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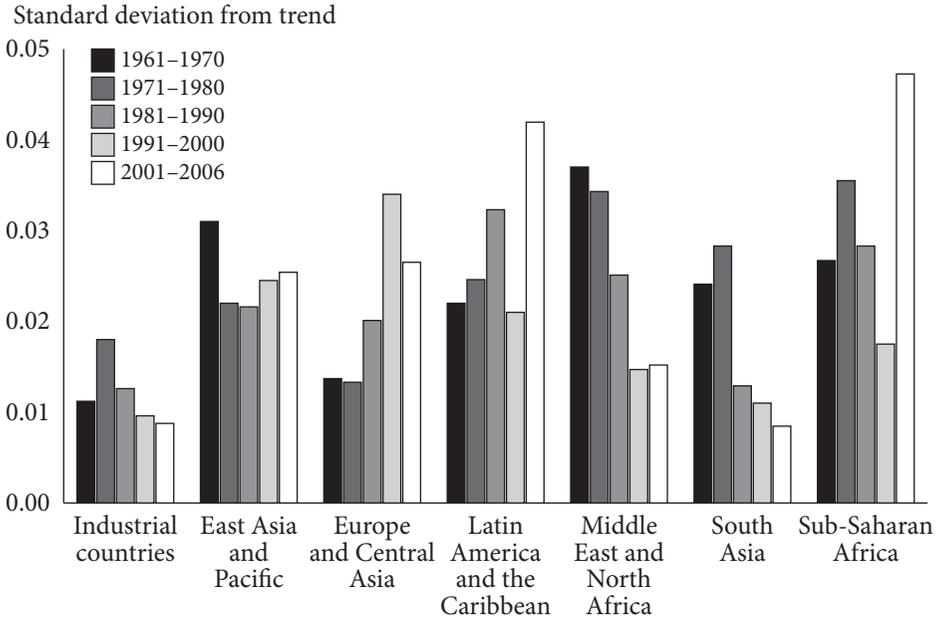
Causes and Consequences of High Volatility in Developing Countries

During most of the last 50 years, output volatility has been much higher in developing countries than in industrial countries (figure 1.1). Although recent years were particularly benign for developing countries in both average growth and reduced volatility, substantial macro-financial vulnerabilities remained, as has become evident once again after the deepening of the international financial crises since last September.

Trends in output volatility have differed across developing regions over a medium-term perspective (see figure 1.1). Though there has been a downward trend in some regions from very high levels in the 1970s and 1980s (in South Asia and the Middle East and North Africa), volatility increased in East Asia and Eastern Europe and Central Asia during the 1990s and in Latin America and Sub-Saharan Africa during 2001–2006. In spite of these differences in trends, average volatility was higher in all developing regions than in OECD countries in all of the last five decades.¹ Thus, high volatility does not seem to be going away in developing countries as globalization advances.²

1. With the exception of Eastern Europe and Central Asia in the 1960s and 1970s, when countries in the region were under central planning.

2. In theory, integration with international financial markets should help smooth out the effect of exogenous shocks, but as is shown later, capital flows to developing countries are highly procyclical and thus have been a part of the problem more than a part of the solution.

Figure 1.1. Volatility of GDP per capita by region, 1961–2006

Note: Volatility is defined as the standard deviation of GDP per capita from its trend.

Source: Author's calculations based on data from *World Development Indicators* (World Bank 2007b).

High volatility is a development problem

Economists are especially concerned about high output volatility because it is closely associated with other negative aspects of underdevelopment. To begin with, consumption volatility is even higher than output volatility in most developing countries, contrary to the case in OECD countries (figure 1.2). Thus, the welfare costs of high volatility in developing countries appear to be great. Furthermore, the stylized fact depicted in figure 1.2 indicates that neither financial markets nor domestic policies are helping to smooth consumption in most developing countries.

Second, a substantial body of technical literature has found evidence that high volatility has negative effects on growth or is at least closely associated with lower growth, controlling for other usual determinants.³ This is not surprising, as there is a broad consensus in the theoretical and empirical literature that high macroeconomic

3. Fatás and Mihov 2006; Bruno and Easterly 1995; Hnatkowska and Loayza 2004; Aghion and others 2005. Though most empirical studies deal in different ways with endogeneity problems, it is fair to say that results about causality remain debatable.

Figure 1.2. Volatility of GDP and consumption per capita by income

Note: Volatility is defined as the standard deviation from the trend. Each group has 15 members, and there are two points per country.

