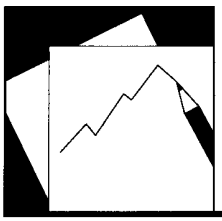

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The Rising Resilience of Emerging Market and Developing Economies

Abdul Abiad, John Bluedorn, Jaime Guajardo, and Petia Topalova

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The Rising Resilience of Emerging Market and Developing Economies

Prepared by Abdul Abiad, John Bluedorn, Jaime Guajardo, and Petia Topalova[1]

Authorized for distribution by Thomas Helbling

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Abstract

Economic performance in many emerging market and developing economies (EMDEs) improved substantially over the past twenty years. The past decade was particularly good—for the first time EMDEs spent more time in expansion and had smaller downturns than advanced economies. In this paper we document the history of EMDEs' resilience over the past sixty years, and investigate what factors have been associated with it. We find that their improved performance in recent years is accounted for by both good policies and a lower incidence of external and domestic shocks—better policies account for about three-fifths of their improved resilience, while less frequent shocks account for the remainder.

JEL Classification Numbers: E32, E60, F43, O11, O23, O40

Keywords: emerging markets, low-income countries, developing countries, growth, development, expansion, recovery.

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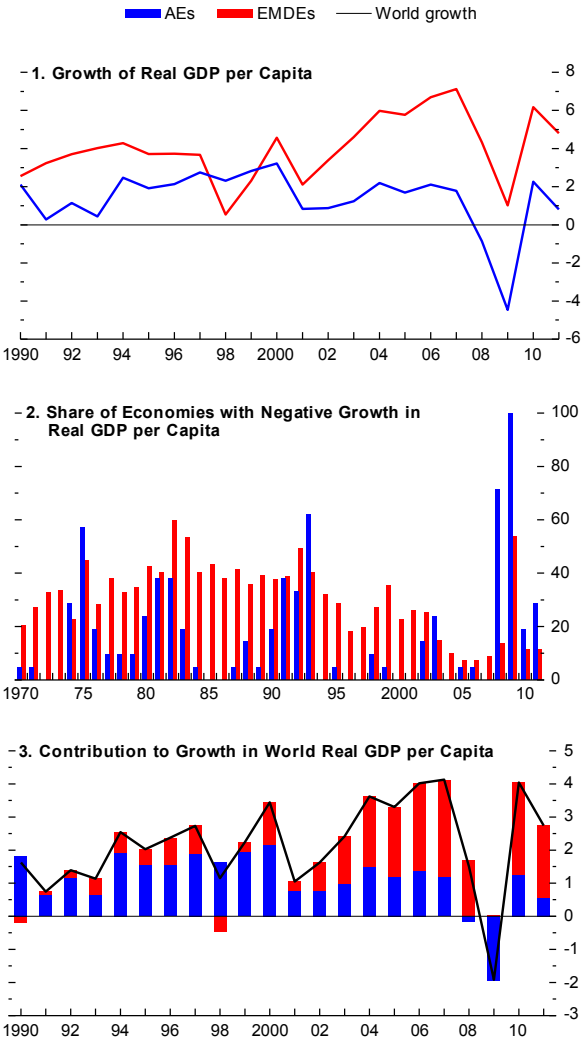
I. INTRODUCTION

Many emerging market and developing economies (EMDEs) have performed well over the past decade and through the global crisis. In 2003–07 growth in EMDEs accelerated even as growth in advanced economies (AEs) remained weak (Figure 1), stimulating a vigorous debate on whether EMDEs had "decoupled" from AEs (Kose, 2008). That debate was silenced temporarily when the global crisis hit and EMDEs were dragged down by the crisis that emanated from the United States and Europe—in fact, more than half of EMDEs experienced negative growth in 2009. But they quickly bounced back, and during 2010–11, many of them grew at or above precrisis rates. As a result, EMDEs now account for virtually all of global growth.

The question on policymakers' minds now is whether this strong performance will last. Beyond the de facto evidence of their resilience over the past decade and through the largest global shock in the past half-century, optimists can point to their improved policy frameworks and the ample policy space—room to maneuver without undermining sustainability—these improvements have created. These economies have also become more diversified along many dimensions—in their economic structure, trading patterns, and the composition of their capital flows. On the other hand, recent growth in some EMDEs has been supported by capital inflows, strong credit growth, and, for commodity exporters, by the continued strength of commodity prices. These factors are prone to reversal, which suggests that these economies' prospects

Figure 1. The Strong Performance of Emerging Market and Developing Economies
(Percent)

Growth in emerging market and developing economies accelerated in the mid-2000s, leading to talk of their decoupling from advanced economies. Emerging market and developing economies were not spared during the global downturn; most experienced negative growth in 2009. But many have recovered and are growing at or above precrisis rates, despite continued weakness in advanced economies. As a result, they now account for almost all global growth.



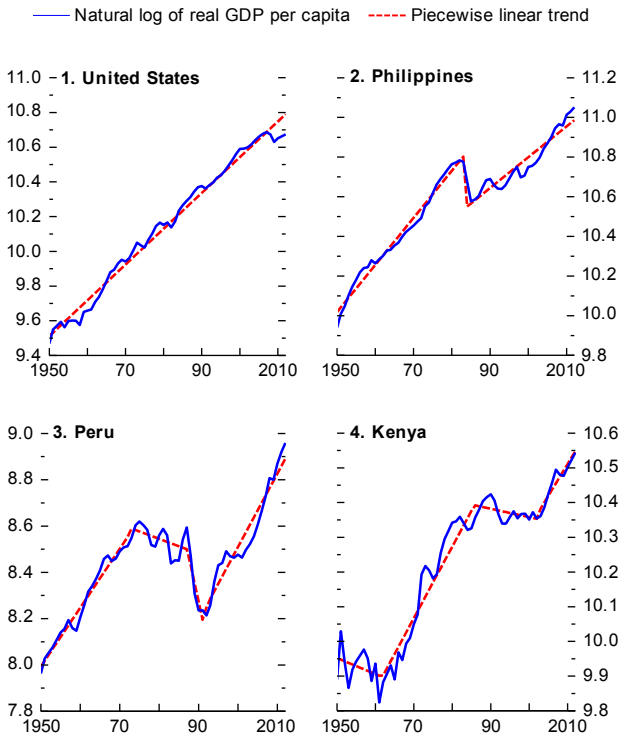
Sources: World Economic Outlook database; World Bank World Development Indicators database; Penn World Tables 7.0; and authors' calculations.
Note: Economy groups are defined in Appendix Table 2. AE = advanced economy; EMDE = emerging market and developing economy.

might not be that robust (Frankel, 2012). In addition, some of the policy space they built over the past decade was used during the global crisis and has not yet been fully rebuilt. And there are now signs that some EMDEs are slowing.

This paper studies the improved performance of EMDEs, and the factors that are associated with it, by looking at resilience, defined as the EMDEs' ability to sustain longer and stronger expansions, and to experience shorter and shallower downturns and more rapid recoveries.[2] Using a variety of tools, including event studies and duration analysis, we analyze how the duration of expansions and the speed of recovery have evolved and what factors are associated with a country's resilience.

Figure 2. Diverse Paths of Output

Unlike the smooth hills that characterize advanced economies' output paths, output in emerging market and developing economies is marked by mountains, cliffs, plateaus, and plains. Expansions and downturns can last just a few years or stretch over many years.



Sources: World Economic Outlook database; World Bank World Development Indicators database; Penn World Tables 7.0; and authors' calculations.

There are two main reasons that motivate our focus on resilience, as the object of interest. While a large body of work has attempted to explain EMDE growth directly, this approach has met with only modest success. This is in part because the behavior of output in EMDEs is much more complex and diverse than in AEs (Easterly, 2001), with very low persistence in EMDE growth rates across decades; a fact that is hard to reconcile with the high persistence of "fundamentals" —such as investment rates, education levels, trade, financial development, and institutional quality—that typically enter growth regressions (Easterly and others, 1992). Pritchett (2000) characterized EMDE output paths as being composed of "mountains, plateaus, cliffs, and plains" and documented large and abrupt changes in growth performance at the country level. Some EMDEs grow at reasonable rates for many years and then, without any obvious change in fundamentals, stagnate for decades, while others experience long periods of stagnation interrupted periodically by bursts of fast growth (Figure 2). Severe

[2] This is consistent with the general definition of resilience, which encompasses the same two aspects. The *Oxford English Dictionary,* for example, defines resilience as "the quality or fact of being able to recover quickly or easily from, or resist being affected by, a misfortune, shock, or illness." Increased resilience would result in longer and stronger expansions, but the latter could also result from fewer shocks—a possibility we explore in this paper. Shorter and shallower downturns and more rapid recoveries are fully consistent with the aforementioned definition of resilience, since downturns are generally the result of negative shocks.

economic crises are not uncommon and tend to happen more often in EMDEs, with large output costs because they often represent declines in the trend rather than fluctuations around a trend (Aguiar and Gopinath, 2007; Cerra and Saxena, 2008). It is precisely this irregular pattern of growth in EMDEs that motivates our focus on resilience as our object of interest in this paper. Studying the length of expansions and speed of recoveries could be considered an intermediate step in investigating the processes underlying growth, since shifts in long-term levels of growth or growth volatility will manifest in changing duration of expansions and speed of recoveries. Another reason for studying their duration is that the factors that tend to halt or prolong expansions and hasten recoveries are of interest in themselves—it is useful for policymakers to know what factors tend to bring expansions to an end, and what helps prolong expansions or shorten recoveries. In analyzing the length of expansions and speed of recoveries, we contribute to a growing literature that tries to shed light on growth transitions and growth durations. Examples include Hausmann, Pritchett, and Rodrik (2005) who investigate growth accelerations, Berg, Ostry, and Zettelmeyer (2012) who study periods of sustained growth, and Rodrik (1999) and Becker and Mauro (2005) who focus on growth collapses.

We identify periods of expansion, downturn, and recovery for 120 EMDEs between 1960 and 2011, by examining the evolution of their output per capita. Using event studies and duration analysis, we document how the duration of expansions and the speed of recovery have evolved over time. We then explore the correlates of these measures of a country's resilience. In particular, we investigate whether external and domestic shocks are associated with the end of expansions, and whether improved policies and structural characteristics are associated with longer expansions and faster recoveries. We use this analysis to shed light on what has contributed to the recent improved performance of EMDEs, and on their prospects for continued resilience in the coming years.

Our main findings can be summarized as follows. First, EMDE resilience has increased markedly over the past two decades. These economies are spending more time in expansion, and downturns and recoveries have become shallower and shorter. The performance of the past decade was particularly impressive for many EMDE regions, with emerging Europe being a notable exception. In fact, the past decade was the first time that EMDEs spent more time in expansion, and had smaller downturns, than advanced economies.

Second, various external and domestic shocks are associated with the end of EMDE expansions. Among external shocks, sudden stops in capital flows, advanced economy recessions, spikes in global uncertainty, and terms-of-trade busts all increase the likelihood that an expansion will end. Among domestic shocks, credit booms double and banking crises triple the probability that an expansion will shift into a downturn by the following year.

Third, good policies are associated with increased resilience. Specifically, greater policy space (as measured by low inflation and favorable fiscal and external positions) and

improved policy frameworks (as measured by countercyclical policy, inflation targeting, and flexible exchange rate regimes) are associated with longer expansions and faster recoveries. There is no clear relation between resilience and structural characteristics, such as trade patterns, financial openness and the composition of capital flows, and income distribution. Few of these characteristics are robustly associated with the duration of expansions and the speed of recoveries.

Fourth, the improvements in policymaking and the buildup of policy space in many EMDEs account for the bulk of the increased resilience during the past decade. Some shocks, such as spikes in global uncertainty, have become more frequent in the past decade, but many other shocks have become less frequent, such as banking crises and credit booms. Overall, fewer shocks account for about two-fifths of the improved performance in EMDEs. Greater policy space and better policy frameworks account for the remaining three-fifths.

The rest of the paper is structured as follows. Section 2 documents how resilience has changed for various country groupings and regions over time, and relates these changes to deeper changes in steady-state growth rates and the variability of growth. Section 3 relates the duration of expansions and the speed of recoveries to external and domestic shocks, to policy space and policy frameworks, and structural characteristics of these economies. It uses standard tools of duration analysis, including both bivariate and multivariate models, to examine these correlates in a comprehensive and integrated manner. It also evaluates whether the nature of these associations has changed over time. In section 4, we examine the robustness of our findings, while Section 5 wraps up by examining how these economies' policies, structures, and the shocks buffeting them have changed over time. It then quantifies their relative contributions to the rise in resilience. Section 6 concludes with a few words on the prospective resilience of EMDEs.

II. RESILIENCE: SOME STYLIZED FACTS

We begin by establishing some stylized facts about the depth and duration of downturns, recoveries, and expansions for various country groups and how these have changed over the past six decades. For the purposes of this paper we split the economies of the world into three groups.[3] Following Pritchett (2000), we define AEs primarily by membership in the Organization for Economic Cooperation and Development prior to 1990, with the exception of Turkey.[4] All other economies are classified as EMDEs, which we further subdivide into two groups: low-income countries (LICs), which are defined as the 51

[3] Throughout, we restrict our analysis to those economies that have had an average population of at least one million inhabitants over the sample period.

[4] This implies that some economies currently classified as advanced (e.g., Korea) are classified as emerging markets in this paper. We do this because over the past sixty years they were more like emerging markets than advanced economies and because their experience—especially their ability to grow sufficiently to attain advanced economy status—provides valuable lessons.

economies currently eligible for concessional IMF loans, and the remaining 69 economies, which we classify as emerging markets (EMs). See Appendix Table 2 for the list of countries included in the analysis and how they are classified.

Our primary variable of interest is GDP per capita. We focus on this variable for consistency with most of the literature on development, because it is the relevant measure of output for welfare analysis, and since it accounts for differences in population growth rates across countries. Most of the paper's findings continue to hold if one uses real output instead, as documented in section 4 below.

To identify expansions, downturns, and recoveries in output per capita, we use Harding and Pagan's (2002) statistical algorithm, which detects turning points in the log level of a time series. The algorithm searches for local maximums (peaks) and minimums (troughs) that meet specified conditions for the length of cycles and phases. Because we are using annual data, and some downturns and expansions can be as short as one year, the only condition we impose is on the minimum length of the cycle (a contiguous expansion and downturn pair), which we specify to be five years.[5] Expansions are defined as the period from the year after a trough to the year of the peak, inclusive, and downturns are defined as the period from the year after a peak to the year of the trough, inclusive. Recoveries are defined as the period from the year after a trough to the year when output per capita reaches or exceeds the previous peak's level. When output is well behaved, as is the case for most AEs, recoveries are a subset of expansions. For EMDEs, however, expansions following a deep downturn may not reach the previous peak's output per capita until after several cycles are completed, in which case a recovery can span several cycles. Application of Harding and Pagan's (2002) statistical algorithm identifies 117 expansions and 105 downturns in AEs and 576 expansions and 496 downturns in EMDEs.[6]

A. Resilience Across Time and Regions

How has resilience changed over time? Figures 3 and 4 plot the dynamics of output per capita during the 10 years following a peak, with peaks grouped by the decades during which they occurred. We begin by looking at output dynamics following peaks in the 1950s and 1960s—the dark blue lines in the figures. These were golden decades for the AEs, and good decades for the EMDEs as a group—the median downturn for the group during these

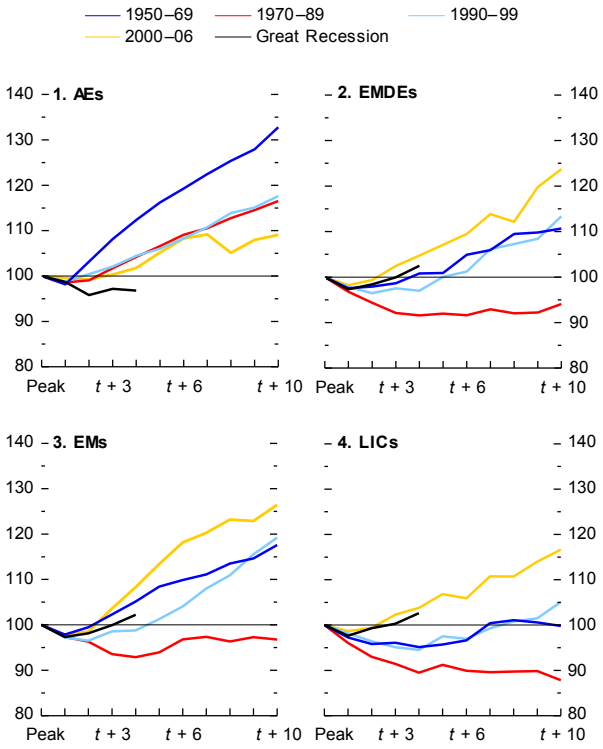
[5] This is not too restrictive a constraint. In AEs, cycles—defined as one contiguous expansion and downturn—have averaged eight and a half years in length (see IMF, 2002). As was noted above, expansions and downturns in EMDEs can often be much more protracted. The imposition of a five-year minimum cycle length serves mainly to filter out high-frequency fluctuations, as EMDEs' output is typically more volatile than output in AEs.

