
CHAPTER 4

Macroeconomic Volatility in Latin America and the Caribbean: Causes and Remedies

Sources of Aggregate Volatility in LAC

AGGREGATE VOLATILITY IN LATIN AMERICA AND THE CARIBBEAN REFLECTS TWO MAIN FORCES: real and financial external shocks and macroeconomic policy instability.¹

External Shocks

LAC is subject to large external disturbances from world goods and financial markets. These can be broadly classified as volatility in the terms of trade and in international capital flows. Figure 4.1 graphs the standard deviation of the rate of growth of the terms of trade across world regions over the last four decades. The figure shows that over the last two decades, LAC suffered terms of trade disturbances that were much greater than those affecting industrial economies and the East Asian miracle countries, and on par with those experienced by South Asia and the Middle East and North Africa.

A key factor behind the large terms of trade variability is the high share of a few primary commodities—such as oil (Colombia, Ecuador, Mexico, Trinidad and Tobago, and Venezuela) and metals (Bolivia and Chile)—in the total exports of many of the region's economies. World commodity prices are highly volatile, and this volatility translates into large terms of trade fluctuations for commodity-exporting countries. Figure 4.2 shows the share of the four most important commodities² in the total exports of selected LAC countries in 1995 and

1999 (or the latest available year). Export concentration remains high in a number of countries, although a few—notably Mexico—have succeeded in reducing it over the last decade.

Terms of trade volatility was particularly high during the 1970s (largely reflecting the first oil crisis), and declined somewhat in the 1980s and more so in the 1990s, both in the LAC region and other world regions. The economic impact of terms of trade fluctuations, however, is determined not only by their magnitude, but also by the degree of openness to international trade of the economies. Like other parts of the world, LAC has considerably increased its openness to global trade over time, and this trend—unless matched by a parallel increase in diversification of trade—could have raised the exposure of the region's economies to external trade disturbances.

This factor can be taken into consideration by looking at the volatility of terms of trade shocks, a concept that reflects both the changes in the terms of trade and the degree of openness of the economy.³ Figure 4.3 offers a comparative perspective across regions and decades on the volatility of terms of trade shocks. The pattern that emerges is similar to that in Figure 4.1, although Latin America now ranks higher than South Asia due to greater openness to trade.

Table 4.1 shows the standard deviation of terms of trade shocks for the major LAC economies over the last four decades.⁴ The table shows that this magnitude is generally higher in smaller commodity-exporting economies (for example, the Dominican Republic, Jamaica, Nicaragua, and Trinidad and Tobago). By this measure, volatility declined since the 1970s in a majority of economies, although for some, such as the Dominican Republic, Jamaica, Paraguay,

FIGURE 4.1

Volatility in Terms of Trade Growth
(Regional Medians)

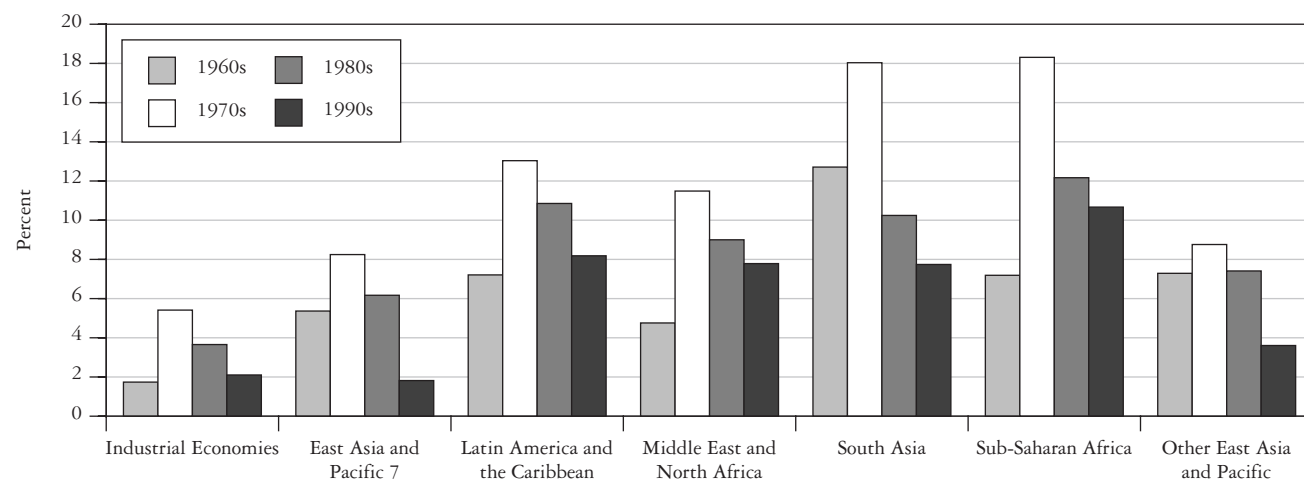


FIGURE 4.2

Share in Total Exports of Four Most Important Commodities
(Selected LAC Countries)

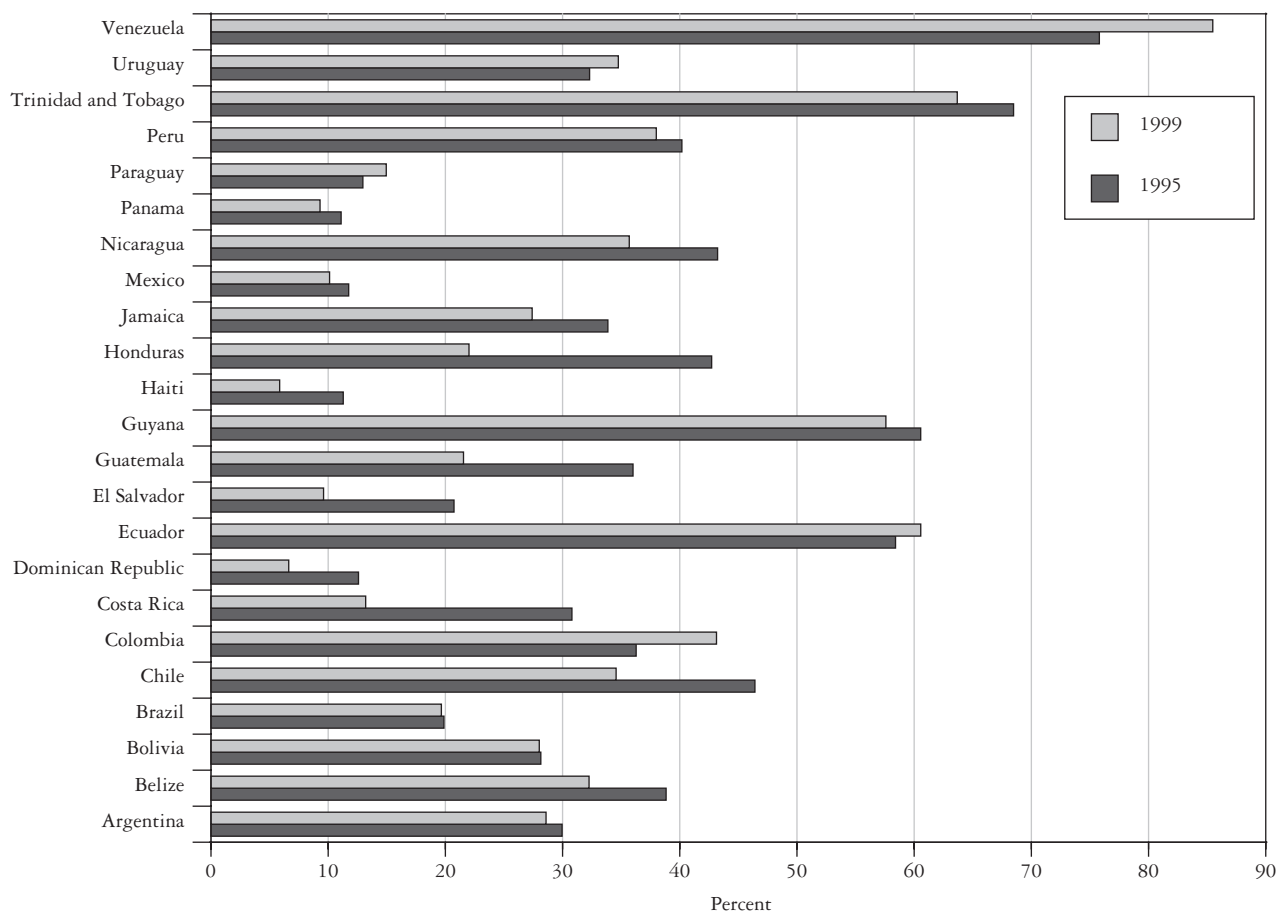
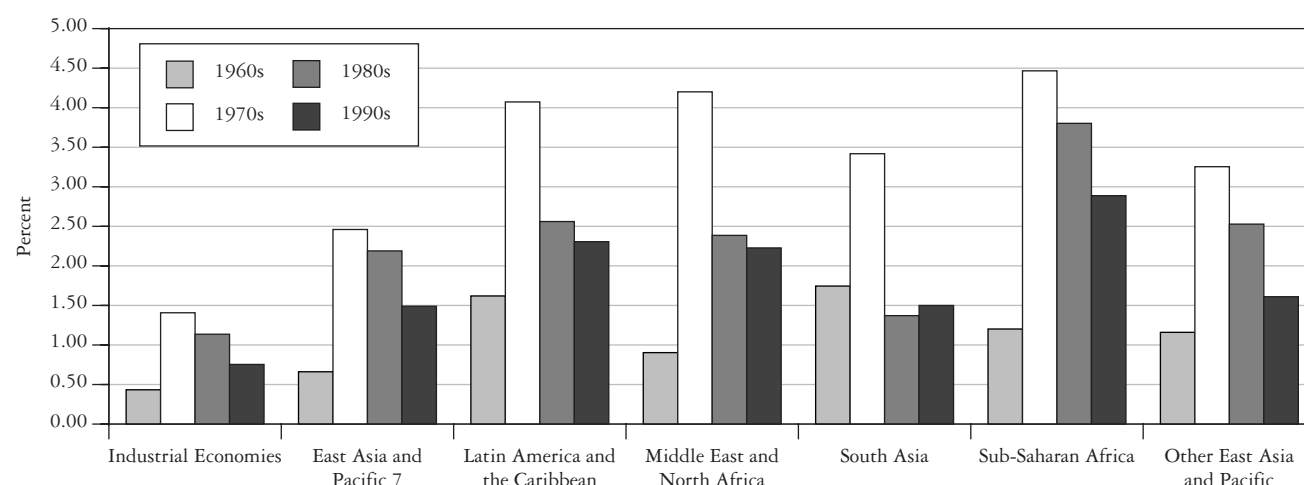


