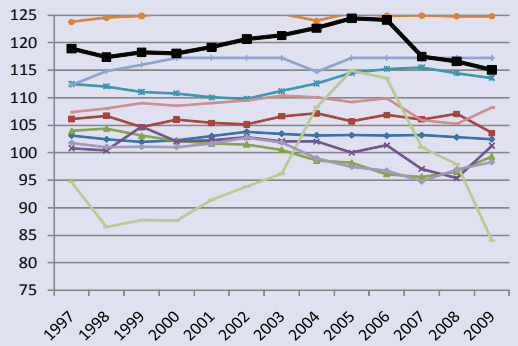

*Source:* Centennial Group International.

Figure A8 **Brazil**



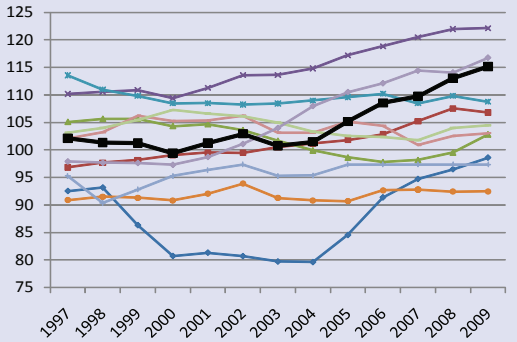

*Source:* Centennial Group International.

Figure A9 **Chile**



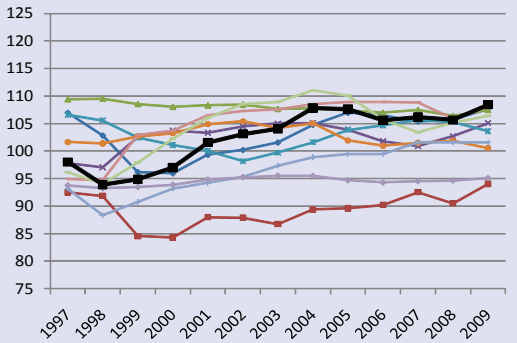

*Source:* Centennial Group International.

Figure A10 **PRC**



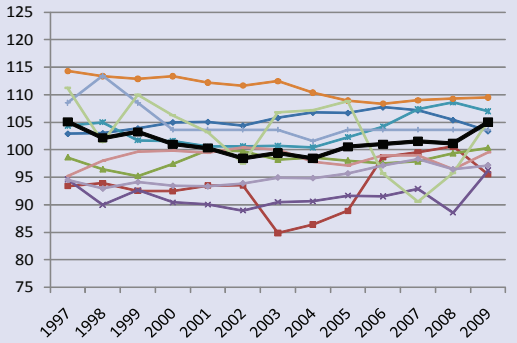

*Source:* Centennial Group International.

Figure A11 **Colombia**



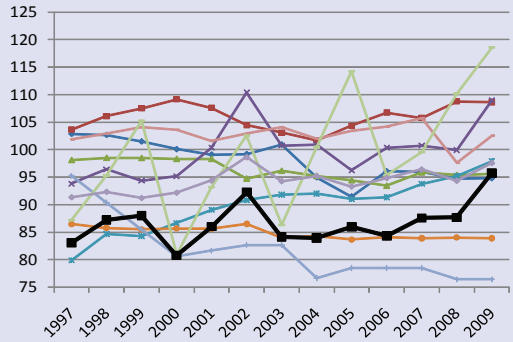

*Source:* Centennial Group International.

Figure A12 **Costa Rica**



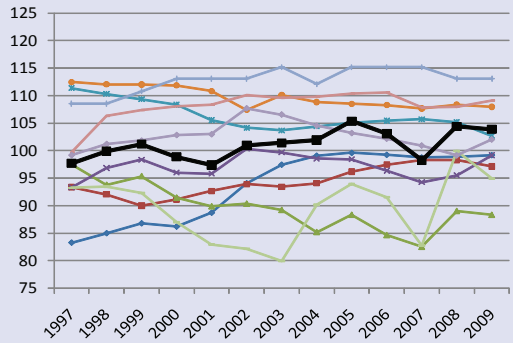

*Source:* Centennial Group International.

Figure A13 **Côte d'Ivoire**



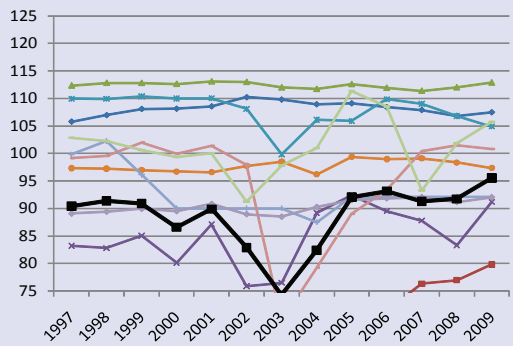

*Source:* Centennial Group International.

Figure A14 **Czech Republic**



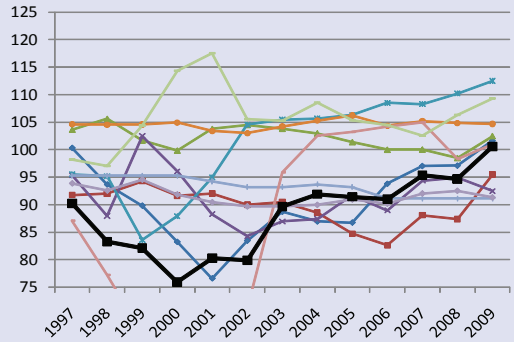

*Source:* Centennial Group International.

Figure A15 **Dominican Republic**



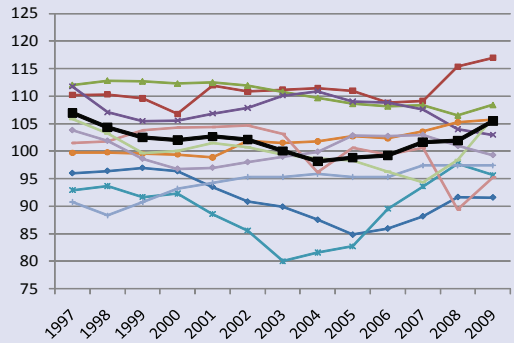

*Source:* Centennial Group International.

Figure A16 **Ecuador**



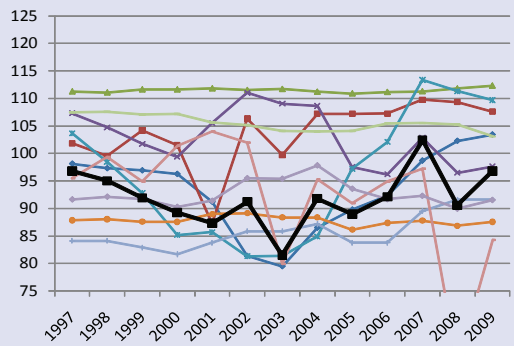

*Source:* Centennial Group International.