Source: Author's calculations based on data from *World Development Indicators* (World Bank 2007b).

volatility tends to depress investment (because investment flows depend on both expected rewards and risks) and to bias it toward short-term returns.⁴ Recent work suggests that higher macroeconomic volatility is also associated with lower investment in human capital, for similar reasons.⁵

Furthermore, developing countries have been shown to be more prone than industrial countries to currency and financial crises.⁶ A high frequency of crisis is closely associated with higher macroeconomic volatility and is just another aspect of higher macro-financial risks and vulnerabilities.⁷ In addition to output forgone during these crises, which entails major welfare losses, there is significant evidence that such crises have lasting effects on growth because of irreversible losses of physical, organizational, and human capital.⁸

4. Servén 1997, 1998, 2002.

5. Krebs, Krishna, and Maloney 2005.

6. Calvo, Izquierdo, and Mejía 2004; Edwards 2004; Frankel and Rose 1996.

7. IMF 1999.

8. Greenwald, Kohn, and Stiglitz 1990; Greenwald, Salinger, and Stiglitz 1992.

Finally, recent evidence also suggests a close association between macroeconomic volatility and inequality, with causality probably flowing in both directions.⁹ And as several studies have shown, the speed of poverty reduction is a function of the rate of growth, the initial level of inequality, and changes in inequality.¹⁰ Thus, insofar as high volatility seems associated with both lower growth and higher inequality, it would seem to be a major drag on poverty reduction.

In summary, high output volatility and a propensity to currency and financial crises are recurrent characteristics of developing countries and appear to be serious impediments to development because they are closely associated with high consumption volatility, low long-term growth, high inequality, and high poverty. To know what to do about these problems, it is first necessary to know the causes of such high volatility.

What are the causes of high volatility in developing countries?

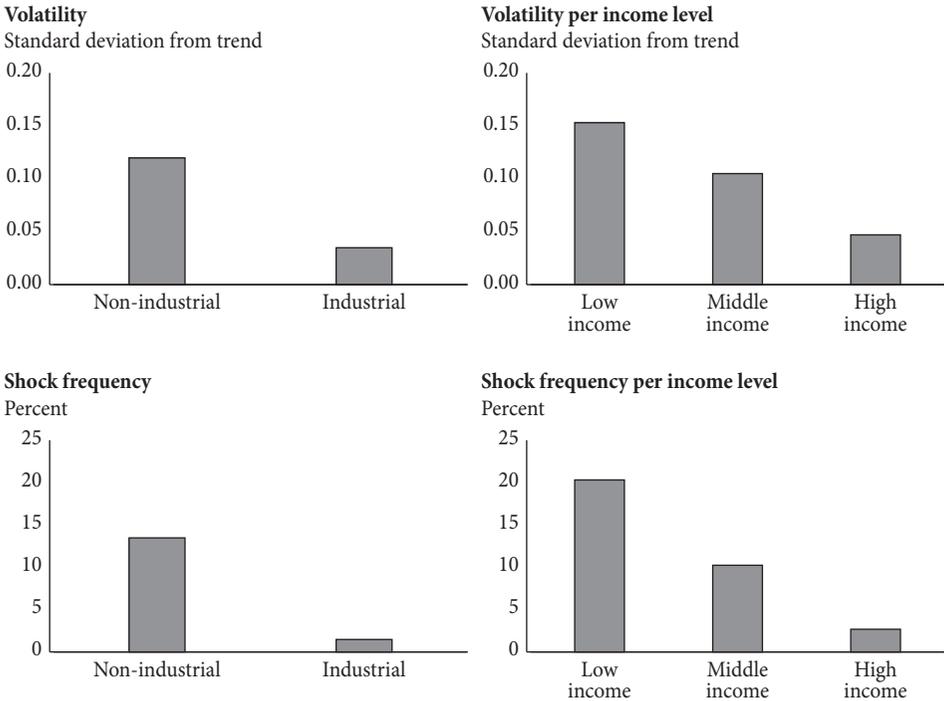
Causes of high volatility and propensity to crises in developing countries can be broadly classified in two groups: those associated with higher exposure to exogenous shocks and augmenting factors, and those related to faulty policies and structural issues. The first group includes both exposure to real external shocks (such as terms of trade) and financial external shocks and natural disasters, and augmenting factors such as the procyclicality of capital flows and currency and maturity mismatches.