FIGURE 4.3

Volatility in Terms of Trade Shocks by Decade

(Regional Medians)



and Trinidad and Tobago, volatility was actually higher in the 1990s than in the 1980s.

In addition to the real external shocks represented by terms of trade changes, LAC, like other developing regions,

is also subject to external financial shocks, reflected in wide swings in the volume and cost of foreign capital inflows. Figure 4.4 shows the annual pattern of private capital inflows to Latin America as a percent of GDP. Capital inflows rose steadily in the late 1970s to peak at over 5 percent of GDP in the early 1980s, declining sharply to 2 percent in the late 1980s, followed by a strong recovery in the 1990s that was interrupted only by the Tequila Crisis in 1995 and the East Asian Crisis in 1998.

These large fluctuations in capital flow volumes are accompanied by similarly large fluctuations in their prices. Figure 4.5 shows the spreads on external public borrowing by four major Latin American economies, defined as the differential over world interest rates.⁵ The spreads display huge fluctuations, with strong surges at times of external crises (for example, Mexico's Tequila Crisis during 1994–95), which signaled a generalized withdrawal of financing for LAC economies.

The swings in the volume and cost of external financing to LAC reflect a combination of external and domestic factors,⁶ which affect both the decisions of nonresidents to supply financing to the domestic economy, and the decisions of residents (including the public sector) regarding whether to borrow or lend abroad. The two critical ingredients are the expected return from holding assets domestically, relative to holding them abroad, and the perceived riskiness of that return.

For given risk perceptions, private capital inflows tend to move in a direction opposite to OECD interest rates, declin-

TABLE 4.1

Volatility in Terms of Trade Shocks for Selected Latin American Countries

	1960s (%)	1970s (%)	1980s (%)	1990s (%)
Argentina	1.8	0.7	1.0	0.4
Belize	—	—	11.5	2.3
Bolivia	3.0	5.6	3.5	1.6
Brazil	0.5	1.4	1.0	0.7
Chile	1.9	5.4	2.4	2.5
Colombia	0.8	2.1	1.7	0.7
Costa Rica	0.9	4.4	4.1	1.8
Dominican Republic	1.8	2.8	3.7	6.5
Ecuador	0.4	7.2	3.3	3.7
El Salvador	1.7	9.5	3.2	1.5
Guatemala	0.7	2.7	1.5	1.1
Guyana	6.4	9.5	6.2	7.9
Haiti	3.3	2.5	1.1	5.8
Honduras	1.3	4.4	2.5	3.1
Jamaica	2.6	3.0	4.8	9.0
Mexico	0.3	0.9	2.0	0.9
Nicaragua	1.5	5.1	18.1	6.2
Panama	—	—	0.9	0.9
Paraguay	0.8	4.9	2.6	7.1
Peru	1.5	4.1	1.5	1.1
Trinidad and Tobago	3.2	12.0	4.0	7.3
Uruguay	2.5	3.0	2.0	1.2
Venezuela	—	3.6	6.8	3.7
LAC Medians	1.6	4.1	2.6	2.3
LAC Averages	1.8	4.5	3.9	3.4

FIGURE 4.4

Median Private Gross Capital Flows in Latin America

(Percent of GDP)

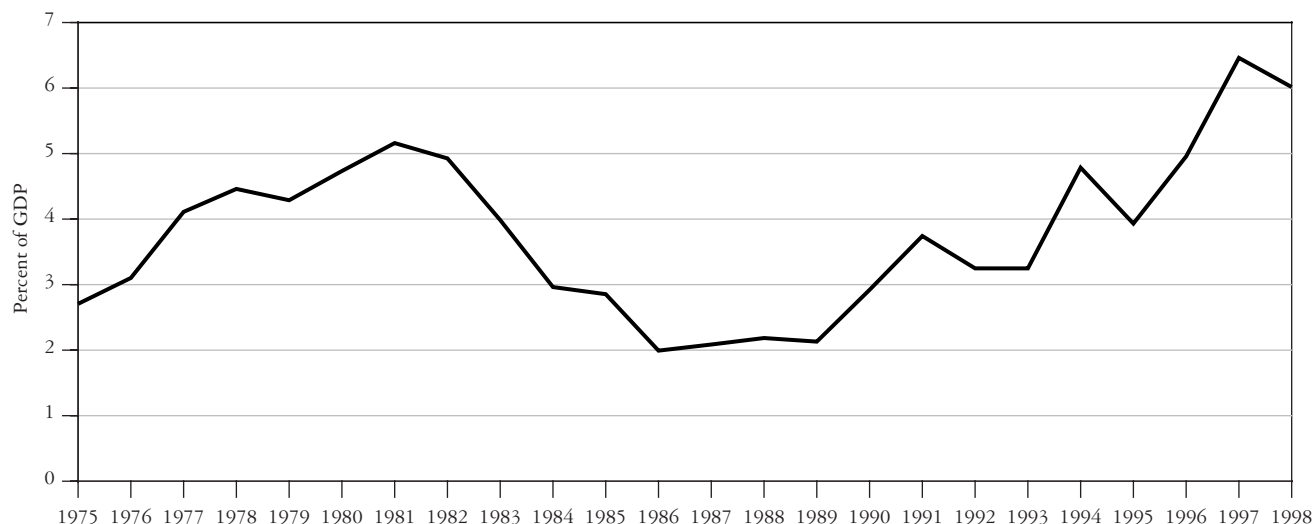
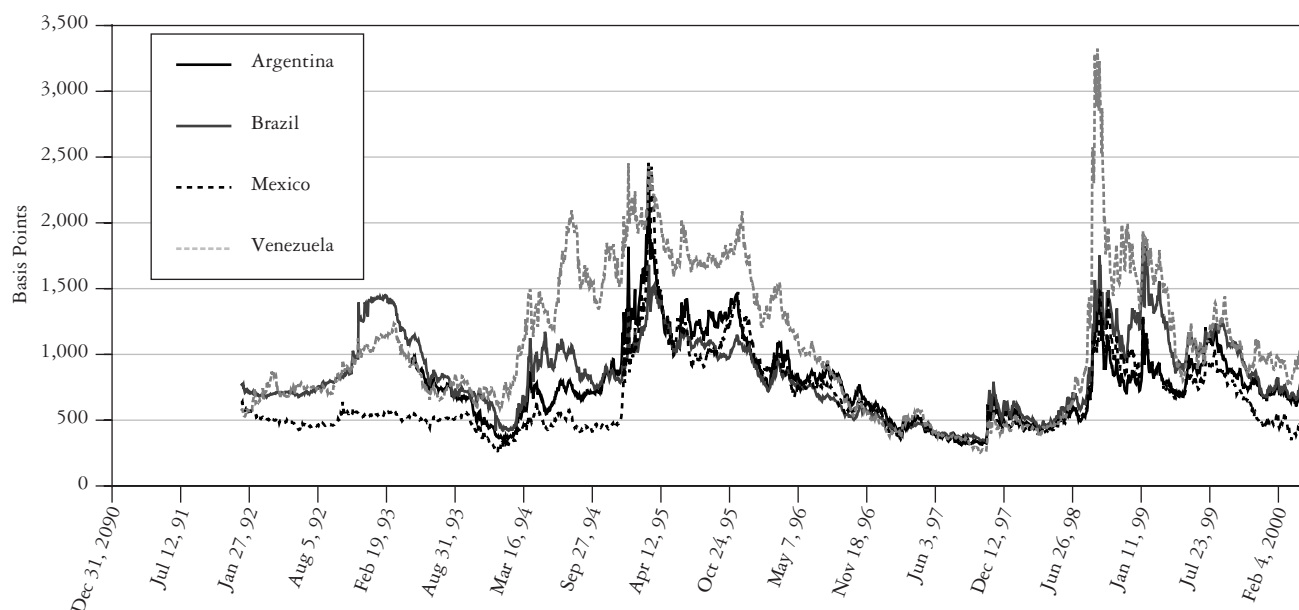