[6] The number of expansions and downturns are not equal due to the presence of incomplete cycles at the start and end of the time series.

Figure 3. Dynamics of Output per Capita following Peaks

(Median output per capita; peak = 100; years on x-axis)

The 1950s and 1960s were good decades for emerging market economies—less so for low-income countries. But the 1970s and 1980s were cruel to both—median output per capita remained below predownturn levels 10 years after the peak. The 1990s saw shallower downturns and faster recoveries in emerging market economies, while the improvement in low-income countries was most evident in 2000–06. Both groups did well during the Great Recession.

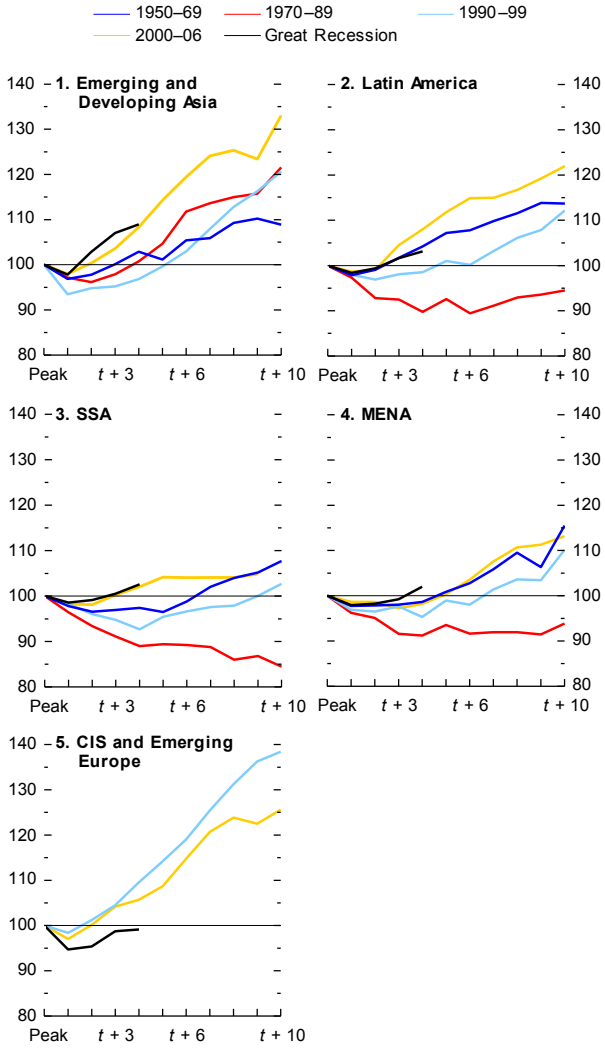


Source: Authors' calculations.
Note: Economy groups are defined in Appendix Table 2. AE = advanced economy; EM = emerging market economy; EMDE = emerging market and developing economy; LIC = low-income country. Peaks in output per capita are identified using the Harding-Pagan algorithm (Harding and Pagan, 2002). Output per capita at the peak (*t*) is normalized to 100, and the median output per capita is plotted in years (*t* + 1) through (*t* + 10) for each group.

Figure 4. Emerging Market and Developing Economy Regions: Dynamics of Output per Capita following Peaks

(Median output per capita; peak = 100; years on x-axis)

There were differences in performance across emerging market and developing economy regions over the past decades. The 1970s and 1980s were difficult for most regions (especially sub-Saharan Africa), but emerging and developing Asia fared relatively well. The 1990s were tough for emerging and developing Asia, but the performance of other regions improved. All regions did better in the 2000s, except emerging Europe during the Great Recession.



Source: Authors' calculations.
Note: Economy groups are defined in Appendix Table 2. CIS = Commonwealth of Independent States; MENA = Middle East and North Africa; SSA = sub-Saharan Africa. Peaks in output per capita are identified using the Harding-Pagan algorithm (Harding and Pagan, 2002). Output per capita at the peak (*t*) is normalized to 100, and the median output per capita is plotted in years (*t* + 1) through (*t* + 10) for each region.

decades was shallow, less than 3 percent, and it took four years for median output per capita to regain or surpass its previous peak (Figure 3, panel 2).

EMDEs took a sharp turn for the worse in the 1970s and 1980s (Figure 3, red lines). The median downturn was much deeper and more protracted—even 10 years later median output per capita failed to recover its losses relative to the previous peak. There was substantial variation across regions, however (Figure 4). Developing Asia was relatively resilient in these decades, with the median downturn and recovery lasting only four years. This was in sharp contrast to Latin America, where many economies went through wrenching debt crises in the 1980s, and to sub-Saharan Africa and the Middle East and North Africa. In all three regions median output per capita 10 years later remained below the previous peak.

Things began improving for the EMDEs in the 1990s (Figure 3, light blue lines). Median output per capita followed a path closer to that observed in the 1950s and 1960s, although again with some variation across regions (Figure 4). This was not a great decade for developing Asia: many economies experienced sharp downturns during the 1997–98 Asian crisis. By contrast, many countries in emerging Europe grew rapidly following their sharp transition-related collapses in output.

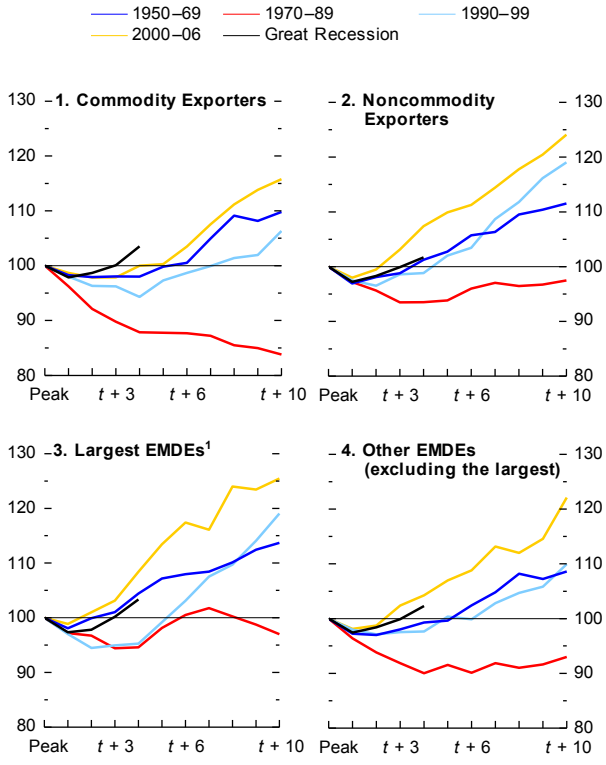
But the strong performance of EMDEs in the early 2000s and throughout the global crisis was unprecedented (Figure 3, solid yellow and black lines). The decline in median output per capita during downturns between 2000 and 2006 was smaller than in previous decades, and it only took two years to recover—this was true for both the EM and LIC subgroups. Even through the Great Recession—arguably the largest external shock in the past half-century—both these subgroups performed well, with median output per capita recovering to its precrisis peak by the third year. The strong performance in the aftermath of the global crisis is evident in most regions, with the exception of emerging Europe, where median output per capita has yet to recover to its precrisis level (Figure 4, black lines).

The improved performance of these economies is not driven by a subset of well-performing countries. As Figure 5 shows, if EMDEs are split into commodity exporters—which have benefited greatly in recent years from high commodity prices—and non–commodity exporters, the same pattern of improvement is evident in both groups. Similarly, isolating the largest EMs such as China and India from the rest does not alter the picture materially.

These economies did so well in the past decade that for the first time, they spent more time in expansion and had smaller downturns than AEs (Figure 6, panel 1). In the 1970s and 1980s, EMDEs spent more than a third of their time in downturns. In the 2000s, however, they spent more than 80 percent of their time in expansion. In contrast, the AEs have spent less time in expansion over the decades, and in the 2000s they were in a downturn more than a fifth of the time. Although EMDEs have been spending more time in expansion, the median growth rate during expansions has not shown a clear trend over the past decades—median

Figure 5. Emerging Market and Developing Economy Subgroups: Dynamics of Output per Capita following Peaks

(Median output per capita; peak = 100; years on x-axis)

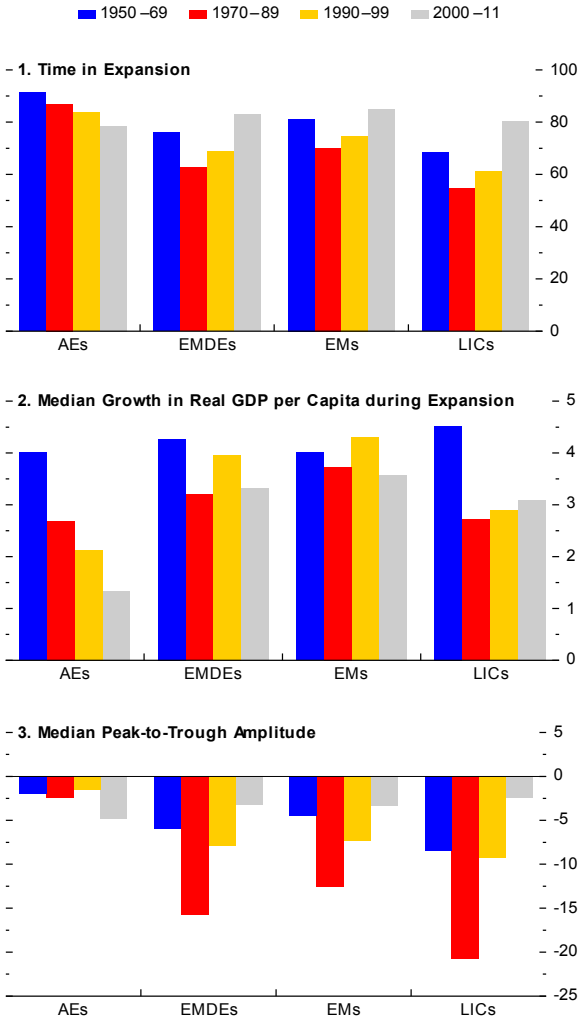


Source: Authors' calculations.
Note: EMDE = emerging market and developing economy. Peaks in output per capita are identified using the Harding-Pagan algorithm (Harding and Pagan, 2002). Output per capita at the peak (t) is normalized to 100, and the median output per capita is plotted in years (t + 1) through (t + 10) for each group.
[1]Refers to the 30 largest emerging market and developing economies based on their average real GDP over the sample period.

Figure 6. Along Which Dimensions Has Emerging Market and Developing Economy Growth Improved?

(Percent)

Emerging market and low-income economies have spent more time in expansion during the past two decades relative to the 1970s and 1980s. The 2000s was the first decade during which both groups spent more time than advanced economies in expansion. Median growth in output per capita during expansions has not risen much, but downturns have become shallower.



Source: Authors' calculations.
Note: Economy groups are defined in Appendix Table 2. AE = advanced economy; EM = emerging market economy; EMDE = emerging market and developing economy; LIC = low-income country. Peaks and troughs in output per capita are identified using the Harding-Pagan algorithm (Harding and Pagan, 2002).

growth during recent expansions is not much different than during the expansions of the 1970s and 1980s (Figure 6, panel 2). But their downturns have become much less severe (Figure 6, panel 3).

B. Why Has Resilience Changed? Taking a Look at Steady-state Growth and Variability

Longer expansions and shorter downturns can be simply manifestations of deeper changes. One possibility is that steady-state or trend growth of EMDEs has been increasing—a higher rate of trend growth would mean that shocks that would have previously caused a downturn now cause only a slowdown. A second possibility is that the variability of growth has lessened, so that the longer expansions and faster recoveries are the result of fewer large, negative fluctuations.[7] Or both changes could be at work.

It is very difficult to estimate potential growth, including for AEs, but one way to shed light on which of these various possibilities is at work is to follow Blanchard and Simon (2001) by modeling output growth as a simple autoregressive process—that is, by letting the growth rate of output per capita be a function of its lagged value and a constant, plus an innovation term. In particular, we estimate:

$$g_t = \alpha + \beta g_{t-1} + \varepsilon_t \qquad \text{with} \qquad \varepsilon_t \sim N\left(0, \sigma^2\right) \qquad (1)$$

where g_t is growth in real GDP per capita at time t, α is a constant, β is the first-order autoregressive coefficient, and ε_t is a mean-zero shock at time t, for all countries over three subperiods—1950-69, 1970-89, and 1990-2007. Table 1 presents the median estimated coefficients and interquartile ranges, by economy group and subperiod, as well as the corresponding steady-state growth, $\alpha/(1-\beta)$, and variability of growth, $\sigma/\sqrt{1-\beta^2}$.

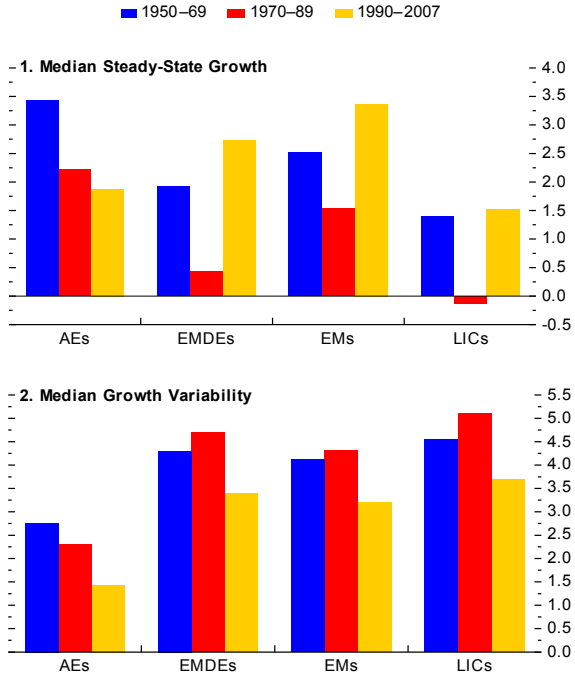
As Figure 7 and Table 1 show, there has been a striking divergence in the evolution of steady state growth and variability between AEs on one hand and EMDEs on the other. In AEs, a continuous decline in steady-state growth—median steady-state growth is less than 2 percent, about half of what it was in the 1950s and 1960s—came hand in hand with a decline in the variability of growth, a phenomenon often referred to as the Great Moderation. These have opposite effects on expansion durations: Lower steady-state growth implies shorter expansions, while lower growth variability implies longer expansions.

[7] A third possibility is that the propagation mechanism has changed—that is, the effect of shocks has become more (or less) persistent over time. But such a change would have ambiguous effects on resilience as defined in this paper. Greater persistence would mean longer-lasting effects for positive shocks, which would prolong expansion, but it would also mean more protracted effects for negative shocks, which would extend the length of recoveries. As it turns out, the estimated autoregressive coefficient (from an AR(1) growth model) for EMDEs has not changed significantly over the past 40 years.