Developing countries as a group suffer much higher terms of trade volatility than industrial countries (figure 1.3). The difference is even greater when only extreme events are considered (cases in which the change in terms of trade is 10 percent or more of the average growth rate). Both terms of trade volatility and shock frequency are higher for low-income countries than for middle-income countries, and higher for middle-income countries than for high-income countries. This fact conforms to a longstanding literature highlighting the macroeconomic volatility effects of high output and export concentration of lower income and smaller economies, in particular of those dependent on primary exports.

Similarly, developing countries are more exposed to volatility and shocks originating in the output volatility of trade partners than are industrial countries (figure 1.4). Differences among countries by income group are less pronounced, however, than for terms of trade volatility. While terms of trade volatility is related to export product concentration and the nature of main export products, external demand volatility is related more to market concentration and higher trade shares with similarly

9. Calderón and Levy Yeyati 2007; Gavin and Hausmann 1998; Halac and Schmukler 2004.

10. Bourguignon 2003.

Figure 1.3. Terms of trade volatility and frequency of shocks, 1975–2005

Source: From Calderon and Levy Yeyati 2007.

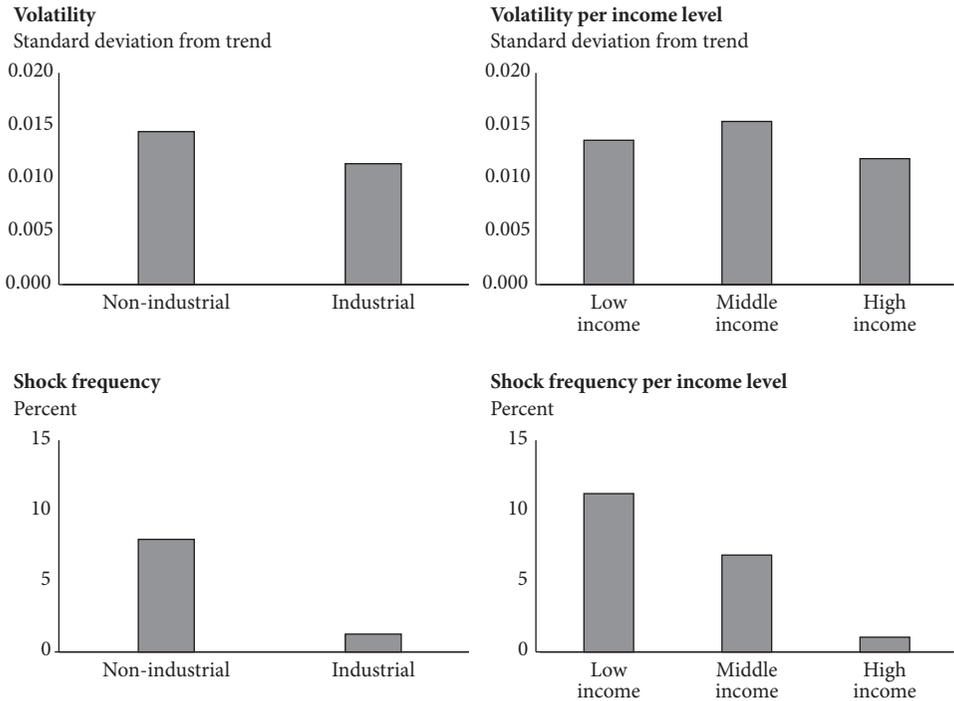
volatile neighbors. Differences among country income groups in export concentration by markets are lower than differences in export concentration by products.

Naturally, countries can reduce their exposure to these real exogenous shocks through export diversification. Most have attempted to do so, with varying success. Still, diversification takes time and can leave developing countries more exposed to these risks than industrial countries were during most of their development process.¹¹ Countries can cover some of these risks, in particular those originating in the volatility of commodity prices that weigh heavily in their export or import structures, through derivatives. However, as shown later (see chapter 5), availability and use of such financial instruments is limited, for various reasons.