Figure A17 **Egypt**



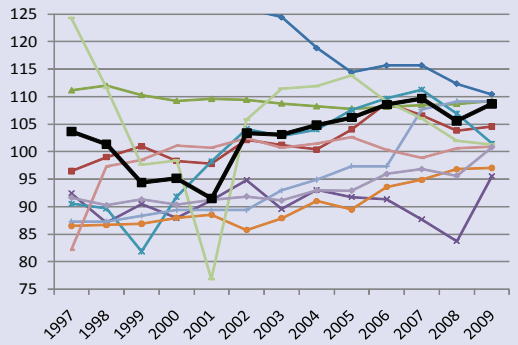

*Source:* Centennial Group International.

Figure A18 **Ethiopia**



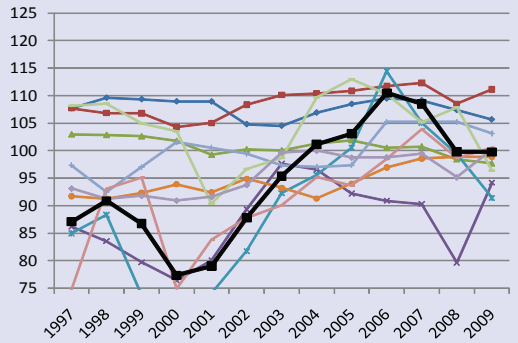

*Source:* Centennial Group International.

Figure A19 **Georgia**



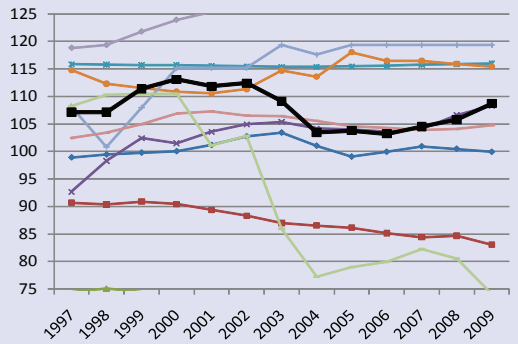

*Source:* Centennial Group International.

Figure A20 **Ghana**



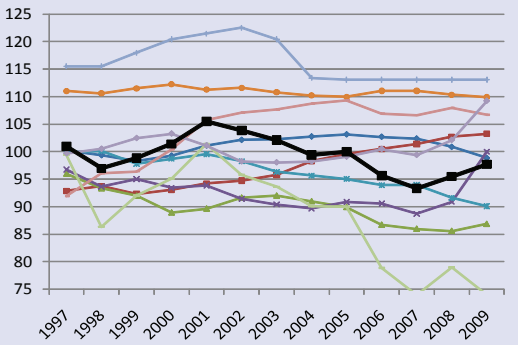

*Source:* Centennial Group International.

Figure A21 **Hong Kong, China**



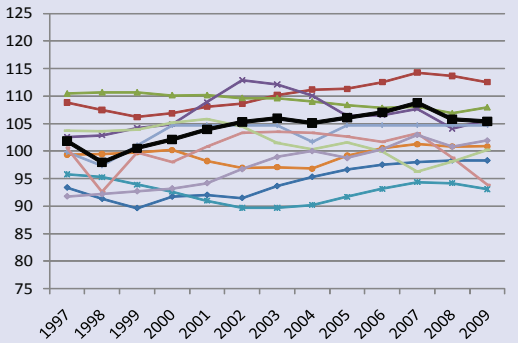

*Source:* Centennial Group International.

Figure A22 **Hungary**



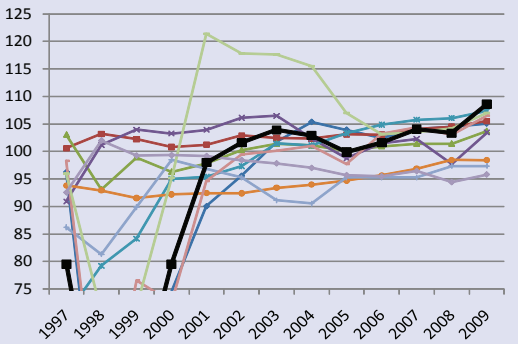

*Source:* Centennial Group International.

Figure A23 **India**



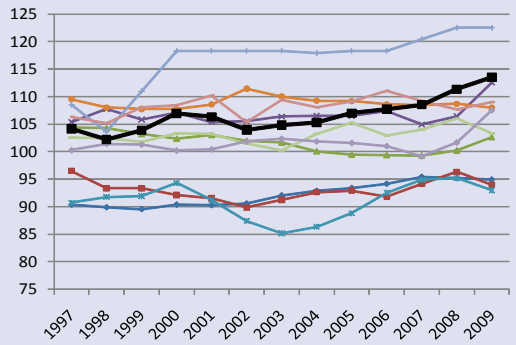

*Source:* Centennial Group International.

Figure A24 **Indonesia**



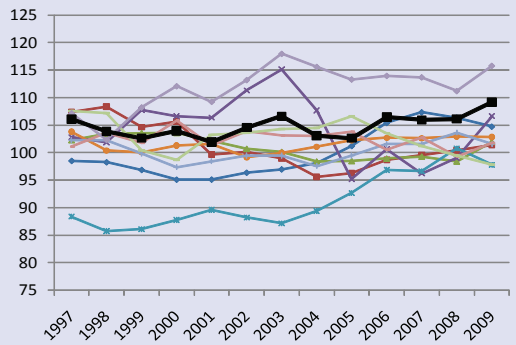

*Source:* Centennial Group International.

Figure A25 **Israel**



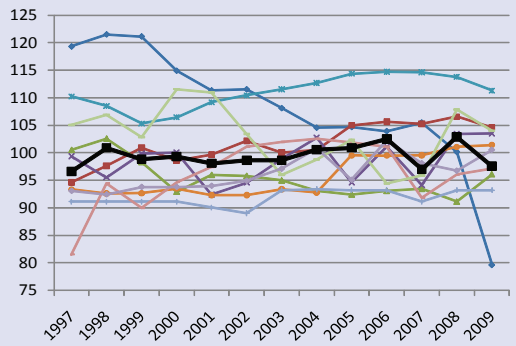

*Source:* Centennial Group International.

Figure A26 **Jordan**



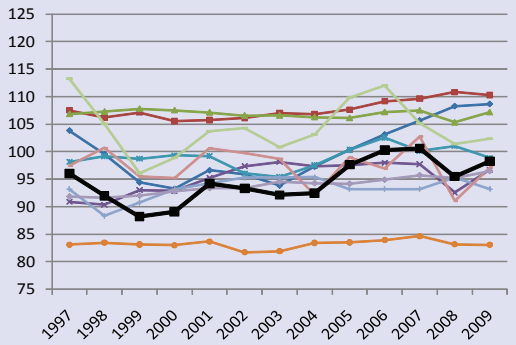

*Source:* Centennial Group International.

Figure A27 **Kazakhstan**



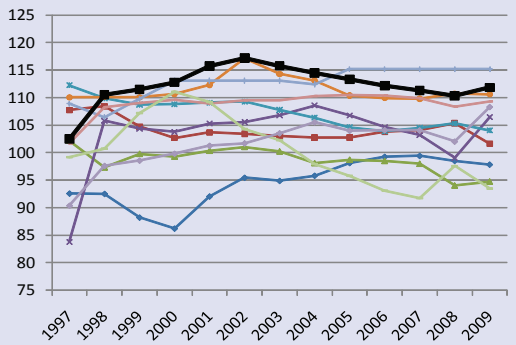

*Source:* Centennial Group International.