Figure 7. Why Have Emerging Market and Developing Economies Become More Resilient?

(Percent)

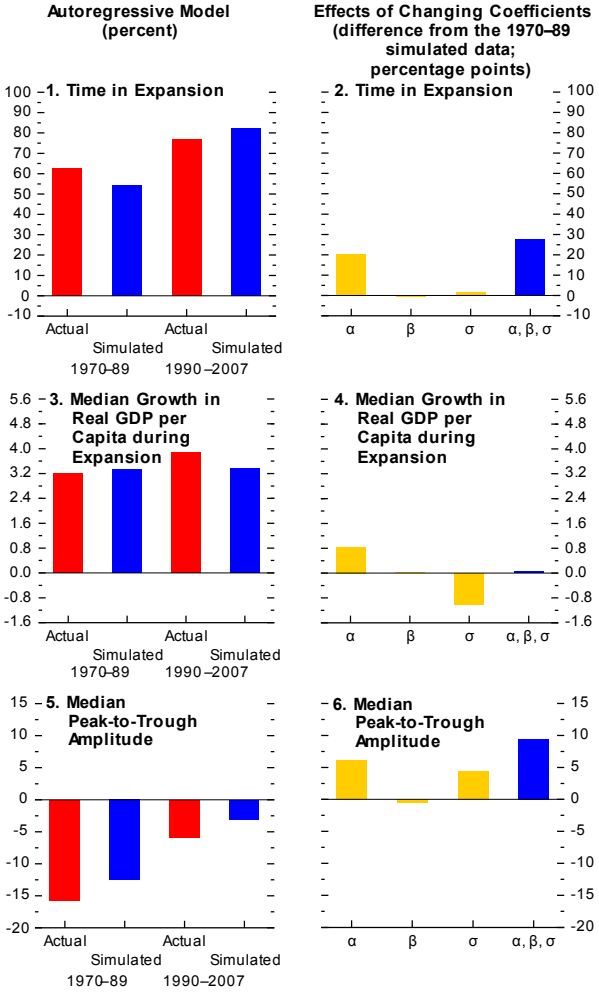
The longer expansions and shorter recoveries observed in these economies during the past two decades are a manifestation of two underlying changes: higher steady-state growth and less variability in growth.



Source: Authors' calculations.
Note: Economy groups are defined in Appendix Table 2. AE = advanced economy; EM = emerging market economy; EMDE = emerging market and developing economy; LIC = low-income country. Growth in output per capita is modeled as an AR(1) process, and the model is estimated for all countries over three subperiods—1950–69, 1970–89, and 1990–2007. See Appendix 4.2 for further details. The results are nearly identical for 1990–2011 as for 1990–2007.

Figure 8. Emerging Market and Developing Economies: Effects of Changing the Autoregressive Model Coefficients

Simulated data from a calibrated AR(1) model with time-varying coefficients broadly replicate the stylized facts of resilience in emerging market and developing economies. However, comparing 1970–89 and 1990–2007 shows that the simulated data overestimate the increase in the time spent in expansion, and underestimate the median real GDP growth during expansions and the amplitude of downturns. Most of the gains in resilience between 1970–89 and 1990–2007 result from an increase in the constant (α) and to a lesser extent from a lower standard deviation of growth innovations (σ).



Source: Authors' calculations.
Note: Peaks and troughs in output per capita are identified using the Harding-Pagan algorithm (Harding and Pagan, 2002). The simulated data are constructed using the median estimated coefficients from Table 1 for each period. These coefficients are plugged into an AR(1) equation for GDP growth per capita, and the growth innovations are drawn from a normal distribution with mean zero and variance of σ^2, to run 1,000 simulations of growth processes for 50 years each for each period. The generated series of GDP growth per capita are then used to construct indices of GDP per capita in levels.

Table 1. AR(1) Median Coefficients and Interquartile Range

		α	β	σ	$\sigma/((1-\beta^2)^{0.5})$	$\alpha/(1-\beta)$
Advanced Economies	1950–69	0.032	0.057	0.028	0.028	0.034
	Interquartile Range	(0.025, 0.037)	(-0.043, 0.107)	(0.017, 0.033)	(0.018, 0.034)	(0.027, 0.040)
	1970–89	0.018	0.181	0.023	0.023	0.022
	Interquartile Range	(0.015, 0.022)	(0.124, 0.274)	(0.020, 0.025)	(0.020, 0.025)	(0.021, 0.026)
	1990–2007	0.010	0.428	0.014	0.014	0.019
	Interquartile Range	(0.009, 0.013)	(0.314, 0.531)	(0.012, 0.016)	(0.013, 0.019)	(0.016, 0.023)
Emerging Market and Developing Economies	1950–69	0.019	-0.069	0.041	0.043	0.019
	Interquartile Range	(0.009, 0.035)	(-0.262, 0.228)	(0.031, 0.061)	(0.032, 0.065)	(0.008, 0.035)
	1970–89	0.003	0.232	0.044	0.047	0.004
	Interquartile Range	(-0.004, 0.014)	(0.076, 0.439)	(0.034, 0.063)	(0.038, 0.069)	(-0.005, 0.020)
	1990–2007	0.018	0.272	0.030	0.034	0.027
	Interquartile Range	(0.008, 0.030)	(-0.002, 0.505)	(0.021, 0.046)	(0.025, 0.051)	(0.012, 0.042)
Emerging Market Economies	1950–69	0.027	-0.067	0.040	0.041	0.025
	Interquartile Range	(0.015, 0.038)	(-0.252, 0.175)	(0.029, 0.057)	(0.032, 0.065)	(0.016, 0.041)
	1970–89	0.009	0.232	0.042	0.043	0.015
	Interquartile Range	(0.001, 0.023)	(0.157, 0.471)	(0.031, 0.061)	(0.033, 0.062)	(0.001, 0.029)
	1990–2007	0.022	0.275	0.030	0.032	0.034
	Interquartile Range	(0.012, 0.034)	(0.106, 0.484)	(0.021, 0.041)	(0.025, 0.046)	(0.020, 0.046)
Low-Income Countries	1950–69	0.010	-0.145	0.043	0.045	0.014
	Interquartile Range	(0.004, 0.029)	(-0.323, 0.242)	(0.032, 0.063)	(0.034, 0.066)	(0.004, 0.025)
	1970–89	-0.001	0.230	0.048	0.051	-0.001
	Interquartile Range	(-0.007, 0.005)	(0.029, 0.314)	(0.039, 0.065)	(0.040, 0.070)	(-0.007, 0.006)
	1990–2007	0.012	0.271	0.033	0.037	0.015
	Interquartile Range	(0.003, 0.026)	(-0.058, 0.550)	(0.020, 0.052)	(0.023, 0.055)	(0.003, 0.033)

Source: Authors' calculations.

In EMDEs, longer expansions, shorter downturns, and faster recoveries are the result of both higher steady-state growth and lower variability of growth. For EMs, median steady-state growth fell from 2½ percent in the 1950s and 1960s to 1½ percent in the 1970s and 1980s, but has more than doubled, to 3¼ percent in the 1990s and 2000s. At the same time, the standard deviation of growth fell to 3¼ percent, from 4¼ percent in the 1970s and 1980s. Both of these trends contributed to longer expansions, shallower downturns, and faster recoveries.[8] The same pattern holds true for LICs, where steady-state growth markedly improved since the stagnation of the 1970s and 1980s, and growth variability declined.

With these estimates on hand, we attempt to disentangle whether the increased resilience observed in EMDEs is mostly due to an increase in their steady state growth or to a decline in growth variability. In particular, we use the median coefficients for EMDEs over each subperiod to run 1000 simulations of growth processes of 50 years each. In addition, we change each coefficient one at a time (α, β, and σ) to assess their importance for resilience. Applying the Harding-Pagan algorithm, we identify peaks and troughs in the level of

[8] The increase in steady-state growth and the decline in growth variability are both statistically significant for the emerging market and developing economies.

simulated GDP per capita, and obtain the duration of expansion, average growth during expansion and the depth of downturns. This simple exercise suggests that the improvement in resilience observed in EMDEs in the last 20 years has been mostly due to an increase in steady state growth, and to a smaller extent to lower output variability (Figure 8, right panel). However, these results should be interpreted with caution: the linear AR(1) model is not able to replicate some of the elements of resilience discussed in this paper, particularly the median real GDP per capita growth during expansion and the amplitude of downturns (Figure 8, left panel).

III. What Factors Are Associated with Resilience?

Having established the stylized facts regarding the changing duration of expansions and speed of recoveries in EMDEs, we now ask which factors are associated with these durations. Specifically, we explore whether shocks, both external and domestic, tend to derail expansions, whether good policies help lengthen expansions and/or hasten recoveries, and whether structural characteristics help strengthen resilience.

It is important to emphasize that it is very difficult to establish causality from factors such as policies and structural characteristics on the one hand to the duration of expansions and recoveries on the other. Many of the variables we explore, including measures of policy space such as low inflation or stronger fiscal balances, are endogenous to the growth process in general; in particular, they could be a function of how long the economy has been in expansion.

A. What shocks tend to end expansions?

There are a number of shocks that could potentially derail expansions in EMDEs. Here, we focus on a subset of economic and financial disturbances, both domestic and external, that have been highlighted in previous studies:[9]

- *External shocks:* We consider increases in global uncertainty and world interest rates, recessions in AEs, and sharp declines in an economy's terms of trade or a sudden stop in capital inflows.[10] Sharp increases in world interest rates, which we proxy with the U.S. real interest rate, have been highlighted by Becker and Mauro (2006), as have spikes in global uncertainty and recessions in advanced economies (Adler and Tovar,

[9] For a related analysis of output drops and shocks, see Becker and Mauro (2006). Adler and Tovar (2012) look specifically at the resilience of emerging markets to global financial shocks. Other shocks, such as political turmoil and civil unrest, have also been important particularly in low-income countries; see Hausmann, Rodriguez, and Wagner (2006) and Berg, Ostry, and Zettelmeyer (2012).

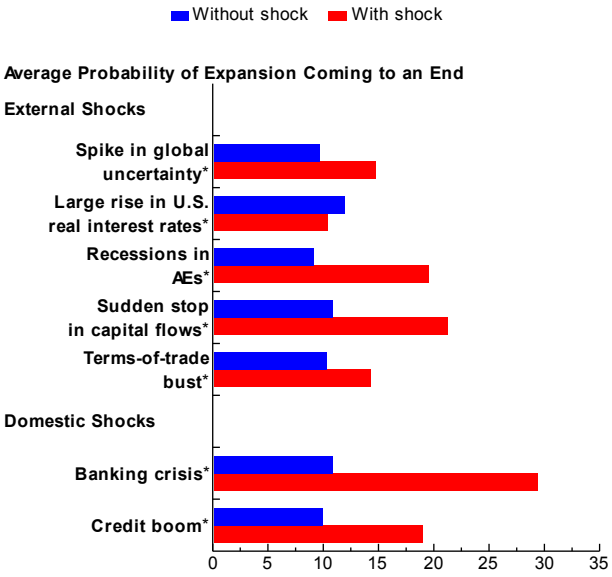
[10] The exact definition of all variables used in the analysis as well as the sources of the data can be found in the Appendix.

2012; IMF, 2010). Similarly, adverse movements in a country's terms of trade or capital flows can be destabilizing (Becker and Mauro, 2006).

- *Domestic shocks:* We consider credit booms and banking crises. Although strong credit growth tends to be associated with strong output growth, excessively high credit tends to generate domestic vulnerabilities such as asset price bubbles or consumption and investment booms, and there is often a downturn when they burst (Tornell and Westermann, 2002; Mendoza and Terrones, 2008). Similarly, banking crises frequently have very negative macroeconomic consequences (Abiad and others, 2009).

Figure 9. Emerging Market and Developing Economies: Effects of Various Shocks on the Likelihood That an Expansion Will End
(Percent)

Various shocks, both external and domestic, are associated with expansions coming to an end. Among external shocks, sudden stops in capital flows, spikes in global uncertainty, recessions in advanced economies, and terms-of-trade busts all significantly increase the likelihood that an expansion will end. Among domestic shocks, credit booms double and banking crises triple the likelihood that an expansion will shift to a downturn by the following year.



Source: Authors' calculations.
Note: AE = advanced economy. The bars show the average probability of exiting an expansion in the absence or presence of various types of external and domestic shocks. For external shocks, which are more likely to be exogenous, the red bars present the contemporaneous effect, that is, the probability that the expansion will end and the downturn will begin in the same year as the shock. For domestic shocks, for which endogeneity is more of a concern, the red bars are the lagged effect, that is, the probability that the expansion will end and the downturn will begin in the year after the shock. The probability of exit conditional on a shock also depends on the length of the expansion at the time the shock occurs; the average probability is used as a summary measure of the distribution of conditional probabilities. Statistically significant differences at the 10 percent level between the underlying distributions are denoted by starred and bolded labels.

The shocks under consideration differ in one important dimension. Many external shocks, such as a rise in global uncertainty or global interest rates or recession in advanced economies, are clearly exogenous to EMDEs. Therefore, we examine the contemporaneous effect of these external shocks on the probability that the expansion ends.[11] But domestic shocks, such as a banking crisis, might be triggered by developments in output—for example, financial sector distress may be the result of a downturn rather than its cause. In order to gauge whether banking crises tend to derail

[11] The case of sudden stops in capital flows is less clear cut; a reversal in net capital flows could be driven by changes in domestic conditions. The findings reported below for sudden stops are not sensitive to whether the contemporaneous or lagged values of the sudden stop indicators are used.

expansions—while minimizing potential reverse causality issues—we examine the likelihood of an expansion ending in the period

immediately following a banking crisis. For credit booms, whose deleterious effects may take time to materialize, we examine the likelihood of an expansion ending in the subsequent period if there has been a credit boom during the previous three years.

The domestic and external shocks under consideration are strongly associated with expansions coming to an end. Figure 9 compares the average probability of an expansion ending when these shocks occur with the average probability of an expansion ending in the absence of such a shock. The mean is taken over the sample probabilities that an ongoing episode will end at each point in the analysis time, and statistical significance is calculated from a test of the difference between the set of probabilities where the shock occurs and the set where it does not. Among external shocks, spikes in global uncertainty, recessions in advanced economies, sudden stops in capital flows, and terms-of-trade busts all significantly increase the likelihood that an expansion will end. Sudden stops and AE recessions have the most pronounced effects; they raise the likelihood that an expansion will end by a factor of two. The effect of domestic shocks is even stronger—credit booms double the likelihood that an expansion will shift into a downturn by the following year, and banking crises triple the likelihood.

B. How are Policies Associated with Resilience?

We now turn to the role of monetary, fiscal, and exchange rate policies. One of the arguments put forward in the literature to explain higher resilience among EMDEs is their improved policy frameworks and increased policy space (Kose and Prasad, 2010; De Gregorio, 2012). For example, many of these economies have adopted inflation targeting and reduced inflation since the early 1990s (Schmidt-Hebbel, 2009). Similarly, some have graduated from procyclical fiscal policy and now have a greater ability to implement countercyclical fiscal policy than in the late 1990s (Frankel, Végh, and Vuletin, 2011) or have reduced their fiscal deficits and public debt.[12] Finally, many have moved away from hard exchange rate pegs, and their more flexible exchange rates act as a shock absorber and reduce the vulnerability of the public and financial sectors to the sudden and severe currency depreciations characteristic of currency crises (Chang and Velasco, 2004).

We analyze both improved policy frameworks and enhanced policy space for fiscal, monetary, and exchange rate policies as follows:

[12] Végh and Vuletin (2012) also find that monetary policy in many emerging market and developing economies has graduated from being procyclical to being more countercyclical.