FIGURE 4.5

Spread of Foreign-Currency-Denominated Sovereign Debt Instruments (bps)

(Selected Major Latin American Countries)



ing at times of high rates (as in the early 1980s), and rising when interest rates decline (as in the early 1990s). Inflows also react strongly to payments crises in specific countries, such as Mexico, which cause investors to reassess risk and often leads to a generalized drop in inflows across emerging markets, in what has been judged as evidence of “financial contagion.”⁷

Importantly, however, the flows also reflect developments in the destination economies, because both risk and return are affected by domestic economic policies. The variability of capital flows does not reflect just external shocks, but is in part governed by forces endogenous to the receiving economies.⁸ With this important caveat in mind, Figure 4.6 shows the variability of gross private capital flows, as mea-

sured by their coefficient of variation,⁹ across world regions and time periods. By this measure, volatility of capital flows has risen relative to the 1970s in all world regions, although in most of them it peaked in the 1980s and declined in the 1990s. In all three decades, LAC ranks above the industrial countries and the East Asian miracle countries in terms of capital flow volatility, although the difference between LAC and these regions has narrowed in the 1990s.

Macroeconomic Policy Volatility

External factors are not the only cause of volatility in Latin America. Macroeconomic policies must share some of the blame. Policy volatility partly reflects mistakes by policymakers, but to a greater extent it is the result of large external shocks in the presence of weak insurance and financial markets and policy institutions, which constrain room to maneuver in macroeconomic management.¹⁰

Monetary policy volatility has been consistently high in LAC. Over the last two decades, the region has stood out for the recurrence of extreme inflation episodes driven by monetary financing of unsustainable fiscal imbalances. Since the 1970s, as Figure 4.7 shows, the standard deviation of base money growth has been higher in LAC than in most other world regions. It peaked in the 1980s at over 20 percent annually, and declined in the 1990s to just under 16 percent. The latter figure, which reflects the extreme inflation episodes of the early part of the decade in a few countries—notably Argentina, Brazil, and Peru—is far above the levels

observed in industrial economies (7 percent) and the East Asian miracle countries (10 percent), and was surpassed only by Sub-Saharan Africa. It should be noted, however, that in the second half of the 1990s monetary volatility has continued on a declining trend in Latin America.

Fiscal policy is also volatile in LAC. Figure 4.8 shows the volatility of real public consumption growth (as measured by its standard deviation) across decades and world regions.¹¹ As in previous cases, LAC displays higher volatility than industrial countries and the East Asian miracle countries—but less than most other developing regions.

Fiscal volatility is also related to monetary instability, because inflationary responses to unsustainable fiscal imbalances has traditionally been one of the primary causes of volatile monetary aggregates in the developing world—including Latin America until the early 1990s. Figure 4.9 plots the volatility of money against that of public consumption—both policy variables—for a large sample of countries.¹² A clear positive association between both variables emerges.

As noted earlier, however, macroeconomic policy volatility also reflects the effect of external shocks hitting domestic economies. This is especially so in developing countries where public sectors are heavily dependent on commodity revenues, as in many LAC economies. Terms of trade disturbances have an immediate impact on public revenues and are clearly reflected in fiscal aggregates. This can be seen in Figure 4.10, which plots fiscal volatility against terms of trade volatility for over 100 countries.¹³ Terms of trade fluctuations

FIGURE 4.6

Coefficient of Variation of Gross Private Capital Flows

(Percent of GDP, Regional Medians)

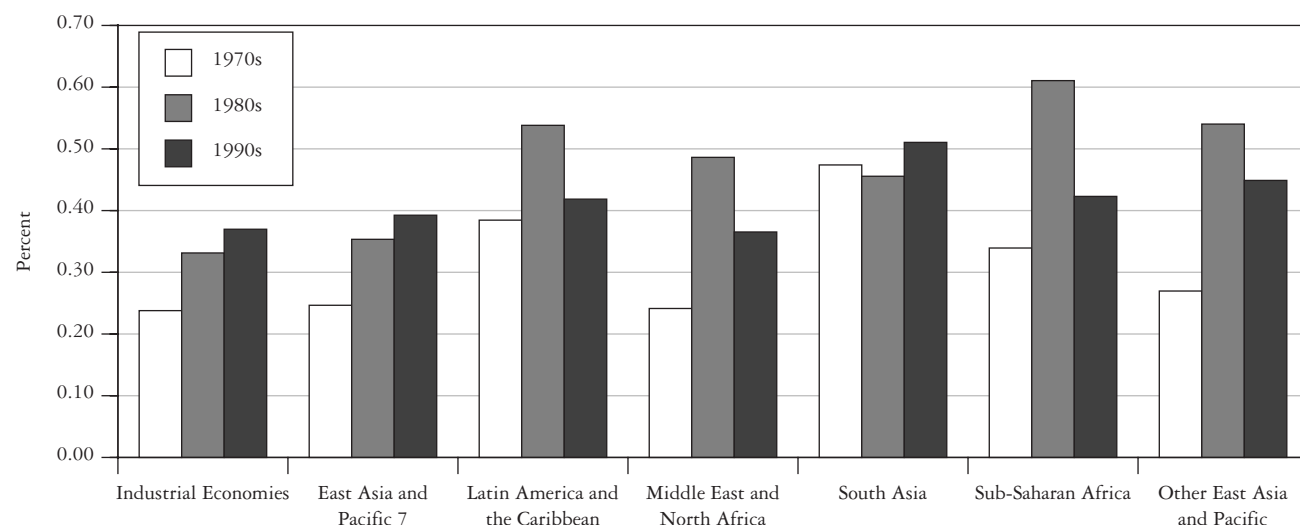


FIGURE 4.7

Volatility of Reserve Money Growth
(Regional Medians)

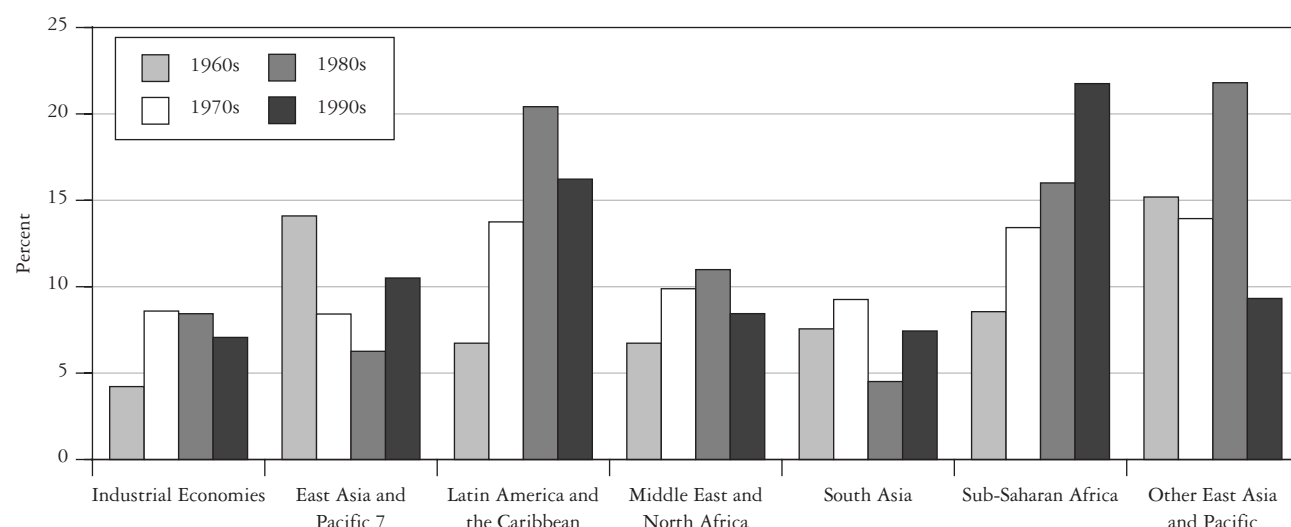
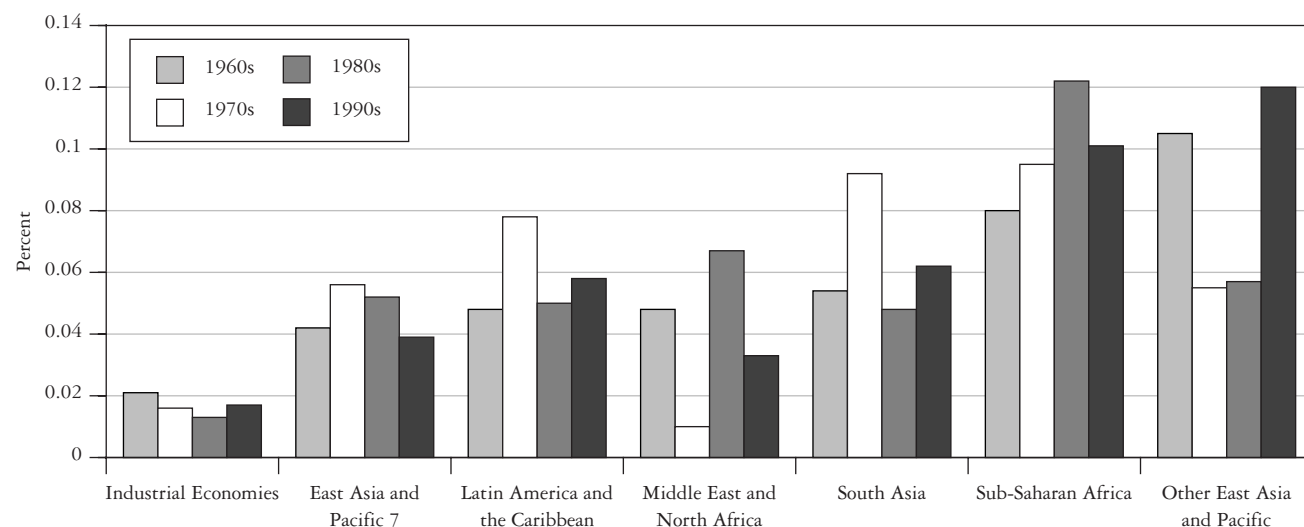