Figure A28 **Kenya**



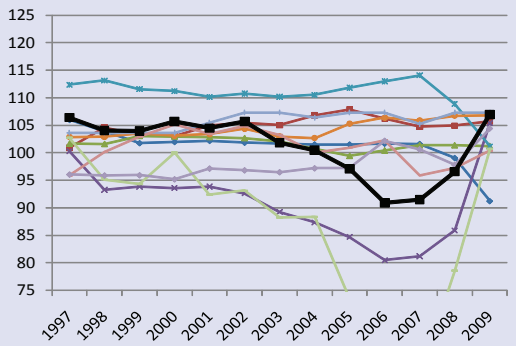

*Source:* Centennial Group International.

Figure A29 **Republic of Korea**



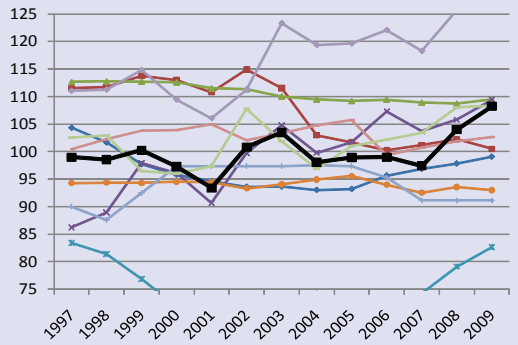

*Source:* Centennial Group International.

Figure A30 **Latvia**



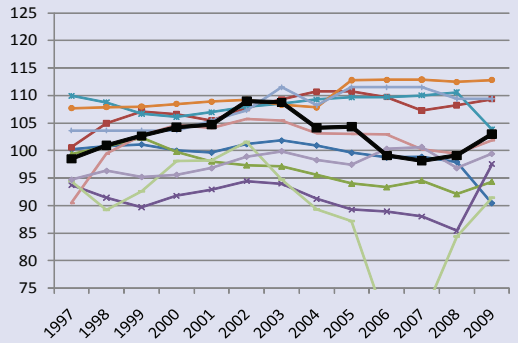

*Source:* Centennial Group International.

Figure A31 **Lebanon**



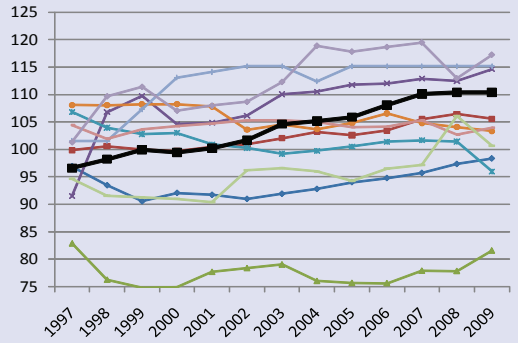

*Source:* Centennial Group International.

Figure A32 **Lithuania**



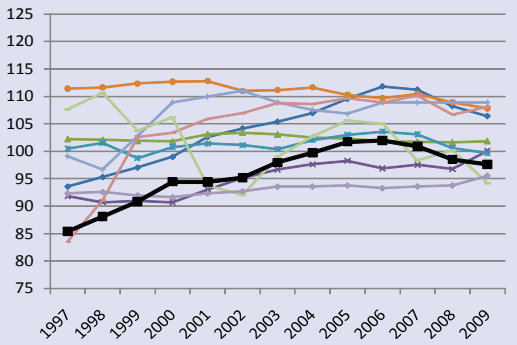

*Source:* Centennial Group International.

Figure A33 **Malaysia**



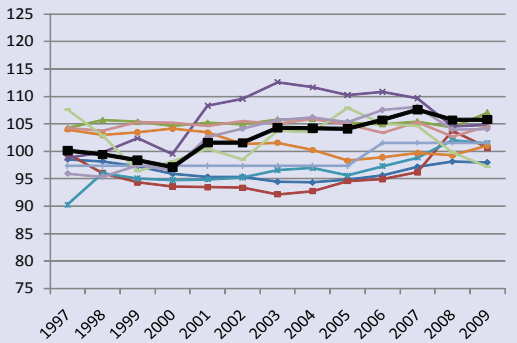

*Source:* Centennial Group International.

Figure A34 **Mexico**



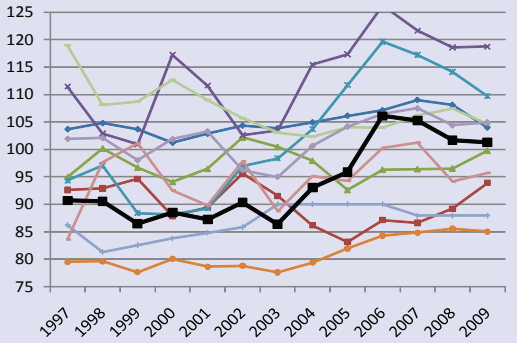

*Source:* Centennial Group International.

Figure A35 **Morocco**



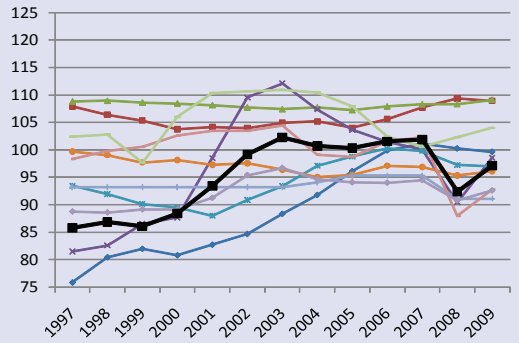

*Source:* Centennial Group International.

Figure A36 **Nigeria**



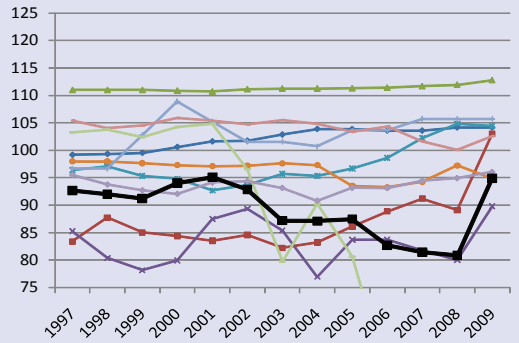

*Source:* Centennial Group International.

Figure A37 **Pakistan**



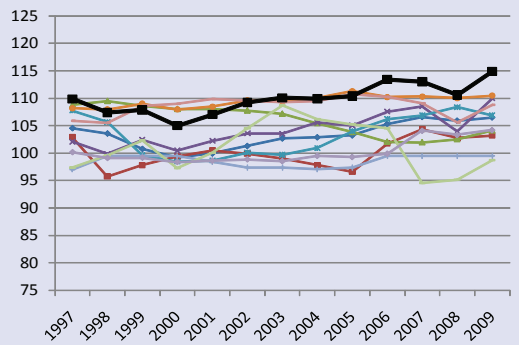

*Source:* Centennial Group International.