- *Monetary policy:* We consider whether the central bank has adopted inflation targeting. To measure policy space, we consider whether the economy had an inflation rate above or below 10 percent.[13]

- *Fiscal policy:* We consider whether fiscal policy was countercyclical or procyclical.[14] We also measure policy space—the scope for further increases in public debt without undermining sustainability (Ostry and others, 2010, p. 4). We use two measures: whether the government was running a fiscal surplus or public debt to GDP is below 50 percent of GDP.[15]

- *Exchange rate policy:* We consider whether the economy had a non-pegged exchange rate regime. For policy space, we look at whether the economy had a current account surplus, a low ratio of external debt to GDP (below 40 percent), and a high ratio of international reserves to GDP (above the sample median).[16]

To assess the role of policies, we relate the duration of expansions and the speed of recoveries to the various policy measures using standard duration analysis tools. As a first step in the analysis of the duration of each episode (expansion or recovery) we map the data from calendar time into analysis time (denoted by t), which counts the time elapsed since the start of an episode ($t = 0$). Duration analysis then involves modeling how the evolution of the episode (as influenced by various explanatory variables) affects the likelihood that the episode will end at a point during the analysis time.

As a first pass, we look at the data without imposing any structure or model. Specifically, we use the standard Kaplan-Meier survivor function estimator to gauge whether policy frameworks and the availability of policy space helps lengthen expansions and hasten recoveries. This involves (1) calculating the probability that an episode will continue beyond a point in the analysis time, given that it has lasted until that point; and (2) taking the rolling product of these probabilities at each point in analysis time (Kaplan and Meier, 1958). The

[13] Our results are robust to choosing a more stringent threshold for low inflation, as noted in Table 3.

[14] The cyclicality of fiscal policy is measured by the correlation between the cyclical component of real government expenditure and the cyclical component of real GDP (as in Kaminsky, Reinhart, and Végh, 2004) measured over the previous 10 years. A negative correlation reflects a countercyclical fiscal policy; a positive correlation reflects a procyclical fiscal policy.

[15] Mendoza and Ostry (2008) find that fiscal solvency in EMs diminishes beyond a public debt threshold of 50 percent of GDP, with fiscal solvency measured by the responsiveness of the primary balance to changes in the debt level. Due to the poor coverage of data on fiscal balances across economies and over time, we proxy this variable by the change in the ratios of public debt to GDP adjusted by GDP growth (see Appendix).

[16] Reinhart, Rogoff, and Savastano (2003) find that "default in emerging markets can and does occur at ratios of external debt to GDP that would not be considered 'excessive' for the typical advanced economy." About one-fifth of defaults they study in these countries occurred when external debt was less than 40 percent of GDP, and one-third occurred when external debt was between 40 and 60 percent of GDP.

result is a mapping of analysis time to the probability of continuation, given that an episode has lasted until that point.

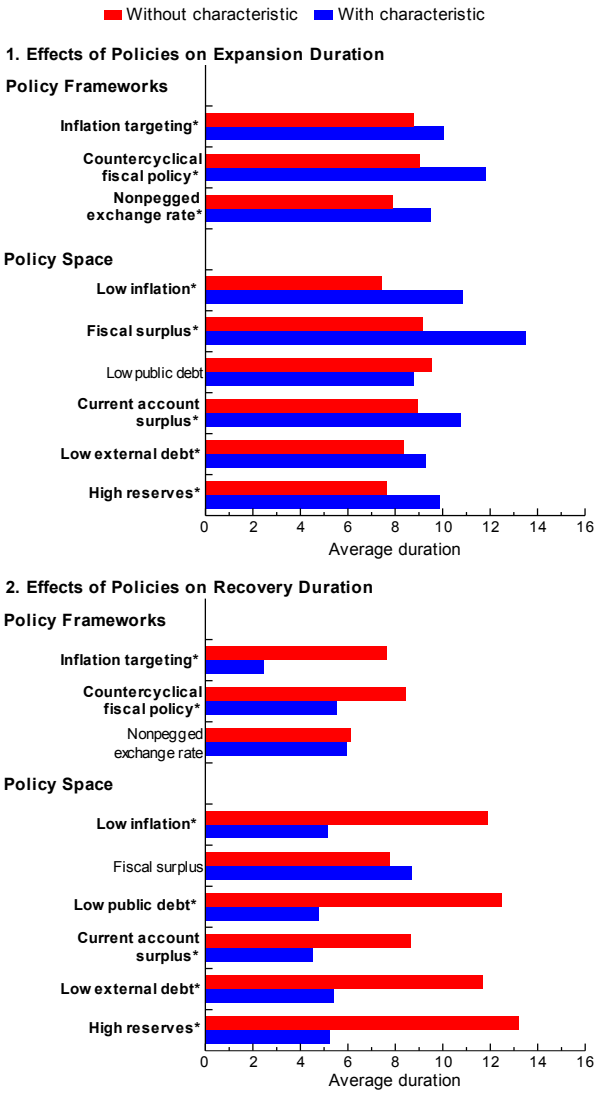
$$\hat{S}(t) = \prod_{j \| t_j \le t} \left(\frac{n_j - d_j}{n_j} \right), \qquad (2)$$

where j indexes the set of observed episode lengths, $\hat{S}$ represents the estimated survival curve, n_j is the number of episodes at risk of ending at time t_j, given that they have lasted until that time, and d_j is the number of episodes at time t_j that actually ended. From this curve (using the sample with or without the characteristic of interest), we calculate the expected duration of the episode. Statistical significance is given by a log-rank test of the difference between the two estimated survival curves.

We find that good policy frameworks have helped EMDEs prolong their expansions and hasten their recoveries.[17] Figure 10 illustrates how their average duration is associated with the various measures of policy frameworks

Figure 10. Emerging Market and Developing Economies: Effects of Policies on Expansion Duration and Speed of Recovery
(Years)

Good policies contribute to emerging market and developing economies' resilience. Specifically, greater policy space (as measured by low inflation and favorable fiscal and external positions) and improved policy frameworks (as measured by countercyclical policy, the adoption of inflation targeting, and more flexible exchange rate regimes) are associated with longer expansions and faster recoveries.



Source: Authors' calculations.
Note: The bars show the average duration of expansions and recoveries in the absence or presence of the given characteristic. The average duration is used as a summary measure of the underlying duration distribution conditional on the characteristic. Statistically significant differences at the 10 percent level between the underlying distributions are denoted by starred and bolded labels.

[17] As with domestic shocks, we used lagged values of the policy variables to miniize reverse causality, so that policy characteristics in the current year are related to the likelihood that an expansion or recovery will end in the following year.

and policy space.[18] In terms of policy frameworks, inflation targeting and a countercyclical fiscal policy significantly increase the length of expansions and hasten recoveries.[19] In addition, not having a pegged exchange rate tends to lengthen expansions, but has no significant effect on the speed of recoveries.

Adequate policy space also appears to provide a cushion. Figure 10 shows that having a low inflation rate significantly lengthens expansions and hastens recoveries. Having a fiscal surplus in the previous year leads to significantly longer expansions, but there is no significant impact of this variable on the speed of recoveries. Economies with low levels of public debt tend to recover significantly faster from downturns, but this variable has no significant effect on the length of expansions. Finally, a strong external position (characterized by current account surpluses, low external debt, and high international reserves) significantly lengthens expansions and hastens recoveries.[20]

C. How are Structural Characteristics Associated with Resilience?

In addition to macroeconomic policies, an economy's structural characteristics shape its economic performance and response to shocks. Various hypotheses have been put forward in recent years that relate changes in the resilience of EMDEs to shifts in their economic structures. While there are many potential characteristics that could affect resilience, we focus on the following for conciseness:

- *Increased trade openness and diversification:* There has been a significant shift in both the trade openness and trading patterns of EMDEs. Trade openness has increased substantially over time as trade regimes have been liberalized and the costs of transportation and communication have fallen. Greater trade openness helps reduce dependence on domestic demand and vulnerability to domestic shocks, but it may also make economies more vulnerable to slowdowns in external demand. Greater diversification across trading partners would help reduce these economies' vulnerability to slowdowns in specific trading partners. In this regard, the dramatic increase in trade among EMDEs is thought to have helped them weather the recent

[18] The average recovery duration shown in Figure 9 may be somewhat surprising to those used to the much shorter recoveries in advanced economies, but recall from Figure 3 that the *median* path of output per capita following peaks in the 1970s and 1980s did not recover to the previous peak's level even 10 years later.

[19] This result is in line with de Carvalho Filho (2011), who documents that inflation targeting economies fared better during the Great Recession.

[20] Several studies have found that the strength of the countries' external position (low levels of foreign currency denominated debt, low current account deficits) was an important factor in explaining the cross-country incidence of the Great Recession. See, for example, Blanchard, Faruquee, and Das (2010) and Lane and Milesi-Ferretti (2010). Didier, Hevia, and Schmukler (2012) document the importance of foreign reserves in explaining the speed of recovery in the aftermath of the 2009 global crisis.

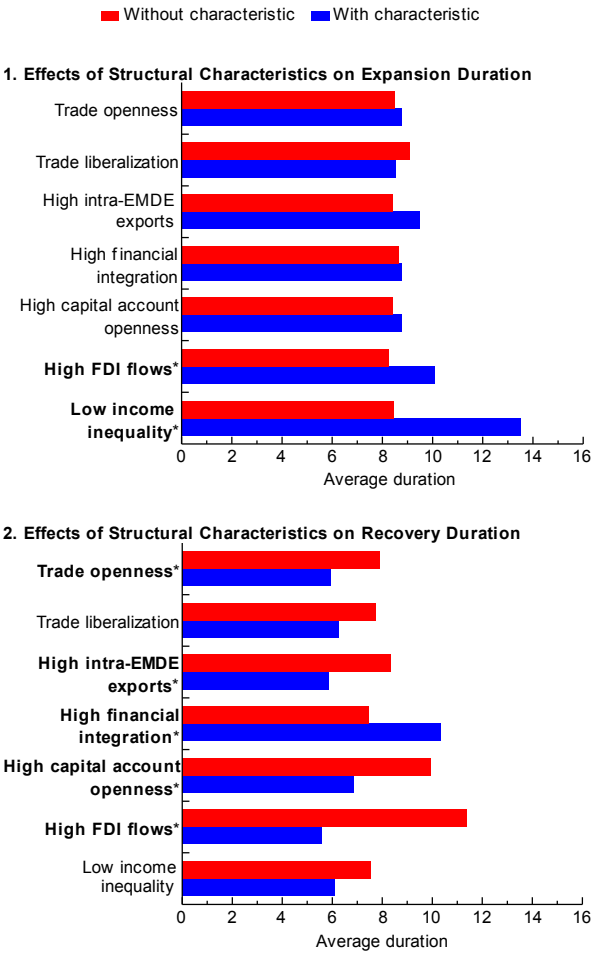
advanced economy crisis, although prospectively it may increase their vulnerability to a slowdown in large emerging markets like China.

- *Increased financial openness and changes in the composition of capital flows:* As with trade, there has been a steady move toward greater financial openness in many regions. Increased capital account openness can facilitate risk sharing, but it can also leave countries more vulnerable to financial shocks or sudden stops in capital flows. For some EMDEs, susceptibility to the volatility of capital flows has been mitigated by a change in their composition—toward foreign direct investment (FDI), which is thought to be more stable. (Dell'Ariccia and others, 2008)

- *Income equality:* Rodrik (1999) posits that when social divisions run deep, the effects of external shocks are magnified by the distributional conflicts they trigger. Adjustment to external shocks often has distributional consequences, and in economies where "latent social conflict" is high—as measured by proxies such as income inequality, ethnic and linguistic fractionalization, and social mistrust—adjustment tends to be inadequate, prolonging the negative effects of the shock. More recent papers such as Berg and Ostry (2011) find that greater income equality enables countries to sustain periods of rapid growth.

Figure 11. Emerging Market and Developing Economies: Effects of Structural Characteristics on Expansion Duration and Speed of Recovery
(Years)

It is more difficult to tease out the effects of economies' structural characteristics—such as trade patterns, composition of capital flows, and the degree of financial integration—on resilience. Among these characteristics, only FDI flows and low income inequality were significantly associated with longer expansion. The effects of structural factors on the speed of recovery are more distinct: greater trade openness and diversification, lower financial integration, higher capital account openness, and higher FDI are all significantly associated with faster recoveries. Income inequality does not have a significant effect on the speed of recovery.



Source: Authors' calculations.
Note: EMDE = emerging market and developing economy; FDI = foreign direct investment. The bars show the average duration of expansions and recoveries in the absence or presence of the given characteristic. The average duration is used as a summary measure of the underlying duration distribution conditional on the characteristic. Statistically significant differences at the 10 percent level between the underlying distributions are denoted by starred and bolded labels.

While the effects of shocks and policies on the duration of expansions are apparent and almost always significant, the effects of structural characteristics are less clear-cut (Figure 11, panel 1). We use the Kaplan-Meier estimator outlined above to examine the patterns of correlation between these structural characteristics and our measure of resilience (again we use lagged values to mitigate reverse causality concerns). Greater trade openness, whether measured de facto by the sum of exports and imports relative to GDP or de jure by the extent of trade liberalization, is not significantly associated with the duration of expansions. Neither are the extent of intra-EMDE trade or greater financial integration. In contrast, greater FDI flows (measured as a share of GDP) are associated with a small but statistically significant increase in the average duration of expansions. The strongest structural correlate of expansion duration, at least in this bivariate exercise, is income inequality—countries with below-median income inequality have expansions that last about five years longer than those with above-median income inequality.

The effects of structural factors on the speed of recovery are more distinct (Figure 11, panel 2). Greater trade openness and diversification, lower financial integration, higher capital account openness, and higher FDI are all significantly associated with faster recoveries. But lower income inequality does not have a significant effect on the speed of recovery.

D. Putting it all Together: Multivariate Analysis

To this point, the paper has examined individual variables and their association with the resilience of EMDEs. However, these determinants rarely change in isolation, and so a proper assessment of each variable's influence requires controlling for movements in the other variables. To do this, we undertake a multivariate analysis of resilience. We do this using the tools of parametric duration analysis, which allow us to model the duration of an expansion or the speed of recovery as a function of several variables simultaneously. From this analysis, we get a sense of how each variable is related to the chances that the episode under study will last—whether the variable tends to increase or decrease the expected length of an episode at a given time.

The duration model used in the multivariate analysis is an accelerated-failure-time model, based on the Weibull distribution. The model assumes that the length of episode j, here denoted t_j, can be broken down into two components: a baseline expected duration which captures how long an episode is likely to last at a particular time, independent of other variables – this is the Weibull-distributed random variable τ_j, and a "shifter" or scaling proportion that scales this baseline and is a function of a set of explanatory variables (denoted by the vector x_{t_j}):

$$t_j = \exp\left(x_{t_j}'\beta\right)\tau_j = \exp\left(\sum_{k=1}^{K}\beta_k x_{k,t_j}\right)\tau_j, \quad (3)$$

where τ_j has a Weibull distribution with shape parameter γ. The estimated coefficients β_k are the weights applied to each of the explanatory variables in the scaling proportion. The effects of the explanatory variables on the baseline are given by the time ratios (the exponentiated coefficients), which are the numbers we report below for each explanatory variable. The magnitude of these time ratios denotes the factor by which the expected duration of the expansion $E\left(\tau_j\right)$ would be shortened or lengthened by a one-unit change in a variable.[21]

The large number of potential explanatory variables and the poor data availability for some of these necessitate a parsimonious approach to the multivariate analysis. As noted, a wide array of factors have been identified as possible factors in the improved resilience of EMDEs, but there is only limited historical experience upon which to draw to test the simultaneous impact of these various factors. For example, the data is extremely sparse for our measure of the cyclicality of fiscal policy prior to the 1990s. As a result, we focus on a selected subset of the variables explored in the previous section:

- *External shocks:* global uncertainty, the U.S. real interest rate, terms-of-trade busts, sudden stops in capital inflows, and advanced economy recessions;
- *Domestic shocks:* credit booms and systemic banking crises;
- *Domestic policies:* indicators of single-digit inflation and low public debt (below 50 percent of GDP); and a measure of international reserves to GDP; and
- *Structural characteristics:* trade openness, financial openness, and income equality.