The incidence of natural disasters, measured by the number of events,¹² their intensity, or their economic cost as a percentage of GDP, is also much higher for developing countries than for industrial countries. Low-income countries, especially small countries, tend to be hit harder by these events (figure 1.5). Size is key because

11. Imbs and Wacziarg 2003.

12. Defined as natural disasters that cause more than a minimum number of deaths and injuries.

Figure 1.4. External demand volatility and shocks, 1975–2005

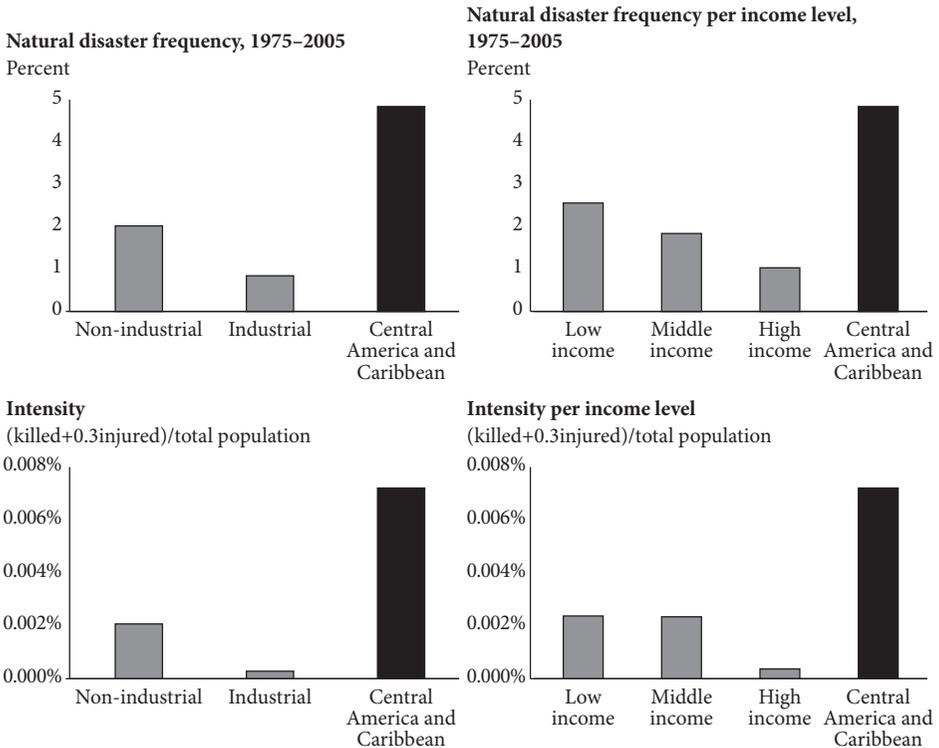
Source: From Calderon and Levy Yeyati 2007.

a natural disaster may affect a large share of the territory of a small country but is usually restricted to a smaller area of a large country.

Policies can also mitigate the effect of natural disasters. In particular, better zoning and resettlement policies and building codes and stronger enforcement can reduce the number of casualties and the economic costs associated with such events. Furthermore, preparedness to deal efficiently with emergencies can also reduce human suffering and speed reconstruction and economic recovery. Admittedly, however, there are limits to what can be done through these policies and programs, and countries and businesses also resort to catastrophe insurance. As shown in chapter 6, however, penetration of catastrophe insurance is very low in most developing countries, and fees are high and volatile.

Capital flows should help smooth the effects of real shocks on output. Indeed, countries are supposed to borrow in bad times and pay back in good times. However, what typically happens is the opposite: net capital flows, especially net financial flows, are highly procyclical (figure 1.6).¹³ There are several potential reasons behind this stylized fact. It could be, for example, that countries appear more creditworthy in

13. The cyclical component is calculated as the deviation of GDP from its trend.

Figure 1.5. Frequency and intensity of natural disasters

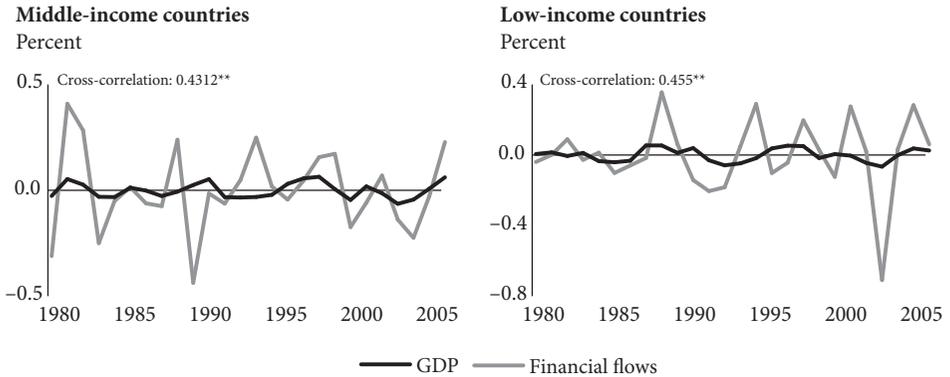
Note: Natural disasters include droughts, volcanoes, tsunamis, floods, and wind storms.