Figure A38 **Panama**



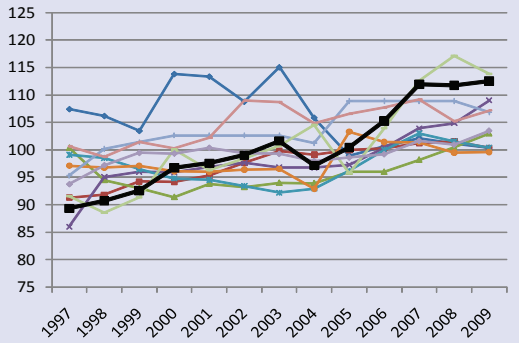

*Source:* Centennial Group International.

Figure A39 **Peru**



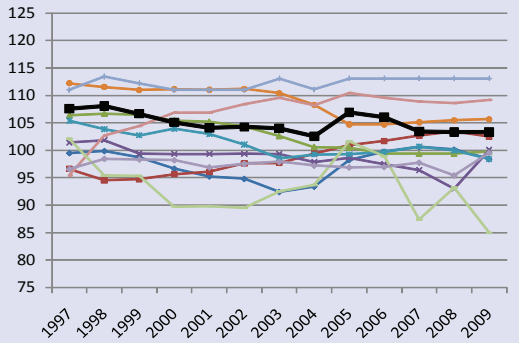

*Source:* Centennial Group International.

Figure A40 **Philippines**



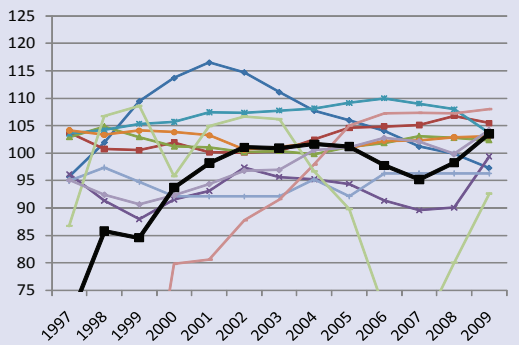

*Source:* Centennial Group International.

Figure A41 **Poland**



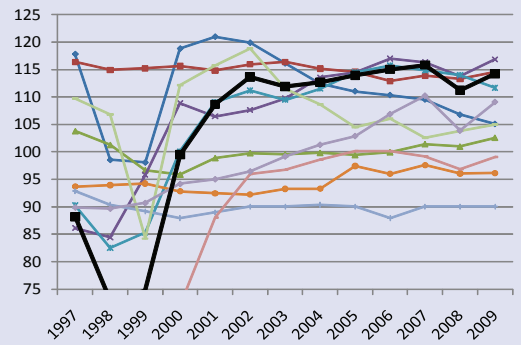

*Source:* Centennial Group International.

Figure A42 **Romania**



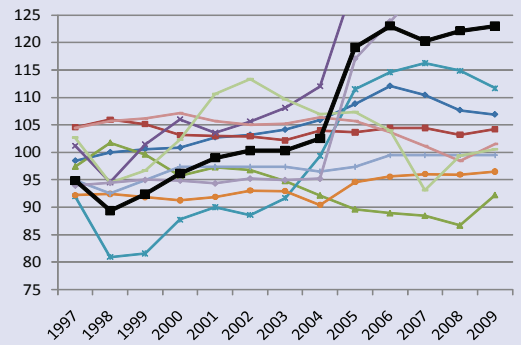

*Source:* Centennial Group International.

Figure A43 **Russia**



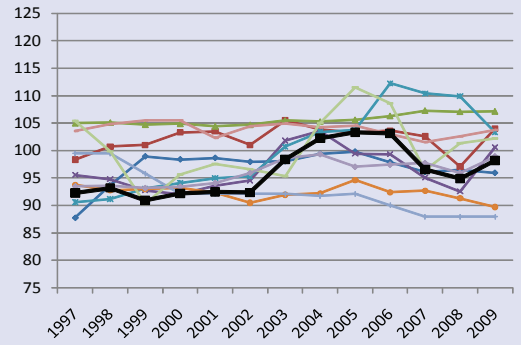

*Source:* Centennial Group International.

Figure A44 **Saudi Arabia**



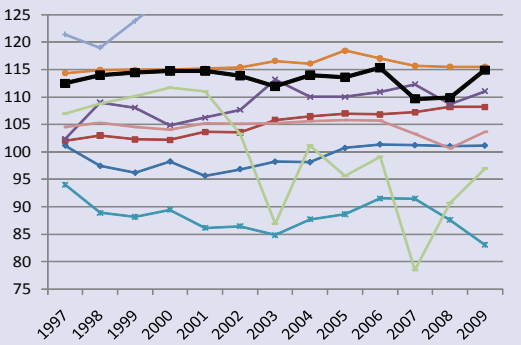

*Source:* Centennial Group International.

Figure A45 **Senegal**



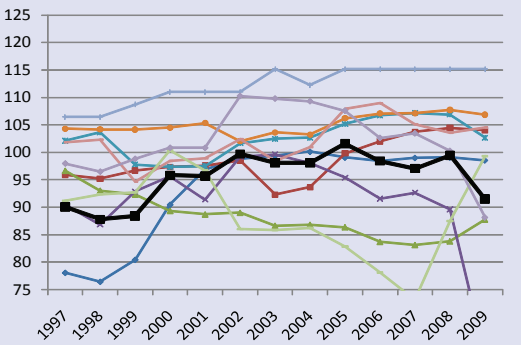

*Source:* Centennial Group International.

Figure A46 **Singapore**



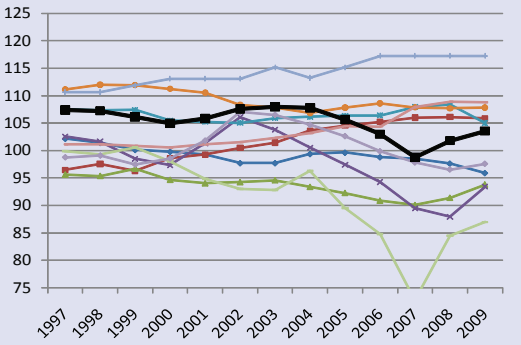

*Source:* Centennial Group International.

Figure A47 **Slovak Republic**



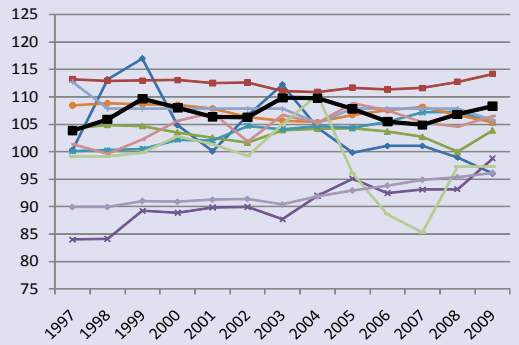

*Source:* Centennial Group International.

Figure A48 **Slovenia**



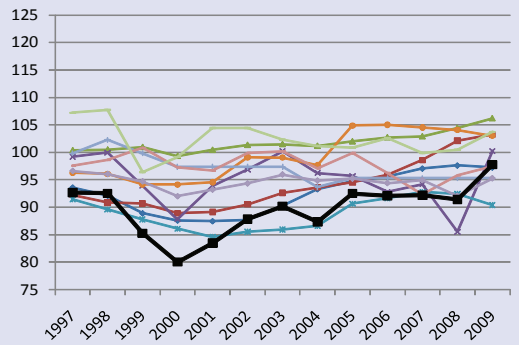

*Source:* Centennial Group International.