Apart from the external shocks, all the explanatory variables are lagged as in the previous section, to mitigate potential endogeneity.

[21] See Cleves and others (2010) for an in-depth description of the approach.

Table 2. What Ends Expansions and Recoveries?

Explanatory Variable	Expansions			Recoveries		
	All Years	Pre-1990	Post-1989	All Years	Pre-1990	Post-1989
Implied S&P 100 Volatility (VXO)[1]	0.951***	0.981	0.943***	1.054***	1.060**	1.042**
	[-4.179]	[-0.985]	[-4.565]	[2.846]	[2.143]	[2.012]
U.S. Ex Ante Real Interest Rate	0.956	0.993	0.835***	1.085	0.960	1.068
	[-1.461]	[-0.158]	[-3.479]	[1.502]	[-0.397]	[0.748]
Terms-of-Trade-Bust Indicator	0.968	0.802	1.134	1.751	1.819	1.726*
	[-0.214]	[-1.034]	[0.740]	[1.582]	[1.065]	[1.944]
Sudden Stop (capital inflows) Indicator	0.590***	0.497*	0.841	0.921	1.208	0.834
	[-2.927]	[-1.885]	[-1.254]	[-0.171]	[0.168]	[-0.452]
Advanced Economy Recession Indicator	0.642***	0.668**	0.680*	1.271	1.006	1.012
	[-4.074]	[-2.420]	[-1.911]	[0.922]	[0.0209]	[0.0372]
Credit Boom during Past Three Years	0.616***	0.591***	0.705***	1.449	1.200	1.546
	[-3.913]	[-2.621]	[-2.610]	[0.875]	[0.300]	[0.867]
Banking Crisis Indicator	0.550***	0.504***	0.538***			
	[-3.376]	[-3.302]	[-2.830]			
Single-Digit Inflation Indicator	1.473***	1.574**	1.276**	0.692	0.788	1.132
	[3.185]	[2.474]	[2.102]	[-1.465]	[-0.674]	[0.457]
Low Public Debt to GDP Indicator	1.009	0.998	1.019	0.550***	0.623	0.472***
	[0.0713]	[-0.0117]	[0.132]	[-2.648]	[-1.308]	[-2.969]
International Reserves to GDP	1.009***	1.006	1.004	0.993	1.001	0.998
	[2.866]	[1.289]	[0.903]	[-0.927]	[0.0636]	[-0.241]
Income Inequality (Gini coefficient)	0.986**	0.976***	0.997			
	[-2.144]	[-2.833]	[-0.459]			
Trade Openness (exports plus imports to GDP)	0.999	1.001	1.000	0.993**	0.987**	1.000
	[-0.451]	[0.373]	[-0.170]	[-2.327]	[-2.324]	[-0.0371]
Financial Openness (external assets plus liabilities to GDP)	0.999***	0.999***	1.000	1.001**	1.004	1.000
	[-3.121]	[-4.840]	[-0.549]	[2.154]	[1.183]	[-0.488]
Observations		1,264			832	
Number of Episodes		188			144	
Number of Exits		126			118	
Number of Economies		75			76	
Weibull Shape Parameter	1.516	1.408	2.277	0.829	0.857	1.024
Z statistic of Shape Parameter	6.829	3.258	2.928	-3.792	-1.846	1.713
Log Likelihood	-103.0	-88.1		-201.1	-189.1	
Model Chi-Squared *p* Value	0.000	0.000		0.000	0.000	

Source: Authors' calculations.
Note: Exponentiated coefficients shown are time ratios, which indicate whether the variable tends to shorten (less than 1) or lengthen (greater than 1) the expected time-in-episode. *Z* statistics are given in brackets underneath the coefficient estimates. A negative *z* statistic indicates that the associated variable tends to shorten an episode; if the *z* statistic is positive, it tends to lengthen an episode. *, **, and *** denote significance at the 10 percent, 5 percent, and 1 percent levels, respectively.
[1]VXO = Chicago Board of Exchange S&P 100 volatility index.

D.1. What ends expansions?

The first column of Table 2 shows how the expected duration of an expansion is associated with these variables. As discussed above, the table reports the time ratios, i.e. the factor by which the expected duration of the expansion is increased relative to the baseline. If the time ratio is greater than 1, the variable tends to lengthen the expansion or slow down the recovery relative to the baseline; if it is less than 1, it tends to shorten the expansion or hasten the recovery.

The multivariate duration analysis for expansions mostly confirms the bivariate relationships reported above. External and domestic shocks tend to reduce the length of expansions. For example, a 1 point rise in global uncertainty reduces the expected duration of an expansion by about 5 percent (because the baseline expected duration is multiplied by 0.951). A 1 percentage point rise in the U.S. real interest rate has a similar effect. Sudden

stops, advanced economy recessions, credit booms, and banking crises reduce the expected duration of an expansion by about 40 percent. These shocks have statistically significant effects, except terms-of-trade busts and the U.S. real interest rate.

The policy-related variables tend to increase the length of expansions, although the statistical significance of these effects varies. Low inflation lengthens the expansion by about 47 percent, while a 10 percent of GDP increase in international reserves lengthens it by about 9 percent. In the multivariate model, a low public debt level does not have a statistically significant effect on expansion duration.

The structural characteristics tend to have little to no effect. Only income inequality and greater financial integration reduce the expected expansion duration in a statistically significant manner, but even then, the magnitudes are small.

As seen in the second and third columns of Table 2, there is also some evidence that the effects of some variables on the length of expansions have changed over time. To investigate whether the greater resilience we observe after 1989 results from changes in the sensitivity of expansions to shocks and policies, we estimate a model whose effects are allowed to be different before and after 1989 (Table 2, columns 2 and 3).

The sensitivity of expansion duration to shocks has not lessened over time. Although the effect of some external shocks is slightly weaker after 1989, only global uncertainty and U.S. real interest rates have statistically significant effects that differ across these subperiods, and both tend to shorten expansions more after 1989. Domestic shocks also tend to have a weaker effect after 1989, but the difference is not statistically significant.

The effects of policy-related variables and structural characteristics are generally similar across the two subperiods, with a couple of notable exceptions. Income inequality and financial openness shorten expansion only before 1989; after 1989, they have no statistically significant effect.

D.2. What hastens recoveries?

The three right-hand columns of Table 2 show how the various factors affect the speed of recovery. Unfortunately, data limitations force us to drop two of the variables—banking crises and income equality.

The multivariate results broadly confirm the directional effects from the bivariate analyses, but statistical significance is much weaker. There are only a few statistically significant variables associated with the speed of recoveries.

In general, recoveries accompanied by the large shocks we consider in this paper tend to be slower (the time ratio is larger than 1), but only global uncertainty is statistically significant. Greater policy space helps hasten recoveries, but again with less statistical

significance than in the bivariate analyses. Low inflation, low public debt, and high reserves tend to hasten recoveries, but only low public debt has statistically significant effect. Among the structural characteristics, trade openness significantly hastens recoveries and financial openness significantly slows them, but both effects are comparatively small.

The fifth and sixth columns of Table 2 show the estimated effects on the speed of recoveries before and after 1989. Among the external shocks, only the effect of global uncertainty is consistently significant, but it does not appear to have changed over time. Terms-of-trade busts slow recoveries, but are only statistically significant after 1989. Low public debt dramatically hastens recoveries after 1989 (roughly halving the expected duration), but it had no significant effect before 1989. Greater trade openness tended to hasten recoveries more before than after 1989. The estimated effects of the other policy-related variables and structural characteristics were not statistically different between the two subperiods.

IV. ROBUSTNESS

We explored the robustness of the results for expansions to the inclusion of additional controls, changes in explanatory variable definitions, alternative measures of expansions, and different distributional assumptions. We also attempted to investigate the robustness of the results for recoveries, but found that the likelihood function was not well-behaved for richer models, reflecting a small sample size issue with recoveries.

A. Unobserved Heterogeneity and Omitted Variables

One of the main challenges that we face is the selection of covariates to include in the multivariate model. As previously discussed, economic theory and the large empirical literature on growth suggest a very wide range of potential determinants of a country's ability to sustain expansions and recover quickly from shocks. By focusing on only a subset of these determinants, we might be introducing a bias that affects the coefficient estimates of the variables included in eq. (3). Without claiming that we have fully addressed this concern, we perform several specification checks that confirm the robustness of the findings to changes in model estimation and the inclusion of some additional controls.

Following Berg, Ostry and Zettelmeyer (2012), we first assume that the model is correctly specified, except for the presence of unobserved heterogeneity (also referred to as "frailty") in the form of a multiplicative stochastic term which is added to the proportional hazard model, eq. (3). This term modifies the hazard conditional on t and x_t for all observations pertaining to a particular country. An analogue to this approach in a panel regression framework is the use of random effects. Table 3, column (2), demonstrates that allowing for this unobserved heterogeneity across countries has almost no effect on the regression coefficients and their significance levels.

Table 3. What Shortens Expansions? Robustness Checks

Explanatory Variable	Baseline	Baseline with Economy Frailties	Baseline with Decadal dummies (80s 90s 00s)	Baseline with Regional dummies (Asia Latam SSA)	Alt. Sudden Stop	Alt. Inflation	Alternative Output	Growth Expansions	Alternative Distribution (generalized gamma)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Implied S&P 100 Volatility (VXO)[1]	0.951***	0.951***	0.944***	0.961***	0.951***	0.952***	0.937***	0.967**	0.950***
	[-4.179]	[-3.325]	[-4.624]	[-4.193]	[-4.138]	[-3.851]	[-4.785]	[-2.191]	[-4.659]
U.S. Ex Ante Real Interest Rate	0.956	0.956	0.982	0.944**	0.956	0.944*	0.917**	0.986	0.939*
	[-1.461]	[-1.110]	[-0.494]	[-2.118]	[-1.471]	[-1.801]	[-2.399]	[-0.328]	[-1.862]
Terms-of-Trade-Bust Indicator	0.968	0.968	0.982	0.982	0.969	0.953	1.051	0.801	0.926
	[-0.214]	[-0.198]	[-0.116]	[-0.134]	[-0.209]	[-0.298]	[0.231]	[-0.826]	[-0.450]
Sudden Stop (capital inflows) Indicator	0.590***	0.590*	0.590***	0.702***		0.622**	0.363***	0.657	0.523***
	[-2.927]	[-1.893]	[-2.731]	[-2.672]		[-2.536]	[-4.946]	[-1.333]	[-2.656]
Advanced Economy Recession Indicator	0.642***	0.642**	0.619***	0.695***	0.648***	0.608***	0.685***	0.680***	0.622***
	[-4.074]	[-2.179]	[-3.967]	[-3.706]	[-4.016]	[-4.449]	[-3.065]	[-2.590]	[-4.091]
Credit Boom during Past Three Years	0.616***	0.616***	0.626***	0.643***	0.620***	0.617***	0.596***	0.497***	0.601***
	[-3.913]	[-2.833]	[-3.631]	[-3.621]	[-3.843]	[-3.664]	[-3.454]	[-3.697]	[-3.373]
Banking Crisis Indicator	0.550***	0.550**	0.567***	0.546***	0.550***	0.524***	0.516***	0.451**	0.480***
	[-3.376]	[-2.197]	[-3.180]	[-3.912]	[-3.387]	[-3.584]	[-3.561]	[-1.977]	[-3.079]
Single-Digit Inflation Indicator	1.473***	1.473***	1.444***	1.298**	1.475***		1.604***	1.145	1.434***
	[3.185]	[2.923]	[2.954]	[2.443]	[3.192]		[3.077]	[0.688]	[2.925]
Low Public Debt to GDP Indicator	1.009	1.009	0.989	1.009	1.001	1.019	0.740*	1.276	1.016
	[0.0713]	[0.0628]	[-0.0811]	[0.0891]	[0.0119]	[0.149]	[-1.699]	[0.988]	[0.127]
International Reserves to GDP	1.009***	1.009	1.009***	1.009***	1.009***	1.009***	1.010**	1.012*	1.009***
	[2.866]	[1.583]	[3.037]	[3.123]	[2.887]	[3.099]	[2.122]	[1.893]	[2.620]
Income Inequality (Gini coefficient)	0.986**	0.986**	0.987**	1.004	0.986**	0.986**	0.998	0.990	0.990
	[-2.144]	[-1.987]	[-2.035]	[0.584]	[-2.154]	[-2.094]	[-0.271]	[-0.847]	[-1.327]
Trade Openness (exports plus imports to GDP)	0.999	0.999	0.999	0.999	0.999	1.000	0.997*	1.003	1.000
	[-0.451]	[-0.317]	[-0.468]	[-0.844]	[-0.495]	[-0.377]	[-1.888]	[1.605]	[0.0951]
Financial Openness (external assets plus liabilities to GDP)	0.999***	0.999*	0.999***	0.999***	0.999***	0.999***	1.000	0.998**	0.999**
	[-3.121]	[-1.766]	[-3.577]	[-3.265]	[-3.094]	[-3.037]	[-0.484]	[-2.324]	[-2.417]
Global Uncertainty Spike and Sudden Stop Joint Indicator					0.603***				
					[-2.828]				
Below 5 Percent Inflation Indicator						1.330*			
						[1.729]			
Observations	1,264	1,264	1264	1264	1,264	1,264	1,417	452	1,264
Weibull Shape Parameter	1.516	1.516	1.498	1.764	1.519	1.476	1.401	1.438	1.506[§]
Z Statistic of Shape Parameter	6.829	2.653	6.411	10.14	6.817	5.968	5.372	3.177	6.67
Number of Episodes	188	188	188	188	188	188	163	84	188
Number of Exits	126	126	126	126	126	126	99	63	126
Number of Economies	75	75	75	75	75	75	75	54	75
Log Likelihood	-103.0	-103.0	-101.0	-89.50	-103.7	-105.6	-73.5	-58.0	-99.2
Model Chi-Squared *p* Value	0.000	0.000	1.90e-20	1.32e-33	0.000	0.000	0.000	0.000	0.000

Source: Authors' calculations.

Note: Exponentiated coefficients shown are time ratios, which indicate whether the variable tends to shorten (less than 1) or lengthen (greater than 1) the expected time-in-episode. *Z* statistics are given in brackets underneath the coefficient estimates. A negative *z* statistic indicates that the associated variable tends to shorten an episode; if the *z* statistic is positive, it tends to lengthen an episode. *, **, and *** denote significance at the 10 percent, 5 percent, and 1 percent levels, respectively.

[1]VXO = Chicago Board of Exchange S&P 100 volatility index.

[§]The generalized gamma distribution nests the Weibull distribution baseline, with two shape parameters. The reciprocal of the first (1/σ), shown here, corresponds to the Weibull shape parameter, if the second, denoted κ, equals 1. The model estimates κ = 0.468, which is significantly different from 1 at the 1 percent level. Despite this, the inferred time ratios and other properties are close to the Weibull baseline.

We then expand the set of covariates included in X with variables that are most likely to proxy for potential omitted determinants of resilience. Given the large differences in the duration of expansion across time periods (as depicted in Figure 6), we include a set of decadal dummies to capture any global shocks that might have caused the baseline resilience of EMDEs to vary across decades. Controlling for these decade dummies leaves the estimated coefficients on our core set of covariates virtually unchanged (Table 3, column (3)). We also augment the model to include a set of regional dummies, since, as suggested in Figure 4, there are substantial differences across regions in the average length of duration. Table 3, column (4), indicates that the inclusion of these regional dummies also has a negligible effect on our estimated coefficients. In sum, our results do not seem to simply capture differences across regions or over time.

B. Alternative Definitions of Explanatory Variables

Our main findings are also robust to alternative definitions of many of the variables of interest. In column (5) of Table 3, we refine the definition of sudden stops to include only "systemic sudden stops." This definition intends to minimize the potential endogeneity of sudden stops, which could be triggered by expectations of the end of an expansion, by taking

into account only episodes that coincide with spikes in global uncertainty. We obtain very similar results with this definition of foreign capital reversal.