Source: From Calderon and Levy Yeyati 2007 and Gurenko and Zelenko 2007.

good times than in bad. This argument implies that markets have difficulty distinguishing cyclical or temporary problems from a deterioration in fundamentals. Or it could be that countries are more likely to fall into a liquidity crisis in bad times and that a liquidity crisis can easily lead to a default. But again, why should a solvent country find itself in a liquidity crisis if not because markets have difficulty distinguishing between solvency and liquidity problems?

Developing country policies can mitigate or amplify the procyclicality of capital flows. However, that the procyclicality of capital flows is such a generalized fact for developing countries suggests that it is related to significant market failures, as previous arguments have indicated. What is more surprising is that net financial flows are equally procyclical for low- and middle-income countries, even though official flows make up a larger component of flows in low-income countries (figure 1.6). These issues are taken up again in chapter 5.

Figure 1.6. Cyclical component of GDP and net financial flows, 1980–2004



**Significant at 5 percent.

Source: Author's calculations based on data from *World Development Indicators* (World Bank 2007b) and *International Financial Statistics* (IMF various years).

It would be bad enough if capital flows were just procyclical. Even worse, there is significant evidence that countries have occasionally been hit by exogenous capital flow shocks, especially through “financial contagion,”¹⁴ whenever there is a major disturbance in international financial markets. In these cases private financial flows have tended to dry up for all or most developing countries, regardless of their credit-worthiness. Financial contagion was especially severe after the Mexican crises of 1982 and 1994, the Russian crisis of 1998, and the Long-Term Capital Management crisis of 2002. Correlations of spreads across countries, which behave almost as the inverse of flows, have tended to increase significantly in these periods (figure 1.7).

Financial contagion from the current financial crisis in the United States to developing countries seemed largely contained until last September. Though stock prices had fallen everywhere and spreads had increased, these phenomena had been more subdued than in previous occasions. Furthermore, there had been no apparent significant capital flow reversals, and developing country currencies continued to appreciate for a while, in sharp contrast to previous episodes of turmoil in financial markets. Unfortunately, such apparent resilience gave way to a traditional sharp increase in spreads, capital flow reversal, and currency depreciations after the events of last September.

Those temporary differences were to a large extent due to better fundamentals (lower current account and fiscal deficits) and higher liquidity ratios (high international reserves and low short-term external debt)—lower macro-financial

14. The term *financial contagion* refers here to the effect of a default or financial stress in one country on third-country spreads and capital inflows (Kaminsky, Reinhart, and Vegh 2003; Claessens and Forbes 2004).

Figure 1.7. Comovement of spreads in emerging markets

Average of pairwise emerging market spread correlations



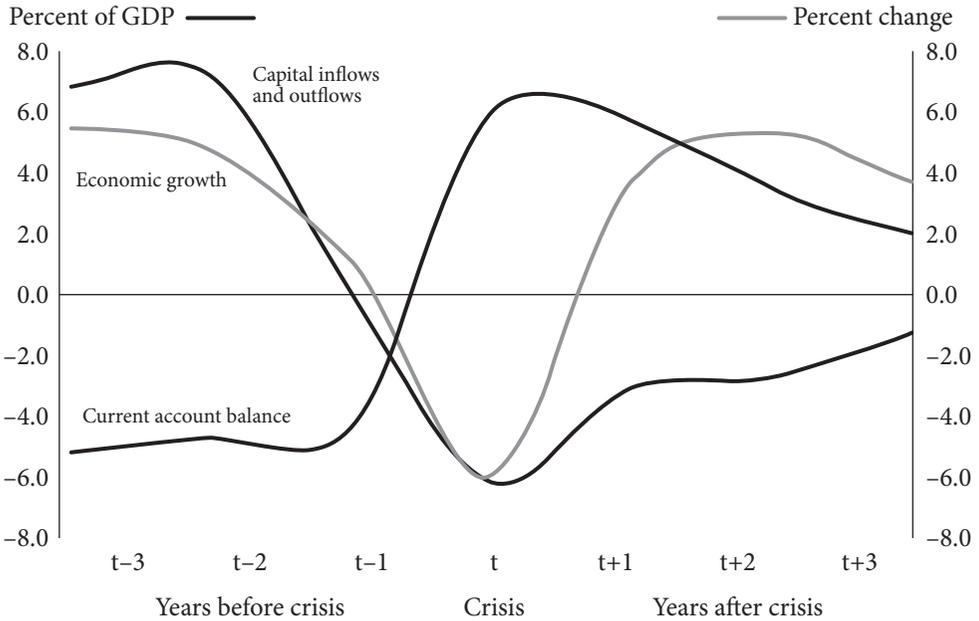
Source: Author's calculations based on data from Bloomberg.com and JPMorgan.com.