FIGURE 4.8

Volatility of Public Consumption Growth
(Regional Medians)



appear to be a major force behind fiscal volatility, accounting for a full one-third of the cross-country variation.

Absorption and Amplification of Shocks: The Importance of Financial Markets

The magnitude of the impact of major economic shocks discussed above on aggregate income and employment in LAC is determined by the functioning of markets, institutions,

and policies that play an instrumental role in absorbing or amplifying shocks. Among these shock absorbers and amplifiers, the domestic and world financial markets are perhaps the most important.

International financial markets allow domestic agents to sell risky income-generating instruments such as stocks and bonds of domestic firms. In this manner, domestic agents can reduce their exposure to risks associated with income volatil-

ity, diminishing the latter and thereby reducing aggregate volatility. Further, world financial markets also play an important role by supplying financing to ease adjustment to shocks after they have occurred so that, for example, a temporary worsening of the terms of trade, such as a fall in the price of oil or copper, does not force the economy into a sharp recession. Instead, such financing allows the shock to be weathered through a temporary increase in the current account deficit.

Domestic financial markets also play a key role in the adjustment to shocks, fulfilling the dual purpose of facilitating both ex ante risk diversification among domestic agents in the capital market—hence the diversification is limited to individual, not aggregate, risks¹⁴—and ex post channeling of resources toward sound firms and sectors hurt by shocks.

Thus, well-functioning domestic financial markets provide the efficient means for economywide self-insurance against aggregate risk—efficiency in the sense that it can achieve relatively quick reallocation of financing and avoid unduly long or widespread disruptions in production and consumption.

In most LAC economies, however, weak links with world financial markets and poorly functioning or shallow domestic financial markets greatly contribute to amplifying shocks rather than helping absorb them. This dual financial weakness is at the core of LAC's macroeconomic volatility.¹⁵

Weak Links with World Financial Markets

That links to international financial markets are weak follows from LAC's modest volume and large swings in private capi-

BOX 4.1

Excess Sensitivity to Disturbances: The Case of Chile

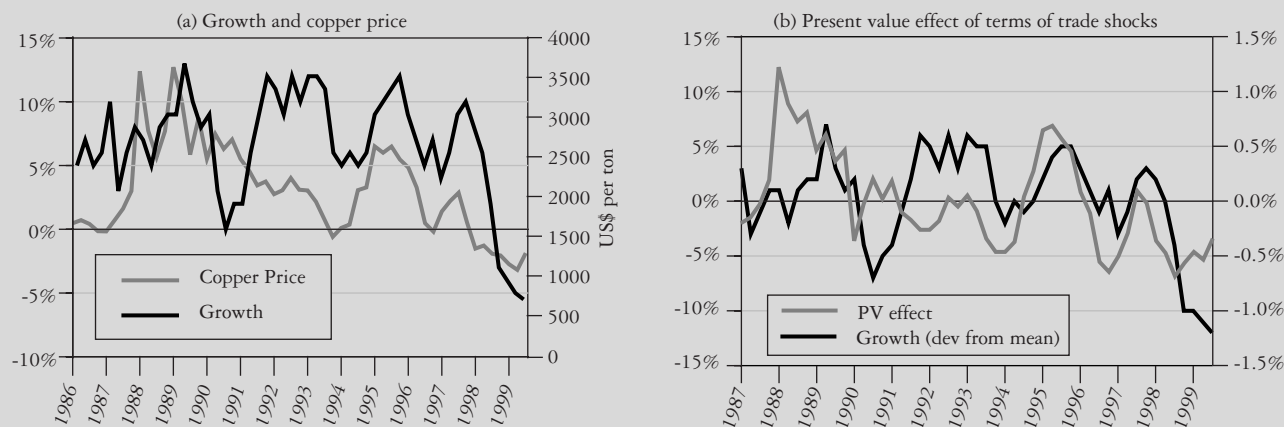
The weakness of the financial links of LAC economies to world markets makes them overly sensitive to disturbances. Here we document the case of Chile, the economic fortunes of which fluctuate widely with world copper prices.

Panel (a) in Figure 4.11 plots the spot price of copper from the London Metal Exchange and Chile's quarterly GDP growth. The resemblance between the two is striking, with the only important exception being the 1990 growth slowdown and subsequent recovery, which had a purely domestic origin.

With unhampered access to external financing, Chile would be able to smooth out temporary copper price fluctuations, and the swings in growth rates would be more muted than those of copper prices. However, panel (b) shows that the opposite happens. The panel compares the fluctuations in GDP actually observed with those that would be dictated from perfect smoothing (specifically, the annuity value of the present value impact of the change in copper prices, as a share of GDP).¹⁸ It is apparent from the figure (from the different scales in the axes, in particular) that fluctuations in GDP are an order of magnitude larger

FIGURE 4.11

Chile's Excess Sensitivity to Shocks



Sources: Growth from IMF; copper prices (London Metal Exchange) from Datastream.

tal flows, and the volatile interest rate spreads on sovereign debt discussed earlier. Even more striking is the fact that LAC borrowers tend to face much higher premiums, and higher return volatility, than private U.S. borrowers of similar rating.¹⁶ All these facts suggest that LAC's integration in world financial markets is still limited, which hampers the ability of the region's economies—even the economically well-integrated ones such as Chile—to smooth the effects of temporary disturbances (see Box 4.1).

Shallow Domestic Financial Markets

Despite the considerable progress made since the 1980s, LAC financial markets remain shallow, and financial systems are still weak in many countries in the region.¹⁷ The poor func-

tioning of domestic financial markets in most LAC countries makes them part of the economic instability problem rather than a solution to it. This is true both of banks and other financial institutions.

Figure 4.13 shows that LAC still lags behind most world regions in terms of banking system development, as measured by the ratio of credit to the private sector to GDP.¹⁹ While there is a great deal of variation across countries in the region,²⁰ on the whole the ability of LAC's banking systems to efficiently intermediate financial resources remains rather limited.²¹

Capital markets, in turn, have experienced a rapid expansion in Latin America over the last decade, but they remain small and illiquid relative to those in other regions. Figure 4.14 provides a comparative perspective on the size and

than would be observed if Chile were able to resort to international financial markets to navigate the disturbances.

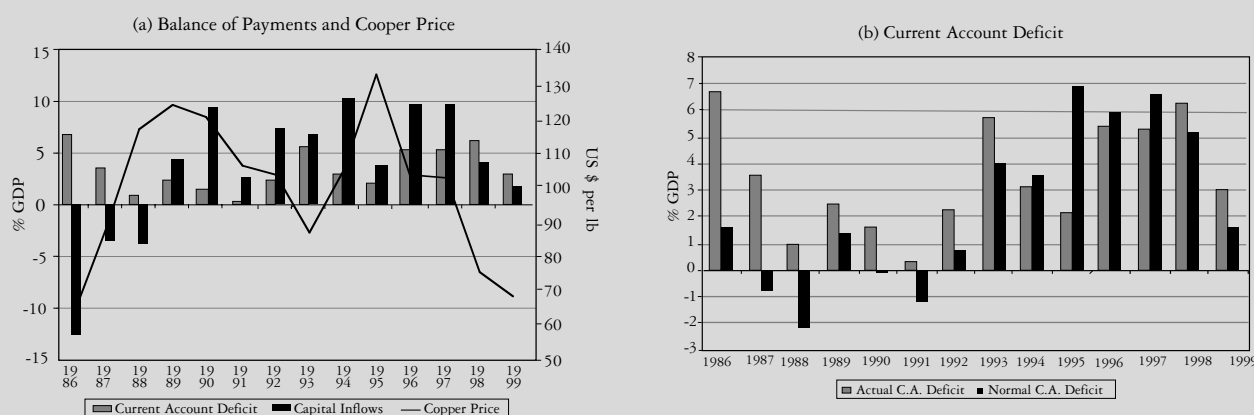
Figure 4.12 reinforces the conclusion that the fundamental problem is one of restricted access to international financial markets. Panel (a) shows that the price of copper and Chile's current account deficit are positively associated—exactly the reverse of what would be observed under smoothing of disturbances.