We also consider an alternative cut-off for the low inflation indicator. In the baseline specification, a country is classified as having low inflation in year *t* if the rate of increase in consumer prices is less than 10 percent. The results are virtually unchanged if the cutoff for low inflation is set to 5 percent (Table 3, column (6)). We have also investigated the robustness of the results to including the continuous measures that underlie some of the indicator variables in the baseline (namely using the actual inflation rate, level of public debt, terms-of-trade change and rate of credit growth) (results available upon request).

C. Alternative Definitions of Expansions

Following the expansive literature on economic growth, our baseline methodology relies on the evolution of real GDP per capita to define periods of expansions and downturns. However, we also examine to what extent our findings are sensitive to this particular definition of economic welfare, rather than overall GDP, as typically used in the business cycle literature. We thus apply the Harding-Pagan algorithm to the log real GDP series to identify turning points and define periods of expansions. Estimating the duration model in eq. (3) on the periods of expansion derived from the GDP series yields very similar results to the baseline, as reported in column (7) of Table 3.

We also look at whether our findings for expansions hold for expansions characterized by rapid and sustained growth. To identify these episodes, we removed a 4 percent linear growth trend from real GDP per capita for each economy and apply the Harding-Pagan algorithm to the detrended series. We then undertake our baseline duration analysis for the growth expansions (periods from trough to peak in the detrended series). The results of this analysis are shown in column (8) of Table 3. They are broadly aligned with the findings for the level expansions (column 1)—external and domestic shocks tend to shorten growth expansions, while policy space tends to lengthen them. The statistical significance of the estimated results is sometimes reduced, but this appears to be largely a function of the much smaller sample size; the point estimates themselves are quite similar to the baseline for level expansions. Thus, the variables that are associated with longer level expansions are also associated with longer growth expansions.

D. Alternative Distributional Assumptions

Finally, we test the sensitivity of our findings to alternative distributional forms. In the baseline specification, we assumed the Weibull distribution for the hazard model. In column (9) of Table 3, we relax this assumption and use instead the generalized gamma distribution, of which the Weibull is a special case. As shown, the coefficient estimates for the covariates are not very sensitive to the use of the generalized gamma distribution and

their statistical significance is similar across the two distributions.[22] Moreover, a likelihood ratio test of the Weibull versus the generalized gamma fails to reject the Weibull at the 1% significance level.

V. Wrapping Up: What Has Contributed to Increased Resilience?

We conclude by examining the key drivers of the apparent resilience that EMDEs have demonstrated in recent years. There are a number of potential explanations. One is that the shocks that afflicted them in past decades—credit boom-bust cycles, sudden stops, and financial crises, to name just a few—have become less frequent and/or less severe. [23]

A second is that while the shocks themselves have not changed, the effects of these shocks have decreased over time. But, as shown in the previous section, the effects of shocks on the duration of expansions and the speed of recoveries have not lessened since 1989. A third is that EMDEs have built bigger cushions—in the form of better policy frameworks and the enhanced policy space or more diversified production or trade patterns—that help them better weather shocks. We explore each of these possible explanations.

Homegrown shocks seem to have become less frequent in recent years (Figure 12, panels 1 and 2). The share of EMDEs that had a banking crisis, for example, rose during the 1990s but fell during the 2000s. Even with substantial financial spillovers and a much weaker economic environment as a result of the Great Recession, only four of these economies (Latvia, Mongolia, Nigeria, Ukraine) had a systemic banking crisis during 2008–09, and none had one in the past two years. Similarly, the incidence of credit booms fell between the 1990s to the 2000s.[24] Although the number of credit booms was high during 2008–09, it fell back during 2010–11 as economic and credit conditions worsened and as some of these economies tightened macroeconomic and credit policies to rein in rapid credit growth. In addition, the deviation from trend of real credit per capita during credit booms in recent years has been lower on average than during booms in previous decades (see Figure 12, panel 2, red line).

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[22] The generalized gamma distribution requires two shape parameters, rather than the single parameter that the Weibull distribution uses. For the sake of space, we do not show these parameters, but the results are available upon request.

[23] While it may be tempting to attribute fewer or less severe shocks to luck, it should be kept in mind that many of these so-called shocks are endogenous to policymaking. For example, fewer credit booms or banking crises can be the result of a more strict regulation and supervision of the financial sector.

[24]Emerging Europe is a notable exception here—the credit boom-bust cycle that several emerging European countries have gone through is one of the causes for the region's weaker performance in the past decade

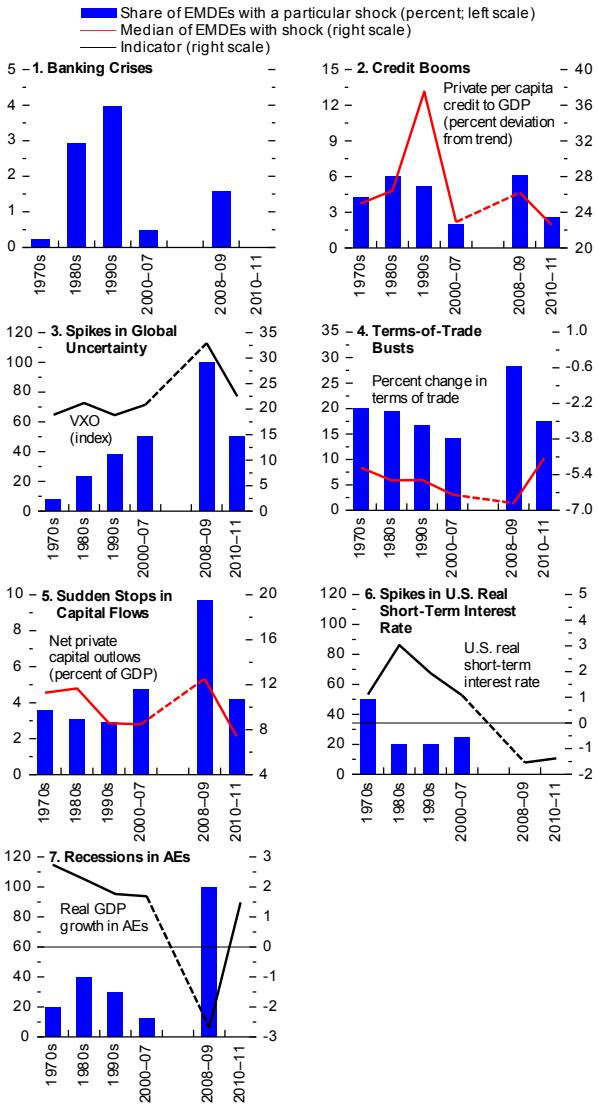
Some external shocks have become more frequent, others less frequent (Figure 12, panels 5, 6, and 7). Sudden stops and spikes in global uncertainty have been more common in the past decade. But terms-of-trade busts, and AE recessions declined in frequency between the 1980s and 2000–07. External shocks reemerged with a vengeance amid the 2008–09 global crisis but have receded in the past two years. The continued volatility of capital flows and commodity prices and the weak activity in AEs suggest taking a cautious view on the likelihood of such shocks in the future—a point we return to below.

There has been a broad improvement in policy frameworks and policy space over time, and this has increased EMDE resilience (Figure 13). Inflation has fallen in many of these economies: although half of them had double-digit inflation in the 1970s and 1980s, more than 80 percent now have inflation in the single digits. This may partly reflect the fact that more central banks have adopted an inflation-targeting framework. Exchange rate regimes have also become more flexible—there are fewer hard pegs than in the 1970s and 1980s.

Figure 12. Frequency of Various Types of Domestic and External Shocks to Emerging Market and Developing Economies

(Percent unless noted otherwise)

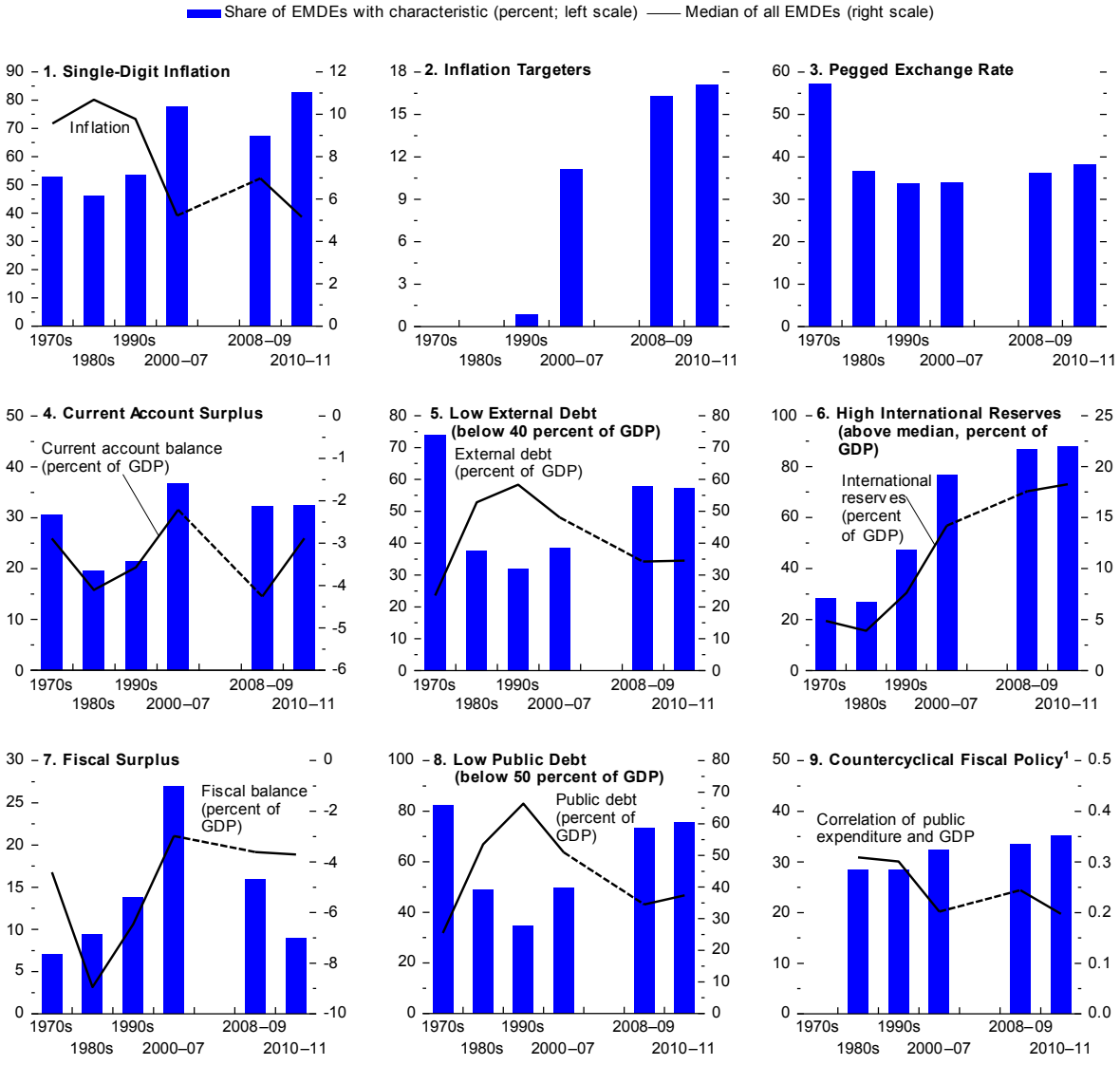
There is no clear downward trend in the frequency of shocks to these economies. Although domestic shocks (banking crises and credit booms) were less frequent in the 2000–07 period compared to the 1980s, the frequency of external shocks has varied. The frequency of global uncertainty spikes and sudden stops in capital inflows increased between the 1980s and 2000–07, while the frequency of terms-of-trade shocks and advanced economy recessions declined over the same period. Many of these shocks reemerged in 2008–09, but have become less common in the last two years.



Source: Authors' calculations.
Note: Economy groups are defined in Appendix Table 2. AE = advanced economy; EMDE = emerging market and developing economy; VXO = Chicago Board of Exchange S&P 100 volatility index. In panels 1, 2, 4, and 5, bars represent the share of EMDEs hit by the shock (banking crises, credit booms, terms-of-trade busts, sudden stops in capital flows) in each subperiod. In panels 3, 6, and 7, bars represent the share of years with shocks (spikes in global uncertainty, spikes in U.S. short-term real interest rate, recessions in AEs) in each subperiod.

Figure 13. Policy Frameworks and Policy Space in Emerging Market and Developing Economies
(Percent unless noted otherwise)

Policy frameworks in these economies have improved in the 2000s as more adopted nonpegged exchange rates, inflation targeting, and countercyclical fiscal policy. Policy space also improved: more economies enjoyed single-digit inflation, current account and fiscal surpluses, lower external and public debt, and higher international reserves.



Source: Authors' calculations.
Note: EMDE = emerging market and developing economy.
[1]The cyclical behavior of fiscal policy is measured as the correlation between the cyclical components of real government expenditure and real GDP (Kaminsky, Reinhart, and Végh, 2004). A negative correlation denotes countercyclical fiscal policy.

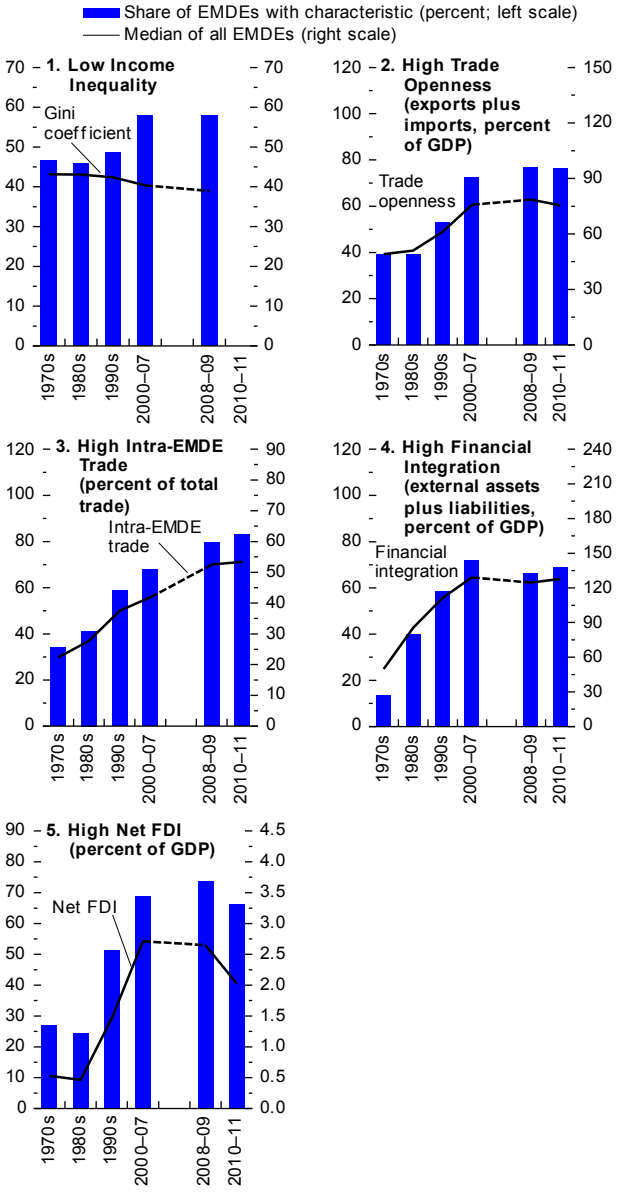
The external positions of many EMDEs are much improved. More are running current account surpluses, and the median external debt level has fallen from close to 60 percent of GDP in the 1990s to less than 35 percent of GDP today. Most EMDEs now have external debt levels below 40 percent of GDP, a threshold that Reinhart, Rogoff, and Savastano (2003) flagged as a level beyond which "debt intolerance" increases. And increasing reserves have not been limited to the high-profile Asian emerging markets—the median EMDE saw its reserves rise from less than 8 percent of GDP on average in the 1990s to 18 percent of GDP during 2010–11. It should be noted, however, that current account surpluses come at the cost of potentially raising global imbalances, while high reserve holdings can come at a substantial opportunity cost.