vulnerabilities—in developing countries than in the past. But, as the first draft of this report pointed out last August, it was naive to assume full decoupling and to believe that liquidity shocks in developing countries as a group were relegated to economic history. The possibility of a global recession or a global financial meltdown that would severely hurt many developing countries could not be ruled out. More to the point, the improvements in both macroeconomic fundamentals and liquidity ratios must themselves be recognized as having been at least in part a consequence of the characteristics of the previous boom for developing countries. Had the current financial turmoil not been preceded by such an outstanding external environment for developing countries, and had commodity prices not remained at exceptionally high levels until last October, many developing countries might have observed sooner significant capital flow reversals in search of low-risk financial assets.

That private financial flows have normally tended to amplify the effect of real exogenous shocks and have sometimes acted as a primary source of shocks has had further implications: countries have had to adjust to exogenous shocks through costly sharp corrections in the current account. Indeed, several studies have observed that capital account shocks tend to be several times larger than current account shocks,¹⁵

15. Calvo and Talvi 2005; Cavallo and Frankel 2007.

Figure 1.8. Propensity toward costly crises in developing countries: Capital account shocks lead to sharp adjustments in the current account and temporary recessions



Note: Values are averages for Mexico (1995); Republic of Korea, Indonesia, Malaysia, and Thailand (1998); Brazil (1999); and Argentina (2001).

Source: Ripoll I Alcón 2006.

forcing countries into much sharper current account corrections (figure 1.8). Such sharp adjustments usually take place through both a contraction in aggregate demand, caused by the negative income effect of the exogenous shock (and frequently required procyclical fiscal adjustments) and a significant depreciation of the exchange rate. The depreciation is expected to bring about compensatory expansionary effects through increased exports and reduced imports. However, currency depreciations have often had net contractionary effects in developing countries as a consequence of their negative impacts on the balance sheets of both government and corporations,¹⁶ which tend to be overexposed to currency risk. The severity of these negative balance sheet effects lies behind the apparent overadjustment evidenced in figure 1.8.

These negative balance sheet effects are a direct consequence of large open currency mismatches. The mismatches, however, are ultimately a consequence of insufficient development of domestic currency capital markets. Governments and large firms often face the dilemma of either financing their investments at high interest costs and

16. Calvo and Talvi 2005; Cavallo and Frankel 2007.

short maturities in domestic currencies or of benefiting from the significantly lower interest rates and longer maturities available in international markets in foreign currencies, though incurring risky currency mismatches on their balance sheets.¹⁷

Of course, imprudent fiscal policies and myopic debt management can exacerbate this problem—and have often done so—leading to high levels of public and external indebtedness and to a biased debt composition as a result of attempts to minimize short-term costs while accumulating excessive currency risks. But, at least since the Asian and Russian crises, both governments and corporations have become aware of the potentially devastating costs associated with excessive open currency risks and have significantly reduced their overall indebtedness ratios, tilted their debt composition toward domestic currencies, and used currency swaps, when available, to cover open exposures¹⁸ (see chapter 4). In doing so, they benefited from the exceptionally favorable external environment between 2003 and mid-2008.