The 1995 Tequila Crisis appears to be the exception that proves the rule because high copper prices gave the Chilean economy enough “liquidity” to ride through the

crisis and experience fast domestic growth despite the large international credit crunch suffered by emerging economies. This is confirmed in panel (b), which demonstrates that Chile used a large fraction of the “liquidity” given by the high price of copper to offset the decline in capital inflows, as the current account deficit at “normal” copper prices reached its highest level during that year. Most important, exactly the opposite occurred during the 1998–99 episode, as the price of copper plummeted (erasing Chile's liquidity) at the precise time that international financial markets tightened.

FIGURE 4.12

Copper Prices and Chile's Current Account



Sources: Instituto Nacional de Estadística and Banco Central de Chile.

FIGURE 4.13

Average Private Domestic Credit

(Percent of GDP, Regional Medians)

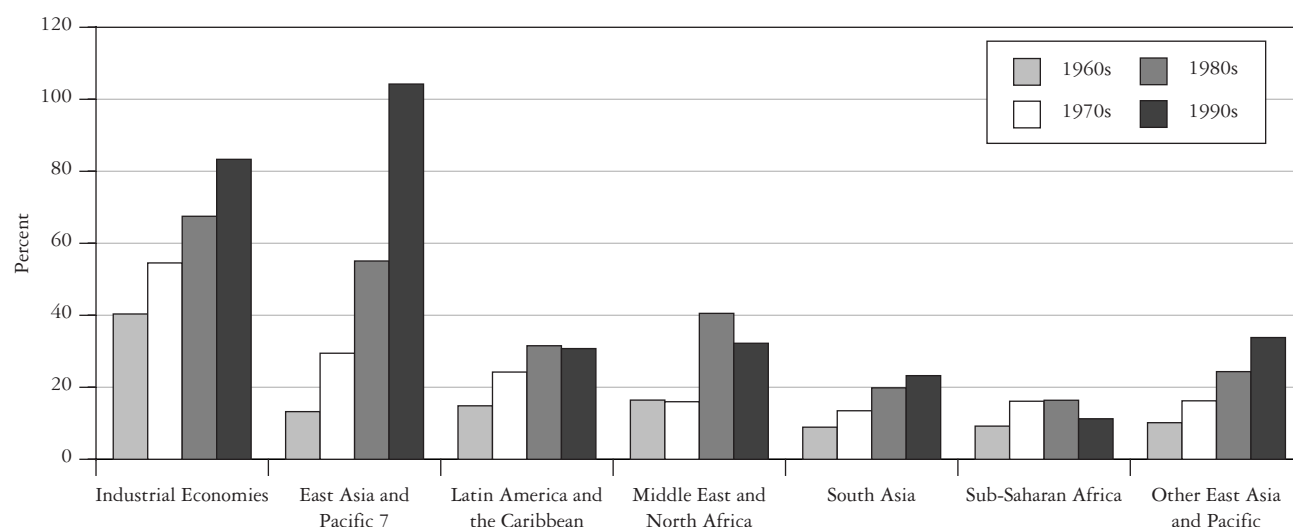
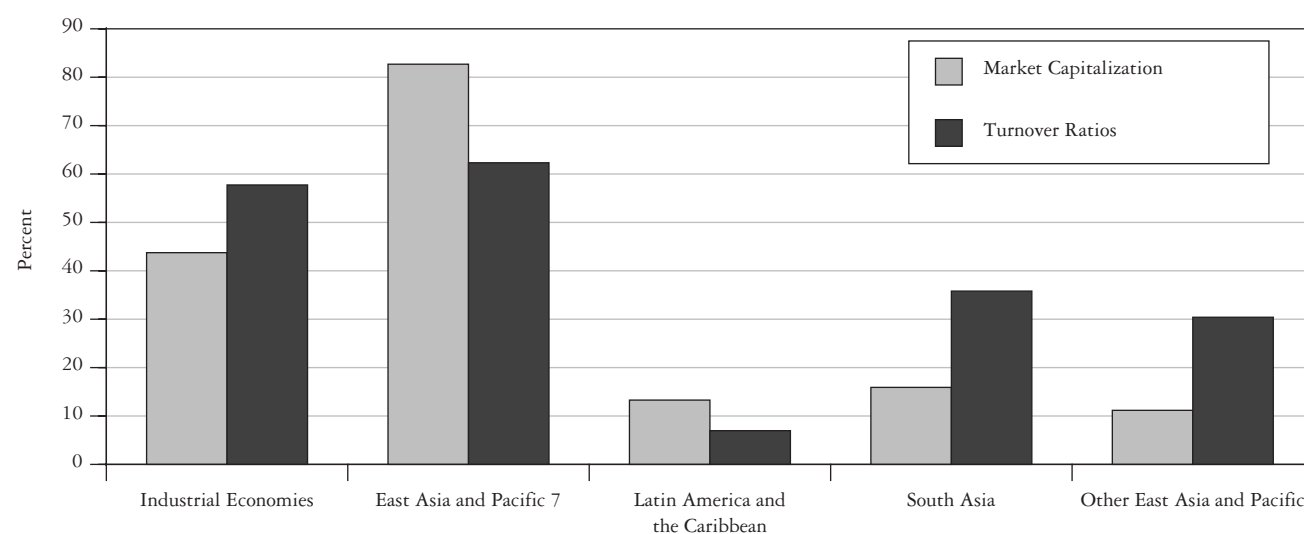


FIGURE 4.14

Stock Market Capitalization and Turnover Ratios

(Regional Medians in Percent, 1990–98)



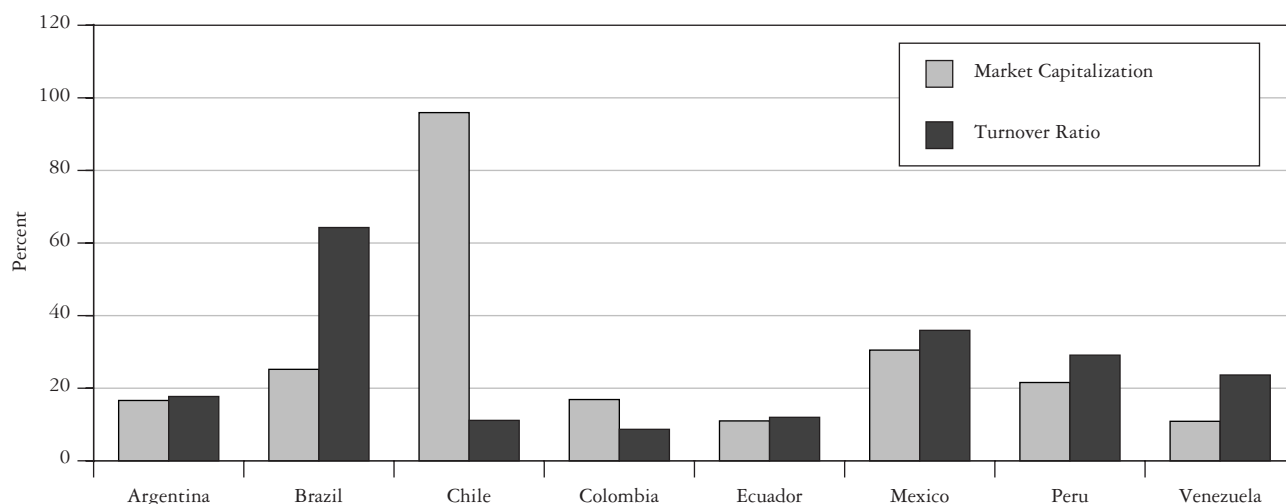
turnover (measured respectively by market capitalization as percent of GDP, and the ratio of value traded to market capitalization) of equity markets across world regions.²² The clear message is that LAC is lagging behind the rest of the world in both dimensions. Figure 4.15 shows that there is considerable diversity among the major economies in the region. At one extreme, Chile's market size is at or above industrial-country levels, but its market liquidity is extremely low. At the other

end, Brazil possesses a fairly liquid market, but its overall size is modest by international standards.

The Combination Increases the Likelihood of Economic Crises

The imperfections of LAC's financial markets severely limit their ability to diversify risk and reallocate financial resources at times of distress. This tends to amplify and propagate

FIGURE 4.15

Stock Market Capitalization and Turnover Ratios for Selected LAC Countries, 1995–98, Averages

adverse disturbances by creating wasteful contractions in sectors most affected by shocks or relatively poorly connected to domestic and international financial pipelines. This propagation effect is particularly evident in the case of the banking system. As adverse shocks put domestic firms in distress, leading some of them to bankruptcy, the credit portfolio of the banking system deteriorates, lowering the ability and willingness of banks to bear risk and channel financial resources efficiently. Some borrowers may be completely excluded from the credit market, exacerbating the magnitude of the downturn. When the banking system's balance sheet is already weak, this sequence of events can bring banks to the verge of financial collapse, and take sound borrowers along with them.