Fiscal positions and frameworks have also gotten better, although fiscal balances have not fully recovered from the effects of the 2008–09 crisis. Median public debt has fallen from over 65 percent of GDP in the 1990s to less than 40 percent of GDP in the past two years. The number of countries running countercyclical fiscal policies is also on the rise. The share of EMDEs with fiscal surpluses rose steadily from the 1970s to the 1990s. By the early 2000s more than one-quarter had budget surpluses, although that number fell during 2008–09 as many of these economies used this fiscal space to support their economies.

Fiscal positions and frameworks have also gotten better, although fiscal balances have not fully recovered from the effects of the 2008–09 crisis. Median

Figure 14. Structural Characteristics of Emerging Market and Developing Economies
(Percent unless noted otherwise)

Emerging market and developing economies' structural characteristics have improved in the 2000s. There has been a significant increase in trade openness and diversification across trading partners, with a marked increase in intra-EMDE trade. Financial integration has also increased, with a larger share of cross-border flows taking the form of FDI. Income inequality has also fallen, and fewer economies have a high Gini coefficient.



Source: Authors' calculations.
Note: EMDE = emerging market and developing economy; FDI = foreign direct investment. Bars represent the share of EMDEs with the indicated characteristics either above (high) or below (low) the grand median of the characteristic in the sample (the median across all economies and years in the sample).

public debt has fallen from over 65 percent of GDP in the 1990s to less than 40 percent of GDP in the past two years. The number of countries running countercyclical fiscal policies is also on the rise. The share of EMDEs with fiscal surpluses rose steadily from the 1970s to the 1990s. By the early 2000s more than one-quarter had budget surpluses, although that number fell during 2008–09 as many of these economies used this fiscal space to support their economies.

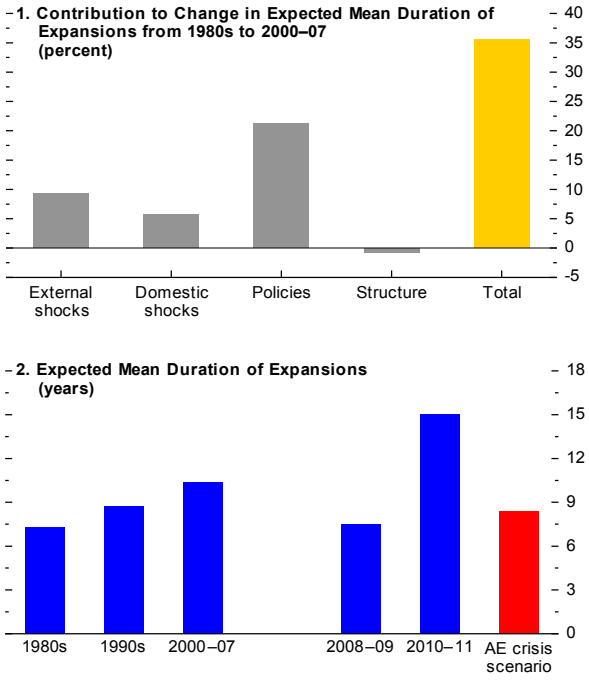
Structural factors—trade openness, financial openness, and income inequality—have also mostly moved in the right direction. The slight downward trend in income inequality—the median Gini coefficient among EMDEs fell from 42 in the 1990s to under 40 in 2008–09—may have helped increase expansion duration (Figure 14).[25] There has also been a trend toward increased intra-EMDE trade, a greater share of FDI flows, and higher trade and financial integration. But the small and often statistically insignificant effects of these structural characteristics suggest that these are likely not a major factor in explaining these economies' increased resilience.

The Relative Contributions of Shocks, Policies, and Structure to Increased Resilience

We can use the multivariate model in the previous section (Table 2, first column) to shed light on the relative contributions of these possible

Figure 15. Contribution of Shocks, Policies, and Structure to the Length of Expansions in Emerging Market and Developing Economies

The expected mean duration of expansion rose steadily from the 1980s to the early 2000s. This increase reflected mostly greater policy space, with more economies achieving lower inflation and building up their international reserve buffers. But fewer and less intense external and domestic shocks also played a part. The expected mean duration of expansions dropped precipitously over 2008–09, with the spike in external shocks coming from advanced economies during the Great Recession. The lack of external shocks over the past two years has helped raise the expected expansion length. However, a sharp rise in advanced economy stresses could largely wipe out these expected gains, reducing the expected expansion length to the level seen during the Great Recession.



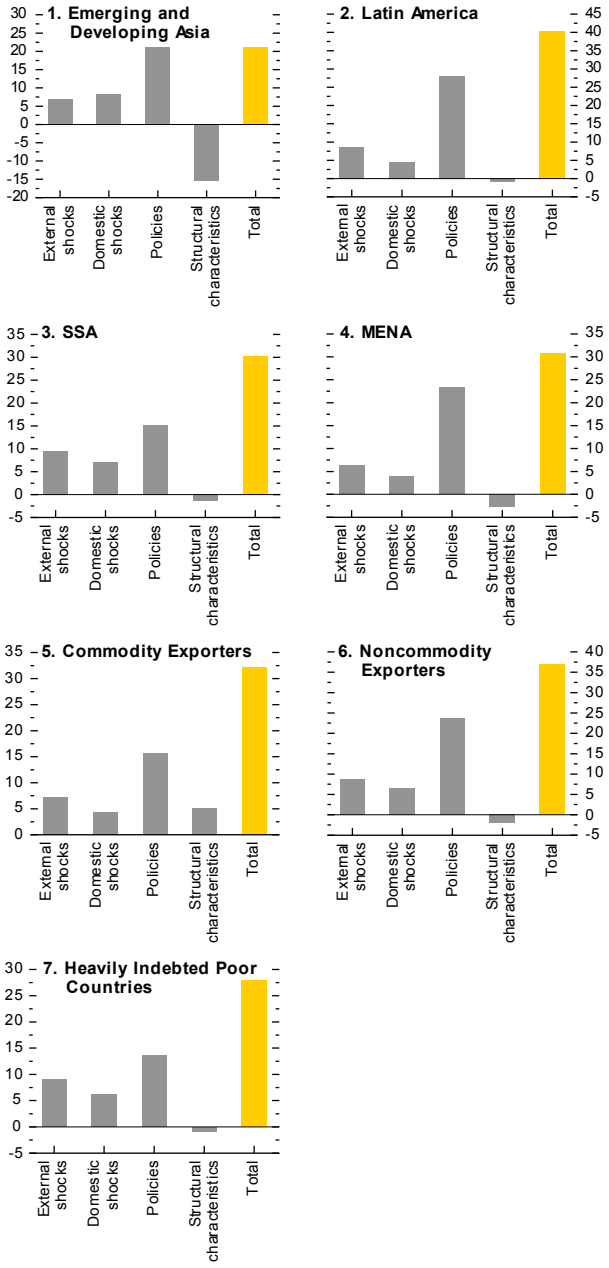
Source: Authors' calculations.
Note: Economy groups are defined in Appendix Table 2. Expected mean durations for expansions and the contributions of variables are calculated using the duration model estimates from Table 2, column 1, and the average values of the explanatory variables for emerging market and developing economies over the corresponding period. The advanced economy (AE) crisis scenario in panel 2 assumes that external shocks reach the levels experienced by emerging market and developing economies during 2008–09.

[25] Country coverage of income inequality data dropped sharply in 2010 and 2011, to fewer than 20 countries, so we exclude it here and in the figure.

explanations to the rising resilience of EMDEs. Such an exercise can only be indicative, since the results will be sensitive to the specific variables that enter the model. Moreover, these contributions should not be given a causal interpretation, since we do not identify the exogenous component of policies. Nevertheless, this decomposition can help give us a feel of how important these various changes have been for these economies' performance.

The model suggests that improved policies account for about three-fifths of EMDE increased resilience between the 1980s and 2000–07, and fewer shocks account for the remaining two-fifths; structural characteristics have made a negligible contribution (Figure 15, panel 1). As noted above and in Figure 12, there was a decline in the frequency of banking crises and credit booms between 1980 and 2000–07. This reduction in frequency and the estimated impact from the duration model imply that the decline in domestic shocks has improved the expected mean duration of expansions by about 5 percent relative to the 1980s. Similarly, the decline in terms-of-trade busts and spikes in world interest rates during 2000–07 relative to the 1980s has more than offset the more frequent spikes in global uncertainty. On the whole, the reduced number of external shocks has improved the expected mean duration of expansions by about 10 percent relative to the 1980s. The big improvement has been in policies, however, as documented in Figure 13; the changes in these variables between the 1980s and

Figure 16. Emerging Market and Developing Economy Regions: Contributions of Shocks, Policies, and Structure to the Length of Expansions
(Contribution to change in expected mean duration of expansions from 1980s to 2000–07; percent)



Source: Authors' calculations.
Note: Economy groups are defined in Appendix Table 2. MENA = Middle East and North Africa; SSA = sub-Saharan Africa. Peaks in output per capita are identified using the Harding-Pagan algorithm (Harding and Pagan, 2002).

2000–07, along with the estimated coefficients, suggest that improved policies have increased the expected mean duration of expansions by about 20 percent over the past two decades.[26]

The relative contributions of shocks, improved policies, and structural characteristics to the increase in resilience are similar across geographical regions and across commodity and non-commodity exporters. As shown in Figure 16, our finding that improved policies account for the bulk of the increase in expected duration of expansions from the 1980s to the 2000s holds across all EMDE regions and subsamples. Less frequent domestic and external shocks also contributed to improved performance. Structural characteristics had a negligible contribution in almost all subsamples, with the exception of emerging and developing Asia—in that region, financial openness almost doubled between the 1980s and 2000s, resulting in a negative contribution to expected duration of expansions.

VI. CONCLUSION

The results of this paper confirm that EMDEs are now more resilient than in previous decades. This is not a recent phenomenon—their performance was already noticeably better in the 1990s than during the previous two decades, even with some severe downturns such as the Tequila, Asian, and Russian crises. But the recent decade has really been exceptional—for the first time, EMDEs have done better than AEs in terms of time spent in expansion. The paper's findings on what is behind these gains in resilience lend support to an optimistic view that these gains are not temporary. These economies are doing better now both because the frequency of shocks has fallen and because policymaking has improved. The past two years (2010–11) were even better than 2000–07 in terms of expected mean duration of expansions (Figure 15, panel 2), particularly for external shocks. Despite weak growth in many AEs, this was not a period of AE recession. World interest rates were low, which supported global growth and credit conditions and fueled capital flows to EMDEs. And global uncertainty remained elevated but was actually lower on average during 2010–11 than in the 2000–03 period. There have also been no banking crises in EMDEs in the past two years, and policy space has improved. Although fiscal balances declined in the aftermath of the global crisis, median public debt fell from about 45 percent of GDP during 2000–07 to about 35 percent of GDP during 2010–11, and a greater proportion of these economies now have low inflation and low public debt. Taken together, these factors have increased the estimated expected mean duration of expansions.

The caveat, of course, is that the relative calm of the past two years could well be temporary. There is a significant risk that AEs could experience another downturn, as

[26] The contribution of policies could be underestimated if one takes into account the endogenous nature of some of the shocks we consider: improved policy making could lengthen expansions by reducing the incidence of shocks, such as banking crises, credit booms and sudden stops in capital flows.

continuing sovereign and banking tensions in Europe and the so-called fiscal cliff in the United States threaten to put the brakes on growth. There could be a rise in terms-of-trade busts in EMDEs if commodity prices drop. Further spikes in global uncertainty are possible, and sudden stops could emerge once again if greater risk aversion leads to capital outflows.

Should the external environment worsen again, EMDEs will likely end up "recoupling" with AEs, much as they did during the Great Recession (see Figure 15, panel 2, red bar). To guard against such a scenario, these economies will need to rebuild their buffers, to ensure that they have adequate policy space to respond to shocks. If improvements in policy frameworks—including greater exchange rate flexibility and more countercyclical macroeconomic policies—in many of these economies are maintained, this will also help them better weather potential shocks on the horizon.

APPENDIX

1. DATA SOURCES

The primary data sources for this paper are the IMF World Economic Outlook (WEO) and International Financial Statistics (IFS) databases and the World Bank World Development Indicators (WDI) database. The data sources used in the analysis are listed in Appendix Table 1. The analytical and regional groupings of economies are presented in Appendix Table 2.

Data on output per capita at the annual frequency are from the WEO, and extended with series from the WDI and the Penn World Table 7.0.

External Shocks

Following Bloom (2009), *global uncertainty* is measured by the Chicago Board of Exchange S&P 100 volatility index (VXO). Spikes in global uncertainty are periods in which the VXO is above its 75th percentile. *Advanced economies' recessions* are defined as in Chapter 1 of the October 2010 issue of the IMF *World Economic Outlook,* with five such recessions during our sample period: 1974–75, 1980–83, 1991–93, 2001 and 2008–09. The *U.S. ex ante real interest rate* is defined as the interest rate on three-month Treasury bills minus projected inflation, which is the percent change in the forecast GDP price index published by the Federal Reserve Bank of Philadelphia. Large increases in the U.S. ex ante real interest rates are those greater than 1.27 percentage points.

Appendix Table 1. Data Sources

Variable Description	Source
Bank credit to the private sector	International Financial Statistics Database
Banking crisis indicators	Laeven and Valencia (2012)
Bilateral exports	IMF, *Direction of Trade Statistics*
Capital account openness	Chinn and Ito (2006), updated to 2010
Consumer price inflation	World Economic Outlook Database
Current account balance	World Economic Outlook Database
De facto exchange rate regime	Reinhart and Rogoff (2004); Ilzetzki, Reinhart, and Rogoff (2008), updated to 2010
Export deflator	World Economic Outlook Database, World Development Indicators Database
Exports of goods and services	World Economic Outlook Database, World Development Indicators Database
External debt to GDP	Lane and Milesi-Ferretti (2007), External Wealth of Nations Mark II Database updated to 2010
Foreign direct investment	IMF, *Balance of Payment Statistics*
Foreign assets	Lane and Milesi-Ferretti (2007), External Wealth of Nations Mark II Database updated to 2010
Foreign liabilities	Lane and Milesi-Ferretti (2007), External Wealth of Nations Mark II Database updated to 2010
GDP (nominal local currency)	World Economic Outlook Database, World Development Indicators Database
GDP (U.S. dollars)	World Economic Outlook Database, World Development Indicators Database
GDP per capita (real)	WEO Database, World Development Indicators, Penn World Tables 7.0
Gini coefficient	Solt (2009), Standardized World Income Inequality Database v. 3.1
Global uncertainty	Bloom (2009) and Chicago Board of Exchange S&P100 volatility index (VXO)
Government expenditure	World Economic Outlook Database
Import deflator	World Economic Outlook Database, World Development Indicators Database
Imports of goods and services	World Economic Outlook Database, World Development Indicators Database
Inflation-targeting indicator	Roger (2010)
Net private capital flows	IMF, *Balance of Payment Statistics*
Public debt to GDP	Abbas and others (2010)
Reserves to GDP	Lane and Milesi-Ferretti (2007), External Wealth of Nations Mark II Database updated to 2010
Trade liberalization index	Wacziarg and Welch (2008)
U.S. projected inflation	Survey of Professional Forecasters, Federal Reserve Bank of Philadelphia
U.S. 3-month Treasury bill interest rate	Global Financial Database