However, the extent to which countries can implement such policies is limited by the size, depth, and efficiency of domestic currency markets. As a consequence, developing domestic capital markets has become a major priority for most developing countries. There have been important, though highly unequal, advances in this area. Some emerging market economies, including Chile, Mexico, South Africa, and some countries in Asia and Central Europe, have developed long-term and relatively low-cost domestic currency and currency swap markets and have managed to substantially eliminate currency mismatches and open exposures in the balance sheets of governments and large corporations (see chapter 4). Policies promoting low inflation and flexible exchange rates and regulatory and market infrastructure reforms have been behind many of these success stories.¹⁹ But for most developing countries the road to efficient long-term domestic capital markets is likely to be long—as evidenced by the low indexes of domestic capital market development for low- and middle-income countries shown in figure 1.9—and to leave governments and firms heavily exposed to currency risks along the way.²⁰

As mentioned, domestic policies can either mitigate or amplify the effect of exogenous shocks. However, monetary and fiscal policies, which should mitigate the effect of exogenous shocks, have often been procyclical in developing countries and in many instances have been the primary source of macroeconomic volatility.²¹ There has

17. The so called “original sin” dilemma; see Eichengreen, Hausmann, and Panizza 2003.

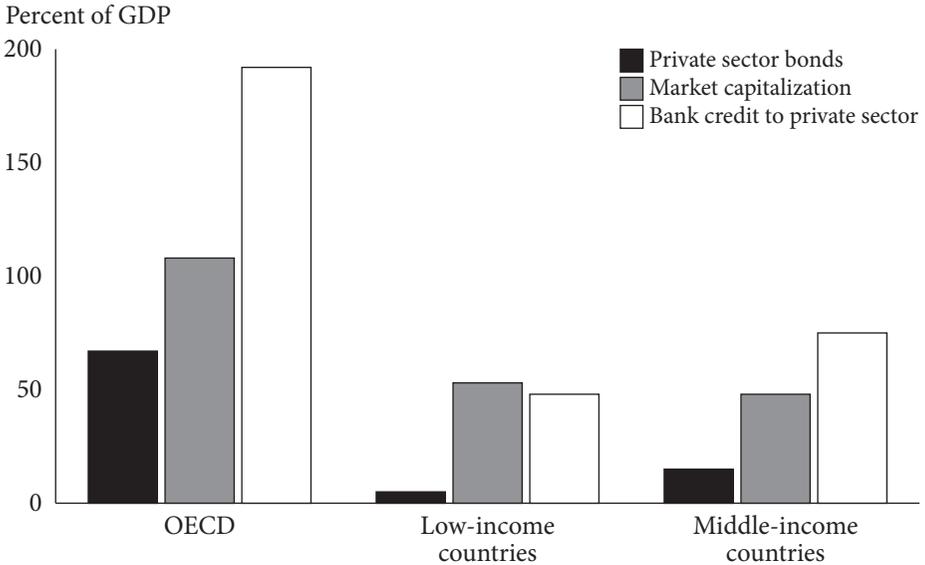
18. See, for example, IADB (2006) and BIS (2007).

19. See, for example, De la Torre and Schmukler (2006).

20. Some countries have attempted to short cut building monetary credibility and domestic long-term capital markets by giving up their currencies and permitting the de facto “dollarization” of their domestic capital markets. De facto dollarization has often led to substantial financial instability, and many countries have been “dedollarizing” their financial systems since the Asian and Russian crises (Fernández Arias and Levy Yeyati 2005; Levy Yeyati 2006b).

21. Procyclicality augments the effect of exogenous shocks while autonomous volatility is a primary source of volatility and shocks; see, Fatás and Mihov (2006).

Figure 1.9. Indexes of domestic financial system development for industrial and developing countries, 2006



Note: Values are weighted averages for each group of countries based on available information.