Figure A49 **South Africa**



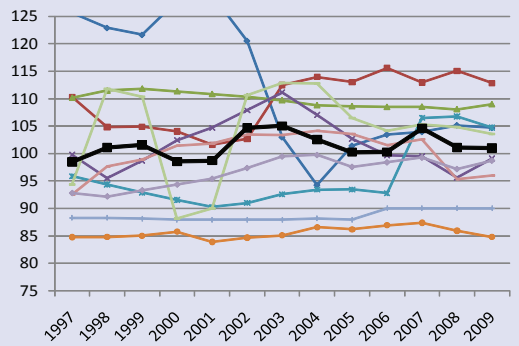

*Source:* Centennial Group International.

Figure A50 **Sri Lanka**



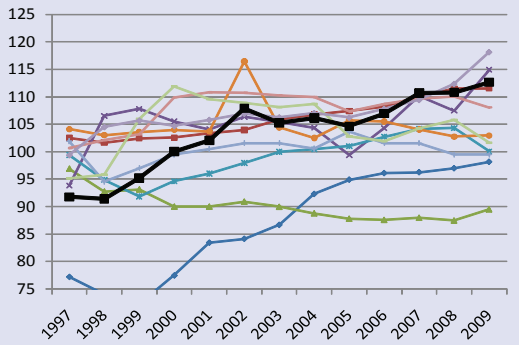

*Source:* Centennial Group International.

Figure A51 **Tanzania**



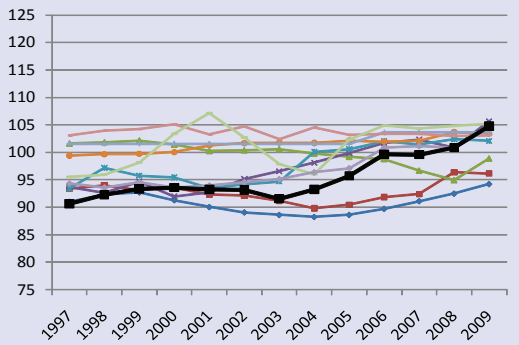

*Source:* Centennial Group International.

Figure A52 **Thailand**



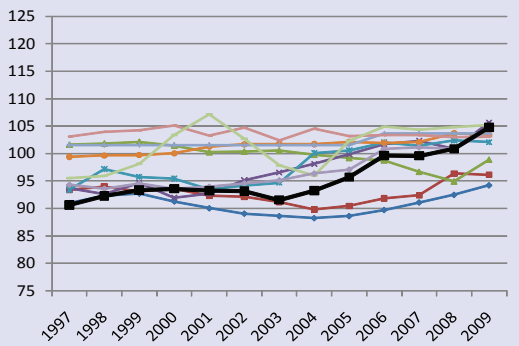

*Source:* Centennial Group International.

Figure A53 **Tunisia**



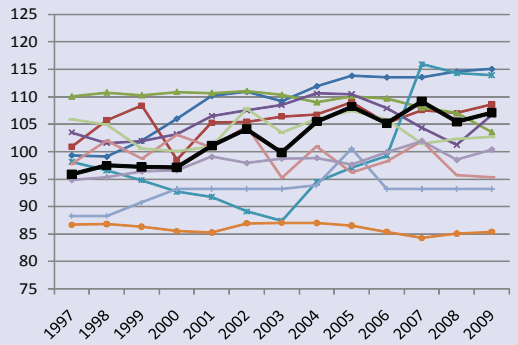

*Source:* Centennial Group International.

Figure A54 **Turkey**



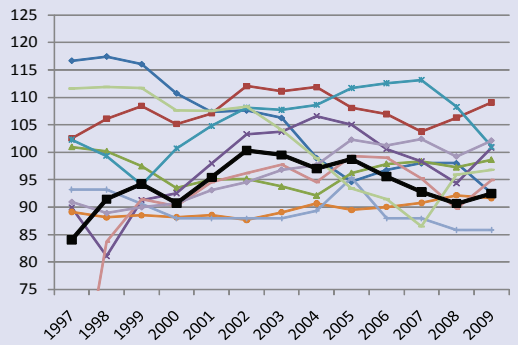

*Source:* Centennial Group International.

Figure A55 **Uganda**



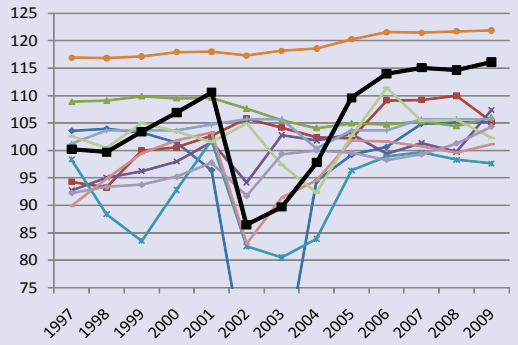

*Source:* Centennial Group International.

Figure A56 **Ukraine**



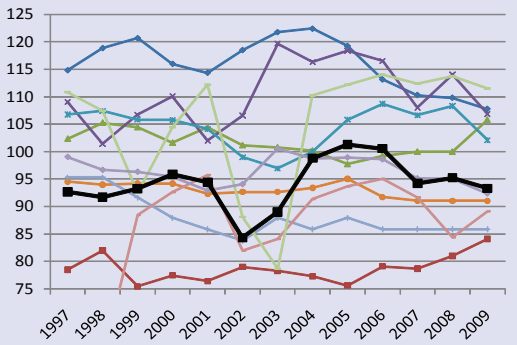

*Source:* Centennial Group International.

Figure A57 **Uruguay**



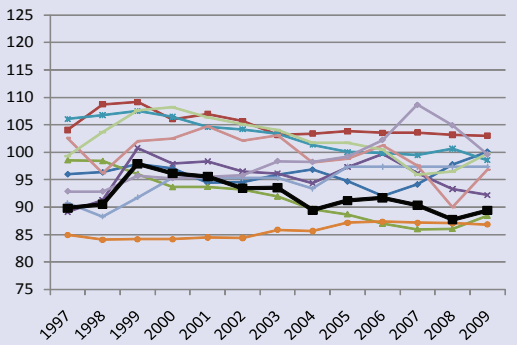

*Source:* Centennial Group International.

Figure A58 **Venezuela**



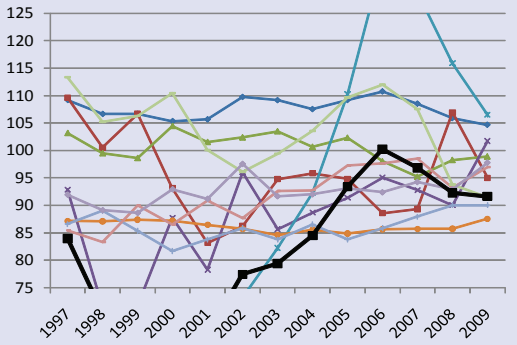

*Source:* Centennial Group International.