Weak capital markets also amplify the effects of shocks. In a manner similar to the credit rationing effect of weak banking systems just described, they result in what may be termed "equity rationing"; that is, the inability of firms to raise funds in the equity market without incurring prohibitively high costs. Moreover, thin markets also result in large fluctuations in equity prices, as shown by Figure 4.16, which compares the sensitivity of equity prices to trading volume in Chile²³—the LAC economy with the largest stock market—and three industrial economies. The result is that firms are unable to diversify their risks well through equity markets.²⁴

The association between underdeveloped financial markets and economic instability is clearly brought out by international evidence. As an illustration, Figure 4.17 plots the stock of private sector credit as a ratio to GDP against GDP growth volatility for a large number of countries. The vari-

ables are measured by their averages over the last three decades. A negative association between both variables is obvious from the figure.²⁵ The relationship, however, appears nonlinear, as indicated by the solid line-of-best-fit.²⁶ Thus, increased size of financial systems is associated with reduced economic volatility, but the association becomes less strong as the financial system becomes very large.²⁷

This implies a qualification regarding the stability-enhancing role of financial markets—the danger posed by excessive indebtedness. As financial systems expand, so does leverage, and with it the vulnerability of the financial system to shocks also increases. Rapid expansion of financial systems, particularly if inadequately regulated and supervised, can also contribute to economic volatility, a factor that played a cru-

FIGURE 4.16

Stock Market Illiquidity

(Regression Coefficient of Absolute Price Changes on Trade Volume)

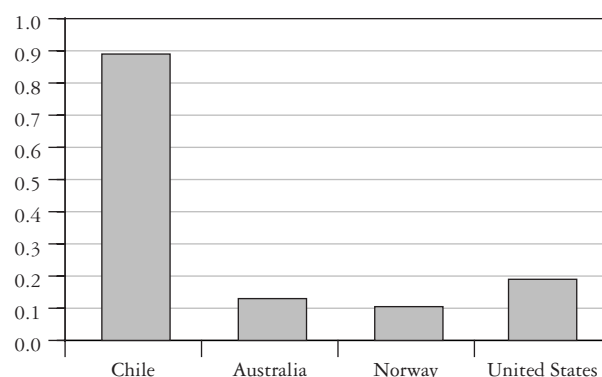
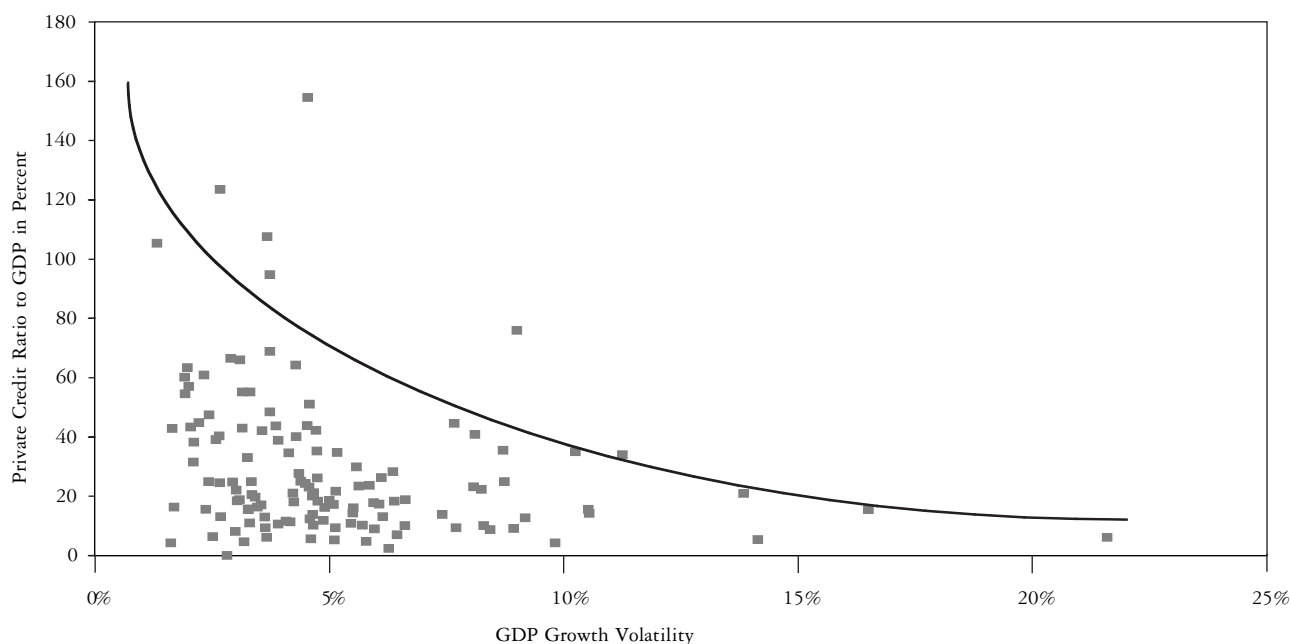


FIGURE 4.17

GDP Volatility and Credit Depth

cial role in the East Asian crisis of 1997–98. It is ironic that several LAC economies have suffered at both ends of the spectrum of financial development: chronic financial repression and underdevelopment first, followed by accelerated expansion and collapse of the banking system later. Deficient bank monitoring and supervision played a major role in these boom–bust episodes.

A second important qualification is that the causation may run the other way too: high economic volatility itself tends to hamper financial market development. In a highly volatile environment, firms may not be willing to undertake the risks associated with extensive borrowing, nor may households wish to save in financial assets (at least those available domestically). Without appropriate policy action, the economy may get stuck in a self-perpetuating vicious circle characterized by weak financial markets that amplify volatility, which in turn prevents further financial market development.

In the LAC context, the interplay between weak links with international financial markets and underdeveloped domestic financial systems may be key to the region's aggregate volatility (see Box 4.2). A closer look at recent crises in the region may help illustrate this. Figures 4.18, 4.19, and 4.20 show credit crunches in three major countries in the region that have followed episodes of external distress. Most striking is the case of Mexico (Figure 4.20), which experi-

enced a severe credit crunch following the 1995 Tequila Crisis. Loans—especially new loans—collapsed early in the crisis, especially as the peso went into free fall, dragging down the already weak balance sheets of Mexican banks. The severe credit crunch amplified the magnitude of the crisis, and the collapse of the banking system imposed massive costs on the economy and the public sector accounts.

In Argentina, in contrast, the amplification developed from the other side of banks' balance sheets. Figure 4.18 shows that in Argentina the major force behind the credit crunch was the run on bank deposits, driven by depositors' fears that tight external conditions would eventually result in the collapse of the system of convertibility between Argentina's peso and the U.S. dollar. The figures also illustrate how the financial turmoil in world markets during 1998–99 resulted in new credit slowdowns in Argentina, Brazil, and Mexico.

Beyond their shock magnification effect, however, domestic and external financial weaknesses are also sources of instability themselves, because they raise the likelihood that as-yet unrealized disturbances will have a major disruptive effect on the economy, triggering precautionary responses by the government or the private sector that anticipate the crisis. An example of this is the case in which policymakers foresee a tightening of external financing, which leads them to contract monetary and/or fiscal policy,