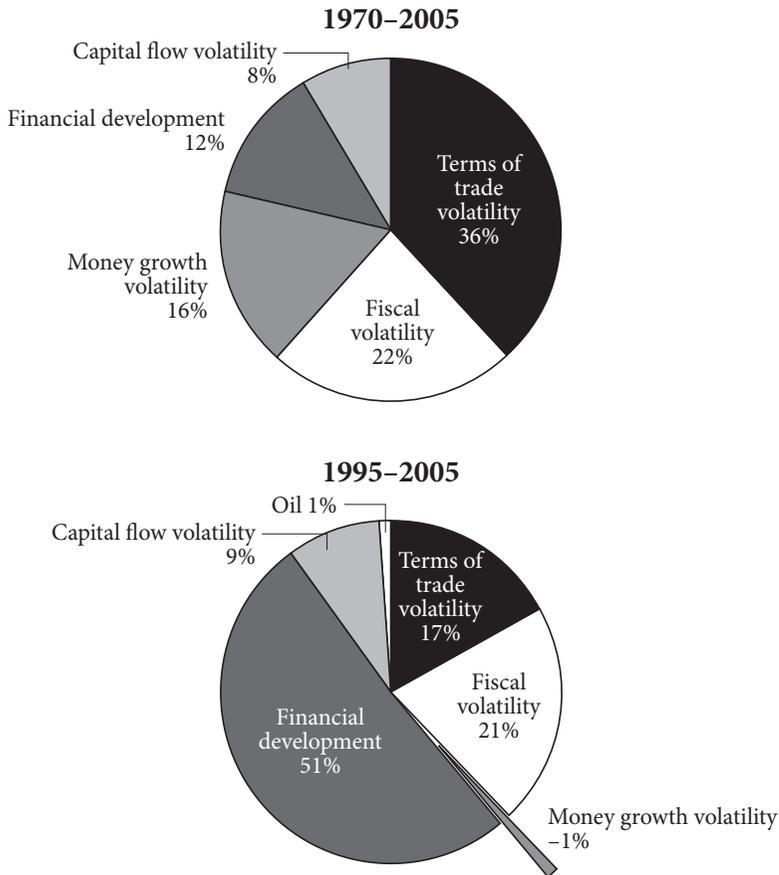
Source: Author's calculations based on data from BIS 2007 and World Bank 2007b.

been important progress in monetary policies in the last two decades, as witnessed by the sharp reduction in average inflation levels and volatility in all developing regions. Furthermore, with the increased adoption of floating, or at least flexible, exchange rate regimes, many developing countries have been able to implement countercyclical monetary policies during recent economic cycles.

This is not the case, however, with fiscal policy. Although today there are fewer cases of macroeconomic crises caused primarily by imprudent fiscal policies, neither are fiscal instruments fulfilling a significant stabilizing role in the developing countries. Automatic stabilizers are in general not very potent, and few developing countries have been able to apply discretionary countercyclical fiscal policies.²² In most cases, fiscal policy continues to be highly procyclical, amplifying the impact of exogenous external shocks. This stylized fact is in part a reflection of the difficulty, even in many industrial countries, of building solid fiscal institutions that help to avoid political pressures to overspend in good times, but it is also linked to the procyclicality of capital flows, which facilitates overspending in good times and make it more difficult to apply expansionary policies in bad times.²³

22. Suescún 2007.

23. Perry 2007; Tornell and Lane 1999; Lora and others 2004; Alberola and Montero 2006.

Figure 1.10. Causes of excess output volatility in developing countries

Note: Total volatility is decomposed into the effects of fiscal volatility, terms of trade volatility, money growth volatility, financial development, capital flow volatility, and oil price volatility. All volatility measures are standard deviations of cyclical component from the trend. OECD and developing countries were estimated separately in order to calculate the difference in volatility explained by each variable between groups. These estimates should be taken with caution as they do not control for potential reverse causality. Further, estimates do not fully separate exogenous and endogenous causes: measured capital flow volatility is partly due to endogenous factors, and measured fiscal and monetary policies volatility is partly due to exogenous factors. *Source:* Author's calculations based on data from *World Development Indicators* (World Bank 2007b) and *International Financial Statistics* (IMF various years).

How much of the high volatility that characterizes developing countries is related to external and how much to domestic factors? Estimates suggest that for 1970–2005 about 44 percent of “excess” volatility in developing countries (as measured against the benchmark of volatility in industrial countries) was associated with higher exposure to external shocks, about 38 percent with more volatile macroeconomic

policies, and the rest (18 percent) with insufficient development of domestic capital markets, financial integration, and other factors (as shown in the upper panel of figure 1.10). Estimates shown in the lower panel of figure 1.10 indicate that in the period 1995–2005 the corresponding figures were 27 percent, 22 percent, and 51 percent. Changes between the two panels suggest a huge improvement in monetary policies in developing countries, though not in their fiscal policies, consistent with the discussion above. They also suggest that the contribution to “excess” volatility of their higher exposure to terms of trade was coming down, although it was still quite significant and has probably risen again given the huge increase in commodity prices in the last three years and their recent collapse. Finally, these figures indicate that the contribution to “excess” volatility of financial factors (especially of insufficient domestic capital market development) was much more important in the latter period (marked by the effects of the Asian and Russian crisis of 1997/98 and the Argentine crisis of 2001) in comparison to their role in previous decades. This finding is consistent with the increased importance attributed by policy makers to the development of domestic currency capital markets and changes in the currency composition of their debt, observed above.