Figure A59 **Viet Nam**



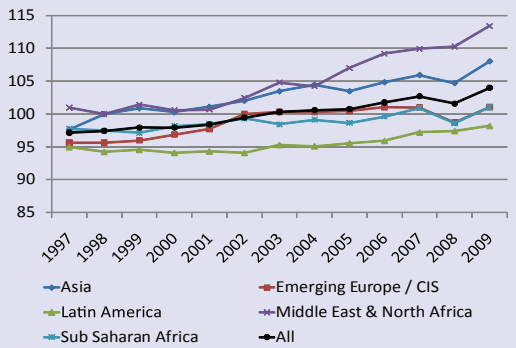

*Source:* Centennial Group International.

Figure A60 **Zambia**



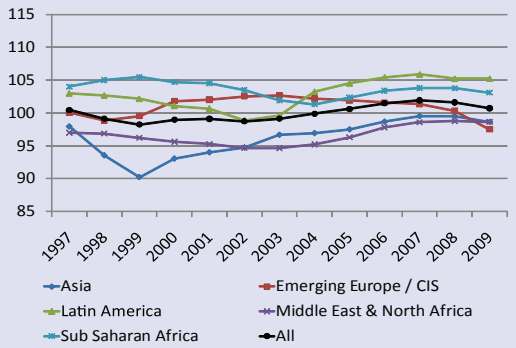

*Source:* Centennial Group International.

Figure A61 **Resilience**



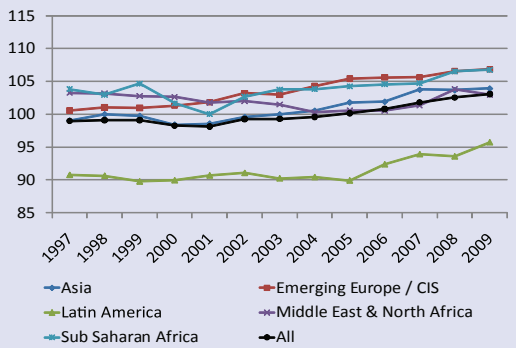

*Source:* Centennial Group International.

Figure A62 **Bank Soundness**



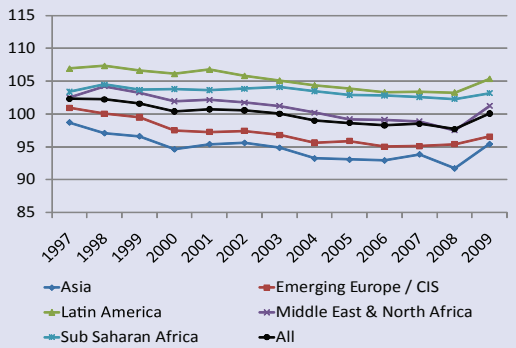

*Source:* Centennial Group International.

Figure A63 **Export Diversity**



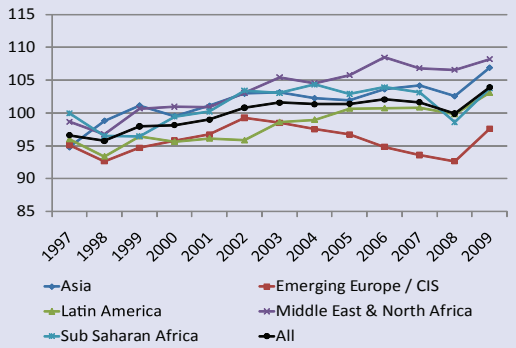

*Source:* Centennial Group International.

Figure A64 **Export Independence**



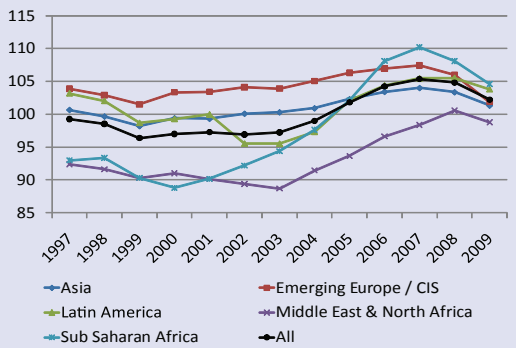

*Source:* Centennial Group International.

Figure A65 **External Robustness**



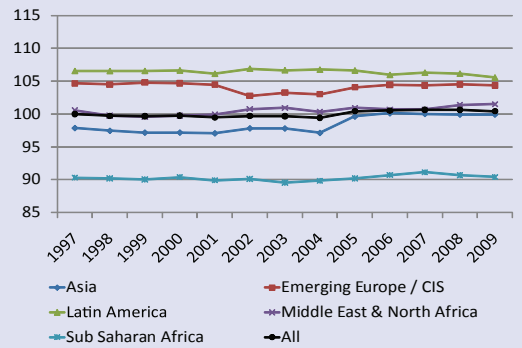

*Source:* Centennial Group International.

Figure A66 **Fiscal Policy**



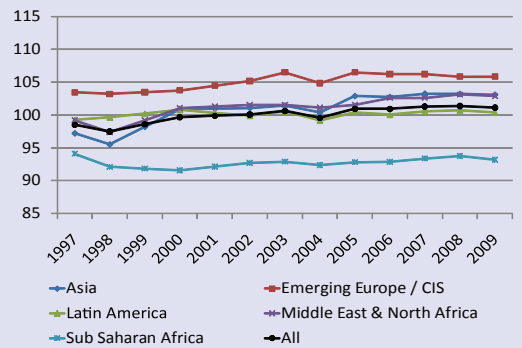

*Source:* Centennial Group International.

Figure A67 **Governance**



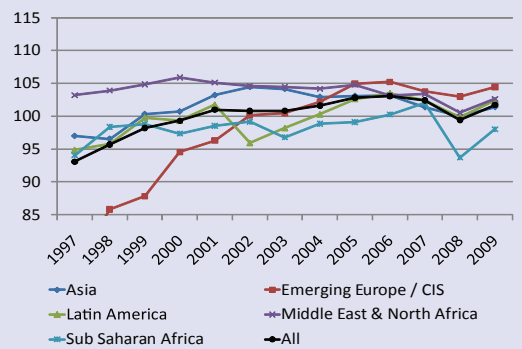

*Source:* Centennial Group International.

Figure A68 **Government Effectiveness**



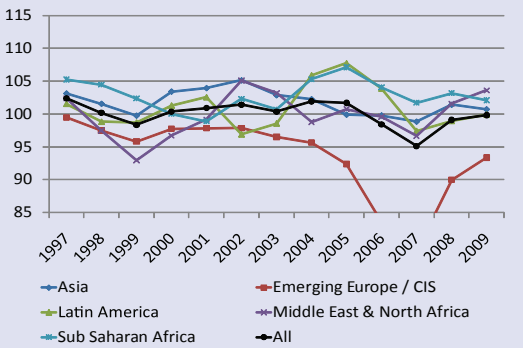

*Source:* Centennial Group International.