FIGURE 4.18

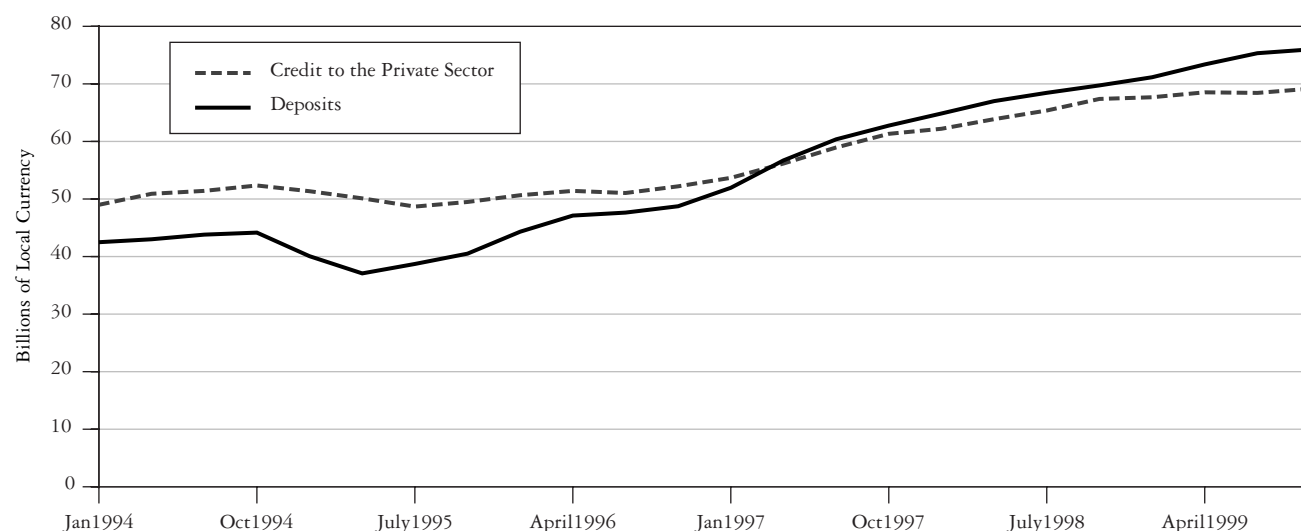
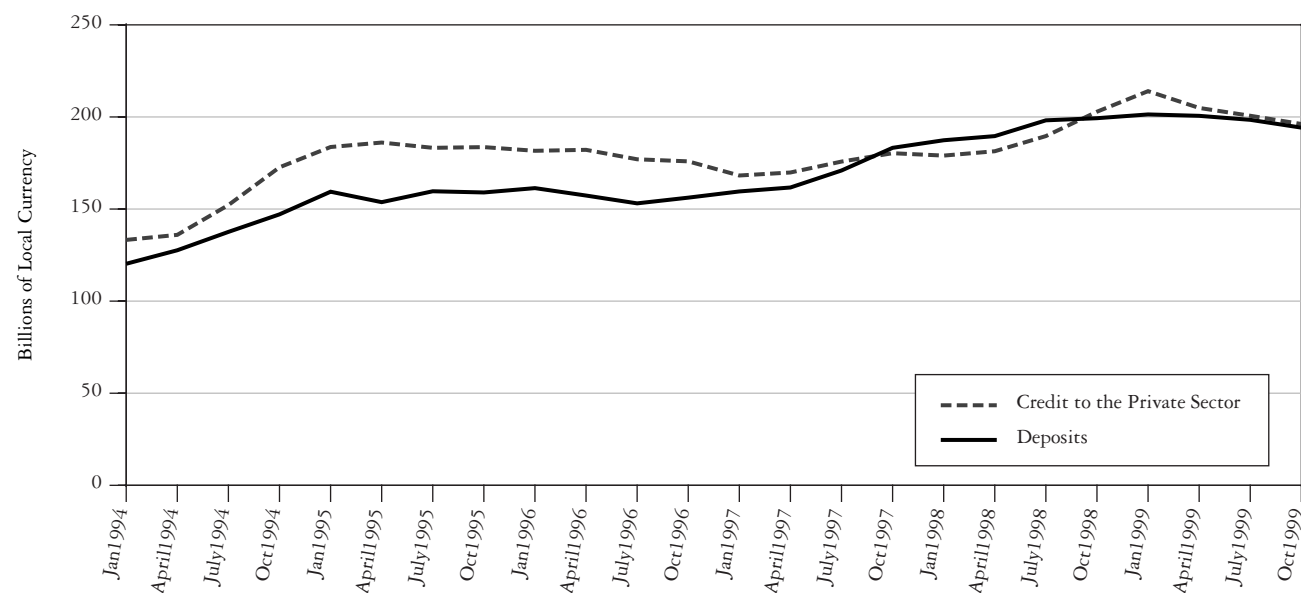
Credit Crunches in Argentina

FIGURE 4.19

Credit Crunches in Brazil

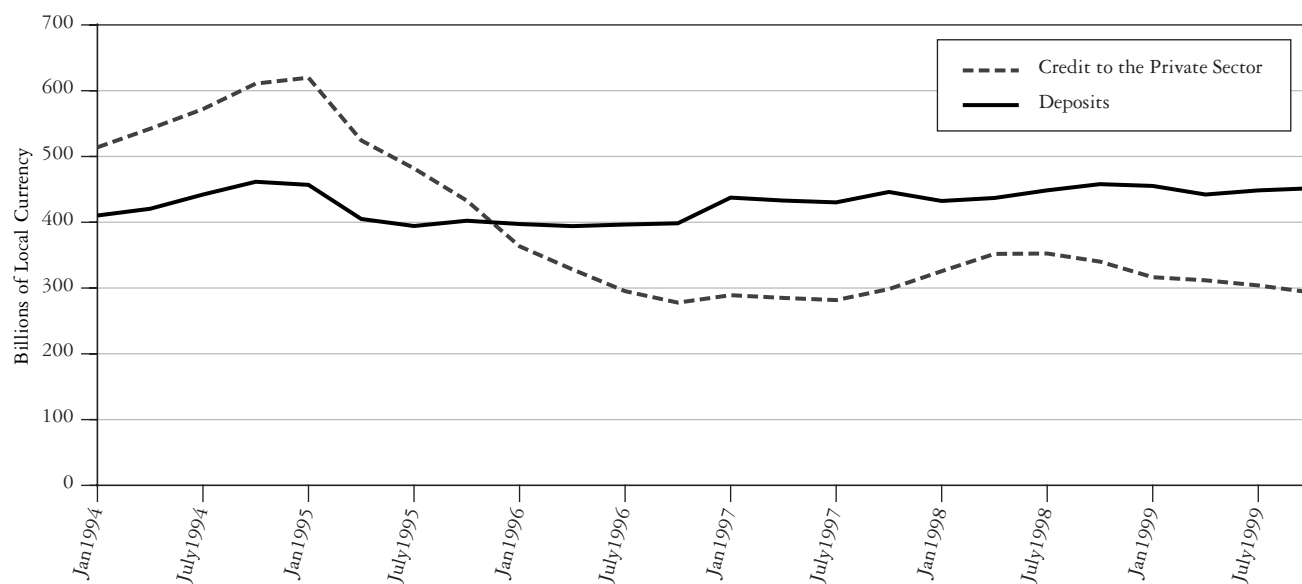
driving the economy into recession ahead of the feared external tightening. Likewise, the private sector often reacts to an anticipated tightening of the external financial bottleneck by running against domestic assets, thus driving down asset prices and forcing a tightening of macroeconomic policies—a scenario similar to the Argentine episode of 1995. Needless to say, a weak domestic financial

system considerably raises the likelihood of success of such speculative attacks and their economic cost.

Other Amplification Mechanisms

Beyond the financial system, other policy and institutional factors also play an important role in magnifying or containing the economic impact of shocks.

FIGURE 4.20

Credit Crunches in Mexico

- Fiscal policy* has traditionally been assigned an “automatic stabilizer” function, which consists of offsetting shocks by expanding aggregate demand in the face of contractionary disturbances and, conversely, in the case of expansionary disturbances. In LAC (and in much of the developing world), however, fiscal policy is often procyclical, adding to the expansion during booms and to the contraction during recessions.²⁸ Thus, a policy risk is inadvertently added to economic risk, amplifying the effects of economic shocks rather than offsetting them. To some extent this again reflects the operation of financing constraints, since at times of adverse shocks governments face sharp reductions in their access to external financing or large increases in its cost.²⁹ Procyclicality also reflects the failure of governments to provide for bad times by increasing their saving during good times, when revenues are high. A stark example of this failure has been the frequent mismanagement of resource booms in countries whose public sector is heavily dependent on natural resource revenues.
- Exchange rate and monetary policy* also shape the economy’s ability to weather shocks. The conventional prescription is that pegged exchange rates provide the best insulation against financial shocks, and flex-

ible rates allow monetary independence and are best for protecting the economy from real disturbances.³⁰ In recent years, LAC has witnessed a shift toward both ends of the exchange regime spectrum: rigid pegs (for example, currency boards as in Argentina, and proposals for outright dollarization in Argentina and Ecuador), and freely floating arrangements (Brazil, Chile, Colombia, Mexico, and Peru). The experience of developing countries, notably in LAC and East Asia, over the last decade or so has added some important qualifications to this conventional wisdom. First, the degree of monetary independence allowed by flexible exchange rates may be limited in practice if firms and banks hold large unhedged liabilities in foreign currency, because under such conditions exchange rate fluctuations can have large effects on firms and banks’ net worth, as in the East Asia crisis.³¹ Second, the ability of flexible rates to ease the adjustment to real disturbances depends on the credibility attached by the private sector to monetary policy and on the extent of inflationary inertia due, for example, to formal or informal indexation. Lack of credibility and widespread indexation may erode much of the real effect of nominal devaluation through additional inflation.³² Third, hard pegs may enhance financial stability and policy credibility.

BOX 4.2

Weak Financial Markets and Volatility: A Framework

The interplay between weak international financial links and underdeveloped domestic financial systems may be at the root of much of LAC's aggregate volatility. Here we present a stylized framework outlining the key mechanism, drawing from work by Caballero and Krishnamurthy (1999).

The Basic Setup

Consider a schematic timeline such that at date 0, which corresponds to “normal” times, investment decisions are made and agents plan toward the “bright future” of date 2. Much of this planning has to do with anticipating and preventing a crisis that can happen in the near future at period 1. Weak international links imply that the country may have a hard time persuading foreign financiers that they will share the gains in a relatively bright future (period 2) if they help to avert the period 1 crisis.

In this context, a crisis is a situation in which the economy needs substantial external funds (to repay debt or undertake new investments) but does not have sufficient international collateral to obtain them. To make this insufficiency of collateral clear, assume that nontradable date 2 assets (for example, buildings that would be completed at date 2), denoted A_n , are of no interest to foreigners—they cannot be used as collateral abroad. However, they can be used as collateral to borrow domestically, at a discount factor L , a maximum of A_n/L . This collateral is held by the “distressed” firms.