Appendix Table 2. Economy Groups

Advanced Economies (AEs)	Emerging Market and Developing Economies (EMDEs)		
	Emerging Market Economies (EMs)		Low-Income Countries (LICs)
Australia	***Asia***	***Latin America***	***Asia***
Austria	China	Argentina	Afghanistan
Belgium	Hong Kong SAR	Brazil	Bangladesh
Canada	India	Chile*	Cambodia
Denmark	Indonesia	Colombia	Lao P.D.R.
Finland	Korea	Costa Rica	Myanmar
France	Malaysia	Dominican Republic	Nepal
Germany	Pakistan	Ecuador*	Papua New Guinea*
Greece	Philippines	El Salvador	Timor-Leste*
Ireland	Singapore	Guatemala	Vietnam
Italy	Sri Lanka	Jamaica	***Commonwealth of Independent States (CIS)***
Japan	Taiwan Province of China	Mexico	
Netherlands	Thailand	Panama	Armenia
New Zealand	***Commonwealth of Independent States***	Paraguay	Georgia
Norway		Peru*	Kyrgyz Republic
Portugal	Azerbaijan*	Trinidad and Tobago*	Moldova
Spain	Belarus	Uruguay	Mongolia*
Sweden	Kazakhstan*	Venezuela*	***Latin America***
Switzerland	Russia*	***Middle East and North Africa (MENA)***	Bolivia*
United Kingdom	Ukraine		Haiti
United States	***Europe***	Algeria*	Honduras
	Albania	Egypt	Nicaragua
	Bosnia and Herzegovina	Iran*	***Middle East and North Africa (MENA)***
	Bulgaria	Iraq*	
	Croatia	Israel	Mauritania*
	Czech Republic	Jordan	Sudan*
	Estonia	Kuwait*	Yemen*
	Hungary	Lebanon	***Sub-Saharan Africa (SSA)***
	Latvia	Libya*	Benin
	Lithuania	Morocco	Burkina Faso*
	Macedonia	Oman*	Burundi*
	Poland	Saudi Arabia*	Cameroon
	Romania	Syria	Central African Republic*
	Serbia	Tunisia	Chad*
	Slovak Republic	United Arab Emirates*	Democratic Republic of the Congo*
	Slovenia	***Sub-Saharan Africa (SSA)***	Republic of Congo*
	Turkey	Angola*	Côte d'Ivoire
		Botswana	Eritrea
		Namibia	Ethiopia
		South Africa	Ghana
			Guinea*
			Kenya
			Lesotho
			Liberia
			Madagascar
			Malawi*
			Mali*
			Mozambique*
			Niger
			Nigeria*
			Rwanda
			Senegal
			Sierra Leone*
			Tanzania
			Togo
			Uganda
			Zambia*
			Zimbabwe*

Note: * denotes a primary commodity and/or fuel exporter. All economies in the analysis have an average population over the sample period of 1 million inhabitants or more. Some economies currently classified as advanced by the WEO are classified as emerging markets in this chapter, because over the past 60 years these economies were more like emerging markets than advanced economies and because their experience—especially their ability to grow sufficiently to attain advanced economy status—provides valuable lessons.

Data on net private capital flows are from the IMF Balance of Payments Statistics (BPS) database. Net private capital flows correspond to the sum of net foreign direct investment (FDI) flows (line 4500), net portfolio flows (line 4600), net derivative flows (line 4910), and net other investment flows (line 4700), excluding other investment flows to the general government and monetary authorities. A *sudden stop in capital flows* occurs when the ratio of net private capital flows to GDP falls by at least 5 percentage points from the previous year, and when the level of net private flows is more than 1 standard deviation below its economy-specific mean. The BPS database is also used to obtain the net foreign direct investment flows as a share of GDP.

The trade-weighted terms of trade are constructed using the deflators of exports and imports of goods and services and the series of GDP, exports, and imports of goods and services in nominal terms—all from the WEO and WDI databases. In particular, the terms of trade series is calculated as the percentage change in the export price deflator times the share of exports in GDP in the previous period minus the percent change in the import price deflator times the share of imports in GDP in the previous period. *Terms-of-trade busts* are defined as a worsening in the terms of trade of at least 3 percent of GDP.

Domestic Shocks

The *banking crisis* indicator is from Laeven and Valencia (2012). Bank credit to the private nonfinancial sector is taken from the IFS database. Breaks in these data are identified using the IFS Country Notes publications and data are growth-spliced at these points. We follow Mendoza and Terrones (2008) and define *credit booms* as periods in which the cyclical component of log real private credit per capita is at least 1.65 times its standard deviation above its mean.

Policy Frameworks and Policy Space

The dates when countries adopted *inflation targeting* are from Roger (2010); *de facto exchange rate regime* data are from Reinhart and Rogoff (2004). We measure the *cyclicality of fiscal policy* as the correlation between the cyclical component of real government primary expenditure from the WEO database and the cyclical component of real GDP (Kaminsky, Reinhart, and Végh, 2004). A negative correlation corresponds to a countercyclical fiscal policy, while a positive correlation corresponds to a procyclical fiscal policy. The fiscal balance is calculated as the change in the ratio of public debt to GDP, corrected for nominal GDP growth. *Fiscal surplus* is an indicator equal to 1 if the fiscal balance is positive. Data on *public debt* is from Abbas and others (2010).

The External Wealth of Nations Mark II Database (see Lane and Milesi-Ferretti, 2007) is used to construct the ratios of *external debt to GDP*, *reserves to GDP*, and *financial integration*, which is defined as the sum of foreign assets and foreign liabilities divided by GDP. The low external debt indicator equals 1 if external debt is less than 40 percent of

GDP. The current account balance and consumer price inflation are both taken from the WEO database. The low inflation indicator equals 1 if inflation is below 10 percent.

Structural Characteristics

Trade openness is measured as the sum of imports and exports over GDP. The *trade liberalization* index is from Wacziarg and Welch (2008), while *capital account openness* is from Chinn and Ito (2006). Data on bilateral imports and exports are from the Direction of Trade Statistics database and are used to construct the *share of exports to EMDEs*. Finally, *inequality*, as captured in the Gini coefficient of household disposable income, is from Solt (2009).

REFERENCES

Abbas, S. Ali, Nazim Belhocine, Asmaa El Ganainy, and Mark Horton, 2010, "A Historical Public Debt Database," IMF Working Paper No. 10/245 (Washington: International Monetary Fund).

Abiad, Abdul, Ravi Balakrishnan, Petya Koeva Brooks, Daniel Leigh, and Irina Tytell, 2009, "What's the Damage? Medium-term Output Dynamics After Banking Crises," IMF Working Paper No. 09/245 (Washington: International Monetary Fund).

Adler, Gustavo, and Camilo Tovar, 2012, "Riding Global Financial Waves: The Economic Impact of Global Financial Shocks on Emerging Market Economies," IMF Working Paper No. 12/188 (Washington: International Monetary Fund).

Aguiar, Mark, and Gita Gopinath, 2007, "Emerging Market Business Cycles: The Cycle Is the Trend," *Journal of Political Economy*, Vol. 115, No. 1, pp. 69–102.

Becker, Torbjorn, and Paolo Mauro, 2006, "Output Drops and the Shocks That Matter," IMF Working Paper No. 06/172 (Washington: International Monetary Fund).

Berg, Andrew, and Jonathan Ostry, 2011, "Inequality and Unsustainable Growth: Two Sides of the Same Coin?" IMF Staff Discussion Note No. 11/08 (Washington: International Monetary Fund).

_____, Jonathan Ostry, and Jeromin Zettelmeyer, 2012, "What Makes Growth Sustained," *Journal of Development Economics*, Vol. 98, pp. 149–66.

Blanchard, Olivier, and John Simon, 2001, "The Long and Large Decline in U.S. Output Volatility," *Brookings Papers on Economic Activity*, Vol. 32, No. 1, pp. 135–74.

_____, Hamid Faruqee, and Mitali Das, 2010, "The Initial Impact of the Crisis on Emerging Market Countries," *Brookings Papers on Economic Activity,* Spring 2010, pp. 263–323.

Bloom, Nicholas, 2009, "The Impact of Uncertainty Shocks," *Econometrica*, Vol. 77, No. 3, pp. 623–85.

Bry, Gerhard, and Charlotte Boschan, 1971, *Cyclical Analysis of Time Series: Selected Procedures and Computer Programs* (New York: Columbia University Press).

Cerra, Valerie, and Sweta Saxena, 2008, "Growth Dynamics: The Myth of Economic Recovery," *American Economic Review*, Vol. 98, No. 1, pp. 439–57.

Chang, Roberto, and Andrés Velasco, 2004, "Monetary Policy and the Currency Denomination of Debt: A Tale of Two Equilibria," NBER Working Paper No. 10827 (Cambridge, Massachusetts: National Bureau of Economic Research).

Chinn, Menzie, and Hiro Ito, 2006, "What Matters for Financial Development? Capital Controls, Institutions, and Interactions," *Journal of Development Economics*, Vol. 81, No. 1, pp. 163–92.

Cleves, Mario, William Gould, Roberto G. Gutierrez, and Yulia V. Marchenko, 2010, *An Introduction to Survival Analysis Using Stata* (College Station, Texas: Stata Press, 3rd ed.).

Corbo, Vittorio, Óscar Landerretche, and Klaus Schmidt-Hebbel, 2000, "Does Inflation Targeting Make a Difference?" presented at the Central Bank of Chile Conference *10 Years of Inflation Targeting: Design, Performance, Challenges.*

De Carvalho Filho, Irineu, 2011, "28 Months Later: How Inflation Targeters Outperformed Their Peers in the Great Recession," *The B.E. Journal of Macroeconomics,* Vol. 11, No. 1, Article 22.

De Gregorio, José, 2012, "Resilience in Latin America: Lessons from Macroeconomic Management and Financial Policies," available at http://www.imf.org/external/np/seminars/eng/2012/fincrises/pdf/degreg.pdf.

Dell'Ariccia, Giovanni, Julian di Giovanni, Andre Faria, Ayhan Kose, Paulo Mauro, Jonathan Ostry, Martin Schindler and Marco Terrones, 2008, "Reaping the Benefits of Financial Globalization," Occasional Paper, International Monetary Fund, Washington.

Didier, Tatiana, Constantino Hevia and Sergio L. Schmukler, 2012, "How Resilient were Emerging Economies to the Global Crisis," World Bank Policy Research Working Paper No. 5637 (Washington: World Bank).

Easterly, William, 2001, "The Lost Decades: Developing Countries' Stagnation in Spite of Policy Reform, 1980–1998," *Journal of Economic Growth*, Vol. 6, No. 2, pp. 135–57.

_____, Michael Kremer, Lant Pritchett, and Lawrence Summers, 1993, "Good Policy or Good Luck? Country Growth Performance and Temporary Shocks," *Journal of Monetary Economics*, Vol. 32, No. 3, pp. 459–83.

Frankel, Jeffrey, 2012, "Will Emerging Markets Falls in 2012?" *Business & Management Journal*, Vol. 2, No. 2, pp. 119–20.

_____, Carlos Végh, and Guillermo Vuletin, 2011, "On Graduation from Fiscal Procyclicality," NBER Working Paper No. 17619 (Cambridge, Massachusetts: National Bureau of Economic Research).

Harding, Don, and Adrian Pagan, 2002, "Dissecting the Cycle: A Methodological Investigation," *Journal of Monetary Economics*, Vol. 49, No. 2, pp. 365–81.

Hausmann, Ricardo, Lant Pritchett, and Dani Rodrik, 2005, "Growth Accelerations," *Journal of Economic Growth*, Vol. 10, No. 4, pp. 303–29.

_____, Francisco Rodriguez, and Rodrigo Wagner, 2006, "Growth Collapses," Kennedy School of Government Working Paper No. RWP06–046.

International Monetary Fund (IMF), 2002, "Recessions and Recoveries," World Economic Outlook, Chapter 3, pp.104-137, April 2002.

International Monetary Fund (IMF), 2010, "Global Prospects and Policies," World Economic Outlook, Chapter 1, pp.1-61, October 2010.

International Monetary Fund (IMF), 2012, *Consolidated Spillover Report* (Washington).

Kaminsky, Graciela, Carmen Reinhart, and Carlos Végh, 2004, "When it Rains, It Pours: Procyclical Capital Flows and Macroeconomic Policies," *NBER Macroeconomics Annual*, ed. by Mark Gertler and Kenneth Rogoff, pp. 11–79 (Cambridge, Massachusetts: National Bureau of Economic Research).

Kaplan, E. L., and Paul Meier, 1958, "Nonparametric Estimation from Incomplete Observations," *Journal of the American Statistical Association,* Vol. 53, No. 282, pp. 457–81.

Kose, M. Ayhan, 2008, "Seven Questions about Decoupling," *IMF Research Bulletin*, Vol. 9, No. 3, pp. 1–5. (Washington: International Monetary Fund).

_____, and Eswar Prasad, 2010, *Emerging Markets: Resilience and Growth Amid Global Turmoil* (Washington: Brookings Institution Press).

Laeven, Luc, and Fabián Valencia, 2012, "Systemic Banking Crises Database: an Update," IMF Working Paper No. 12/163 (Washington: International Monetary Fund).

Lane, Philip R., and Gian Maria Milesi-Ferretti, 2007, "The External Wealth of Nations Mark II: Revised and Extended Estimates of Foreign Assets and Liabilities, 1970–2004," *Journal of International Economics*, Vol. 73, No. 2, pp. 223–50.

_____, and Gian-Maria Milesi Ferretti, 2010, "The Cross-Country Incidence of the Global Crisis," IMF Working Paper No. 10/171 (Washington: International Monetary Fund).

Mendoza, Enrique, and Jonathan Ostry, 2008, "International Evidence on Fiscal Solvency: Is Fiscal Policy 'Responsible'?" *Journal of Monetary Economics*, Vol. 55, No. 6, pp. 1081–93.

Mendoza, Enrique, and Marco Terrones, 2008, "An Anatomy of Credit Booms: Evidence From Macro Aggregates and Micro Data," IMF Working Paper No. 08/226 (Washington: International Monetary Fund).

Ostry, Jonathan D., Atish R. Ghosh, Jun I. Kim, and Mahvash S. Qureshi, 2010, "Fiscal Space," IMF Staff Position Note No. 10/11 (Washington: International Monetary Fund).

Pritchett, Lant, 2000, "Understanding Patterns of Economic Growth: Searching for Hills Among Plateaus, Mountains, and Plains," *World Bank Economic Review*, Vol. 14, No., 2, pp. 221–50.

Reinhart, Carmen, Kenneth Rogoff, and Miguel Savastano, 2003, "Debt Intolerance," *Brookings Papers on Economic Activity*, Vol. 34, No. 1, pp. 1–74.

_____, and Kenneth S. Rogoff, 2004, "The Modern History of Exchange Rate Arrangements: A Reinterpretation," *Quarterly Journal of Economics*, Vol. 119, No. 1, pp. 1–48.

Rodrik, Dani, 1999, "Where Did All the Growth Go? External Shocks, Social Conflict, and Growth Collapses," *Journal of Economic Growth*, Vol. 4, No. 4, pp. 385–412.

Roger, Scott, 2010, "Inflation Targeting Turns 20," *Finance and Development*, Vol. 47, No. 1, pp. 46–49.

Schmidt-Hebbel, Klaus, 2009, "Inflation Targeting Twenty Years on: Where, When, Why, With What Effects, What Lies Ahead?" Economics Institute Working Paper No. 360 (Santiago: Pontifical Catholic university of Chile).

Solt, Frederick, 2009, "Standardizing the World Income Inequality Database," *Social Science Quarterly,* Vol. 90, No. 2, pp. 231–42. SWIID Version 3.1, December 2011.

Tornell, Aaron and Frank Westermann, 2002, "Boom-Bust Cycles in Middle Income Countries: Facts and Explanations," NBER Working Paper No. 9219 (Cambridge, Massachusetts: National Bureau of Economic Research).

Végh, Carlos, and Guillermo Vuletin, 2012, "Overcoming the Fear of Free Falling: Monetary Policy Graduation in Emerging Markets," NBER Working Paper No. 18175 (Cambridge, Massachusetts: National Bureau of Economic Research).

Wacziarg, Romain, and Karen Horn Welch, 2008, "Trade Liberalization and Growth: New Evidence," *World Bank Economic Review*, Vol. 22, No. 2, pp. 187–231.