Figure A69 **Monetary Policy**



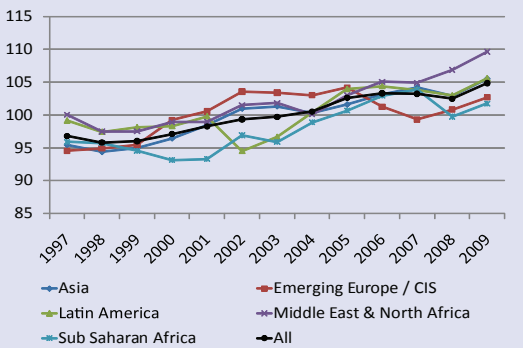

*Source:* Centennial Group International.

Figure A70 **Private Sector Debt**




*Source:* Centennial Group International.

Figure A71 **Reserves**




*Source:* Centennial Group International.

*The authors would like to thank Harinder S. Kohli, Hervé Ferhani and Claudio Loser for their valuable, insightful, and commonsense suggestions; Ali Ayub and Nate Schwalb for their assistance with collecting data; and Katy Grober for her support in preparing this report.*

Table A1 **The Centennial Resilience Index by country over time**

| Country | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Asia | | | | | | | | | | | | | |
| Azerbaijan | 86.5 | 93.7 | 90.2 | 84.0 | 84.3 | 85.6 | 87.1 | 84.3 | 93.3 | 97.2 | 104.5 | 92.8 | 101.0 |
| Bangladesh | 88.6 | 87.1 | 85.0 | 81.9 | 83.7 | 85.6 | 87.1 | 87.4 | 87.9 | 89.1 | 90.4 | 92.0 | 96.3 |
| PRC | 102.1 | 101.4 | 101.2 | 99.4 | 101.2 | 102.9 | 100.8 | 101.5 | 105.2 | 108.6 | 109.8 | 113.0 | 115.2 |
| Georgia | 103.6 | 101.3 | 94.4 | 95.2 | 91.5 | 103.4 | 103.1 | 104.8 | 106.2 | 108.5 | 109.7 | 105.6 | 108.7 |
| Hong Kong, China | 107.1 | 107.2 | 111.4 | 113.1 | 111.8 | 112.4 | 109.1 | 103.5 | 103.8 | 103.2 | 104.5 | 105.8 | 108.7 |
| India | 101.8 | 98.0 | 100.5 | 102.1 | 103.9 | 105.3 | 106.0 | 105.1 | 106.1 | 107.0 | 108.8 | 105.8 | 105.4 |
| Indonesia | 79.5 | 45.2 | 54.7 | 79.5 | 98.0 | 101.6 | 103.9 | 102.9 | 99.9 | 101.6 | 104.0 | 103.3 | 108.6 |
| Kazakhstan | 96.6 | 100.9 | 98.8 | 99.3 | 98.1 | 98.7 | 98.6 | 100.6 | 100.9 | 102.5 | 97.0 | 102.9 | 97.6 |
| Rep. of Korea | 102.5 | 110.5 | 111.5 | 112.8 | 115.7 | 117.2 | 115.8 | 114.5 | 113.3 | 112.2 | 111.3 | 110.3 | 111.8 |
| Malaysia | 96.6 | 98.2 | 99.9 | 99.4 | 100.2 | 101.7 | 104.6 | 105.2 | 105.9 | 108.0 | 110.1 | 110.4 | 110.4 |
| Pakistan | 85.8 | 86.9 | 86.1 | 88.4 | 93.5 | 99.2 | 102.3 | 100.7 | 100.3 | 101.5 | 101.9 | 92.4 | 97.1 |
| Philippines | 89.3 | 90.7 | 92.6 | 96.7 | 97.6 | 99.0 | 101.6 | 97.2 | 100.4 | 105.3 | 112.0 | 111.8 | 112.5 |
| Singapore | 112.5 | 114.0 | 114.4 | 114.8 | 114.7 | 113.9 | 112.0 | 114.0 | 113.6 | 115.3 | 109.7 | 109.9 | 114.9 |
| Sri Lanka | 92.7 | 92.5 | 85.3 | 80.0 | 83.5 | 87.8 | 90.2 | 87.3 | 92.5 | 92.1 | 92.2 | 91.4 | 97.8 |
| Thailand | 91.8 | 91.4 | 95.2 | 100.0 | 102.1 | 107.9 | 105.3 | 106.1 | 104.6 | 107.0 | 110.7 | 110.8 | 112.7 |
| Viet Nam | 89.8 | 90.5 | 97.9 | 96.2 | 95.6 | 93.4 | 93.5 | 89.4 | 91.2 | 91.7 | 90.4 | 87.7 | 89.4 |
| Emerging Europe/CIS | | | | | | | | | | | | | |
| Czech Republic | 97.7 | 99.9 | 101.2 | 98.9 | 97.4 | 100.9 | 101.4 | 101.9 | 105.4 | 103.1 | 98.3 | 104.4 | 103.9 |
| Hungary | 100.9 | 97.0 | 98.8 | 101.4 | 105.5 | 103.8 | 102.1 | 99.4 | 100.0 | 95.7 | 93.3 | 95.5 | 97.7 |
| Latvia | 106.4 | 104.1 | 104.0 | 105.7 | 104.5 | 105.7 | 101.9 | 100.5 | 97.1 | 90.9 | 91.5 | 96.5 | 106.9 |
| Lithuania | 98.5 | 100.9 | 102.7 | 104.2 | 104.7 | 109.0 | 108.7 | 104.2 | 104.4 | 99.1 | 98.2 | 99.1 | 103.0 |
| Poland | 107.6 | 108.1 | 106.7 | 105.1 | 104.1 | 104.3 | 104.0 | 102.6 | 106.9 | 106.1 | 103.4 | 103.3 | 103.3 |
| Romania | 69.6 | 85.8 | 84.6 | 93.8 | 98.2 | 101.1 | 100.9 | 101.6 | 101.2 | 97.8 | 95.2 | 98.3 | 103.5 |
| Russia | 88.2 | 72.9 | 74.7 | 99.5 | 108.7 | 113.6 | 111.9 | 112.7 | 114.0 | 115.0 | 115.8 | 111.2 | 114.2 |
| Slovak Republic | 90.1 | 87.8 | 88.4 | 95.8 | 95.7 | 99.7 | 98.1 | 98.1 | 101.6 | 98.4 | 97.1 | 99.4 | 91.5 |
| Slovenia | 107.4 | 107.2 | 106.2 | 104.9 | 105.9 | 107.6 | 108.0 | 107.8 | 105.6 | 103.0 | 98.8 | 101.8 | 103.6 |
| Turkey | 89.4 | 88.9 | 88.7 | 91.6 | 86.2 | 93.0 | 100.6 | 107.4 | 110.9 | 109.1 | 108.2 | 108.8 | 109.4 |
| Ukraine | 84.1 | 91.5 | 94.2 | 90.7 | 95.4 | 100.3 | 99.5 | 97.0 | 98.7 | 95.6 | 92.8 | 90.7 | 92.5 |
| Latin America | | | | | | | | | | | | | |
| Argentina | 103.3 | 103.4 | 105.8 | 105.8 | 104.2 | 76.0 | 85.6 | 98.1 | 114.6 | 114.4 | 112.4 | 108.4 | 111.6 |
| Bolivia | 97.8 | 92.0 | 89.9 | 92.9 | 98.0 | 97.1 | 99.8 | 99.9 | 97.9 | 102.9 | 106.8 | 107.7 | 107.4 |

Table A1 **The Centennial Resilience Index by country over time**

| Country | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Brazil | 104.1 | 104.2 | 103.8 | 104.3 | 102.1 | 102.3 | 108.2 | 110.6 | 112.2 | 112.2 | 113.5 | 112.6 | 112.1 |
| Chile | 118.9 | 117.4 | 118.3 | 118.1 | 119.2 | 120.6 | 121.3 | 122.7 | 124.4 | 124.2 | 117.5 | 116.6 | 115.1 |
| Colombia | 98.0 | 93.9 | 94.9 | 97.0 | 101.6 | 103.1 | 104.1 | 107.8 | 107.6 | 105.6 | 106.2 | 105.7 | 108.4 |
| Costa Rica | 105.1 | 102.2 | 103.2 | 101.0 | 100.3 | 98.4 | 99.4 | 98.5 | 100.5 | 101.0 | 101.5 | 101.2 | 105.0 |
| Dominican Republic | 90.5 | 91.4 | 90.9 | 86.6 | 89.9 | 82.9 | 74.3 | 82.4 | 92.0 | 93.2 | 91.3 | 91.7 | 95.5 |
| Ecuador | 90.3 | 83.3 | 82.1 | 76.0 | 80.3 | 79.9 | 89.7 | 91.9 | 91.4 | 91.0 | 95.4 | 94.7 | 100.6 |
| Mexico | 85.4 | 88.1 | 90.9 | 94.5 | 94.4 | 95.2 | 98.0 | 99.8 | 101.7 | 102.0 | 100.9 | 98.5 | 97.6 |
| Panama | 92.7 | 92.0 | 91.2 | 94.0 | 95.1 | 92.9 | 87.2 | 87.1 | 87.5 | 82.7 | 81.4 | 80.8 | 94.9 |
| Peru | 109.9 | 107.4 | 107.9 | 105.0 | 107.0 | 109.3 | 110.1 | 109.9 | 110.4 | 113.4 | 113.0 | 110.6 | 114.9 |
| Uruguay | 100.2 | 99.7 | 103.4 | 106.9 | 110.6 | 86.5 | 89.7 | 97.8 | 109.6 | 114.0 | 115.1 | 114.6 | 116.1 |
| Venezuela | 92.7 | 91.7 | 93.2 | 95.9 | 94.4 | 84.3 | 89.0 | 98.8 | 101.3 | 100.6 | 94.2 | 95.2 | 93.3 |
| Middle East & North Africa | | | | | | | | | | | | | |
| Bahrain | 98.6 | 89.9 | 86.6 | 94.1 | 93.5 | 105.5 | 103.5 | 96.0 | 97.5 | 99.7 | 98.3 | 102.8 | 107.1 |
| Egypt | 106.9 | 104.3 | 102.5 | 102.0 | 102.7 | 102.1 | 100.0 | 98.2 | 98.8 | 99.2 | 101.6 | 101.9 | 105.5 |
| Israel | 104.2 | 102.2 | 103.9 | 106.9 | 106.3 | 103.9 | 104.8 | 105.3 | 107.0 | 107.7 | 108.5 | 111.3 | 113.5 |
| Jordan | 106.1 | 103.8 | 102.7 | 104.0 | 101.9 | 104.6 | 106.6 | 103.1 | 102.6 | 106.5 | 105.9 | 106.1 | 109.2 |
| Lebanon | 99.0 | 98.5 | 100.2 | 97.3 | 93.4 | 100.8 | 103.5 | 98.1 | 98.9 | 99.0 | 97.4 | 104.0 | 108.3 |
| Morocco | 100.1 | 99.4 | 98.4 | 97.1 | 101.6 | 101.5 | 104.3 | 104.2 | 104.1 | 105.7 | 107.6 | 105.7 | 105.8 |
| Saudi Arabia | 94.9 | 89.4 | 92.4 | 96.1 | 99.0 | 100.3 | 100.3 | 102.6 | 119.1 | 123.0 | 120.3 | 122.1 | 123.0 |
| Tunisia | 90.6 | 92.3 | 93.4 | 93.6 | 93.2 | 93.2 | 91.6 | 93.3 | 95.7 | 99.7 | 99.6 | 100.9 | 104.8 |
| Sub-Saharan Africa | | | | | | | | | | | | | |
| Botswana | 126.7 | 129.1 | 126.7 | 129.5 | 127.0 | 126.2 | 122.7 | 120.8 | 122.8 | 124.6 | 126.0 | 121.5 | 121.0 |
| Côte d'Ivoire | 83.1 | 87.3 | 88.0 | 80.8 | 86.0 | 92.3 | 84.1 | 84.0 | 86.0 | 84.4 | 87.6 | 87.7 | 95.7 |
| Ethiopia | 96.8 | 95.0 | 91.9 | 89.2 | 87.3 | 91.2 | 81.6 | 91.8 | 89.0 | 92.1 | 102.4 | 90.6 | 96.8 |
| Ghana | 87.1 | 90.9 | 86.8 | 77.4 | 79.0 | 87.8 | 95.3 | 101.1 | 103.1 | 110.5 | 108.5 | 99.8 | 99.8 |
| Kenya | 96.0 | 92.0 | 88.2 | 89.1 | 94.2 | 93.3 | 92.1 | 92.5 | 97.6 | 100.3 | 100.6 | 95.5 | 98.3 |
| Nigeria | 90.7 | 90.5 | 86.5 | 88.5 | 87.3 | 90.4 | 86.4 | 93.1 | 95.9 | 106.1 | 105.3 | 101.7 | 101.3 |
| Senegal | 92.3 | 93.2 | 91.0 | 92.2 | 92.5 | 92.3 | 98.4 | 102.3 | 103.3 | 103.1 | 96.5 | 94.9 | 98.2 |
| South Africa | 103.8 | 105.9 | 109.7 | 108.0 | 106.4 | 106.3 | 109.8 | 109.7 | 107.8 | 105.5 | 104.9 | 106.8 | 108.3 |
| Tanzania | 98.5 | 101.1 | 101.6 | 98.5 | 98.7 | 104.7 | 105.0 | 102.5 | 100.3 | 100.3 | 104.6 | 101.1 | 101.0 |
| Uganda | 95.9 | 97.5 | 97.2 | 97.1 | 101.1 | 104.1 | 99.9 | 105.5 | 108.2 | 105.2 | 109.2 | 105.4 | 107.1 |
| Zambia | 84.0 | 70.3 | 72.1 | 74.1 | 66.7 | 77.4 | 79.4 | 84.5 | 93.4 | 100.2 | 96.8 | 92.3 | 91.7 |

**About the Asian Development Bank**

ADB's vision is an Asia and Pacific region free of poverty. Its mission is to help its developing member countries substantially reduce poverty and improve the quality of life of their people. Despite the region's many successes, it remains home to two-thirds of the world's poor: 1.8 billion people who live on less than $2 a day, with 903 million struggling on less than $1.25 a day. ADB is committed to reducing poverty through inclusive economic growth, environmentally sustainable growth, and regional integration.

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