In turn, other domestic firms or individuals hold internationally acceptable collateral, denoted A_t , which includes items like the output of firms in the tradable goods sector at date 2, plus foreign currency assets, plus perhaps some domestic assets attractive to foreigners, such as telecom firms. Assuming that the international discount factor equals 1—or the interest rate equals 0—the most the country can borrow abroad at date 1 is $\lambda_t A_t$, where $\lambda_t < 1$, because of imperfect access to the world capital market.

Weak International Links and Fire Sales

Figure 4.21 shows the equilibrium in the economy's financial market. In panel (a), the supply of international

financing (flat at the discount factor 1 until the maximum amount $\lambda_t A_t$ is reached, at which point supply becomes vertical), is enough to meet the needs of distressed firms (the solid line that becomes vertical at the economy's total number of projects, set at unity). Thus, equilibrium is reached at $L = 1$, so that the domestic cost of funds equals the world interest rate, and distressed firms pledge only a fraction of their assets to the “intermediaries” holding the internationally acceptable collateral. In panel (b), however, international collateral falls short of the needs of distressed firms. The result is a fire sale of domestic assets, with the cost of domestic funds jumping to $L > 1$, and only a fraction $\lambda_t A_t$ of all projects getting financed.

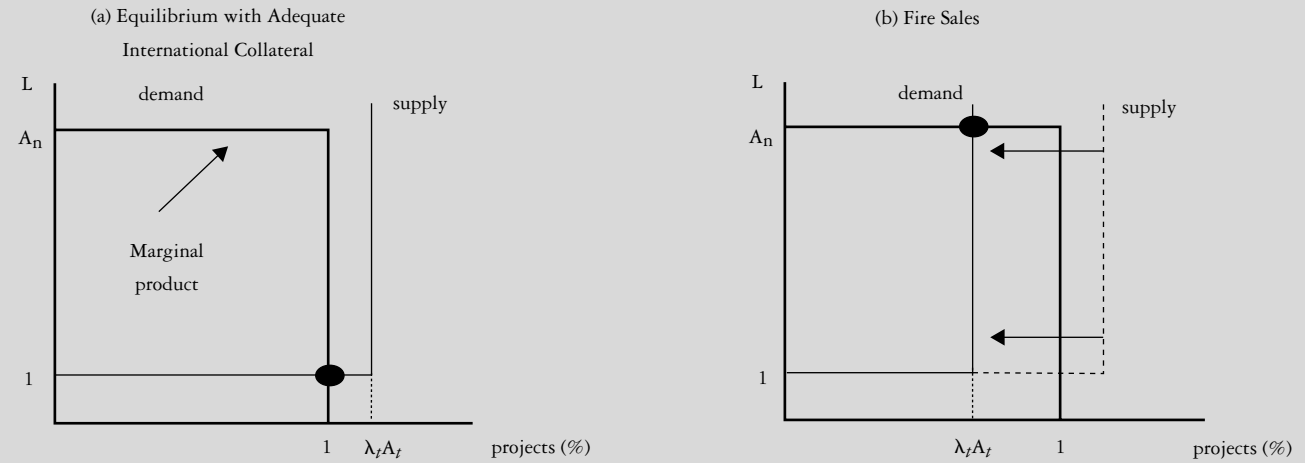
Weak International Links, Shallow Domestic Markets, and Excess Vulnerability

If, unlike in Figure 4.21, domestic financial markets are also imperfect—in the sense that distressed firms cannot fully pledge their assets to the domestic intermediaries holding the internationally acceptable collateral—the latter's incentive to hoard and supply international liquidity is lessened. In the model, the domestic price of this liquidity L falls. This situation is shown in Figure 4.22 by assuming that only a fraction $\lambda_n < 1$ of domestic collateral can be pledged. This shifts down the effective demand schedule (solid line) in panel (a), leading to a decline in L relative to Figure 4.21. Frictions in domestic financial markets now distort the return to holding international collateral, and as a result less will be held by the intermediaries supplying international liquidity.

This is shown in panel (b) of Figure 4.22 as an inward shift in the supply of international liquidity. The reduced supply means that the economy will experience more frequent fire sales and more severe distress in the face of international disturbances. The economy becomes too vulnerable to external shocks due to the undervaluation of international liquidity created by domestic financial market imperfections.

FIGURE 4.21

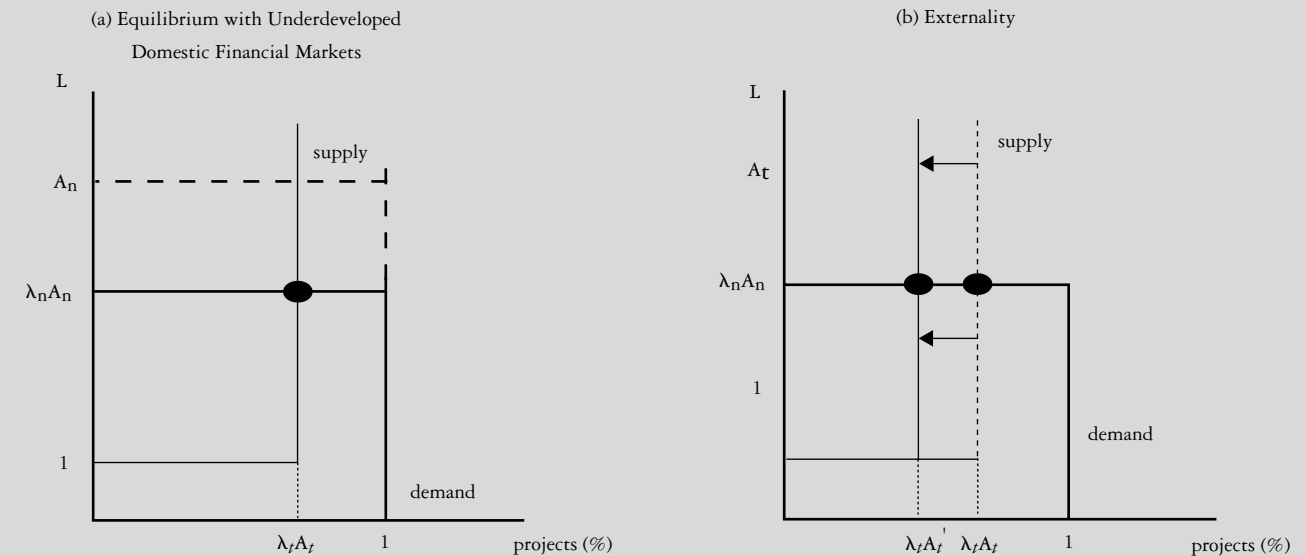
Fire Sales



- Limited number of profitable projects.
- Scarcity of international collateral limits the transfer of funds to distressed firms.
- A decline in the quality of a country's international collateral can cause a fire sale.

FIGURE 4.22

Excess Vulnerability



- Limited number of profitable projects.
- Scarcity of international collateral limits the transfer of funds to distressed firms.
- A decline in the quality of a country's international collateral can cause a fire sale.

However, when combined with nominal rigidities (in wages or other prices) they can make adjustment to real disturbances slow and costly, as shown by Argentina's experience.

- *Labor market rigidities* tend to magnify the cost of real disturbances, by forcing the labor market to adjust through unemployment rather than real wages and sectoral redeployment of the labor force. The notable example is again Argentina, where lack of adjustment of real wages has in effect created another source of pressure on firms in addition to the credit squeeze that they suffered from financial markets.

Summary

The preceding discussion has identified a number of key factors behind aggregate volatility in LAC. How important is the contribution of each to the region's overall economic instability? To answer this question, we combine those factors into an empirical quantitative model aimed at explaining long-term volatility. The results are briefly discussed here; the model is described in more detail in Annex 1.³³ The empirical model characterizes the relationships between external volatility, policy volatility, and financial depth. In spite of its simplicity, the model does a good job of explaining observed growth volatility, and accounts for close to 60 percent of the variation in the latter across countries.

The role of the various sources of volatility is described in Figure 4.23, which identifies the factors that make the average LAC country more volatile than other world

regions. It uses industrial countries and the East Asia miracle economies as a benchmark for the comparison. As has been shown, LAC's GDP volatility exceeds that in each of these regions by a considerable margin.³⁴

The results show that LAC's higher growth volatility relative to industrial and East Asian miracle countries arises from three main sources: the region's higher terms-of-trade volatility, the higher volatility of its macroeconomic policy, and its weaker financial links with domestic and foreign markets. Of all these factors, terms of trade shocks account for one-fourth of the difference in GDP growth volatility between LAC and the other regions. In turn, monetary and fiscal policy volatility combined account for over one-third of the cross-regional difference in volatility. Latin America's lower degree of external financial integration than the other regions' (measured by the volume of capital inflows plus outflows relative to GDP) accounts for another 20 percent. Volatility of capital flows also contributes to LAC's higher GDP growth volatility than in the other regions, but only a small amount. Finally, the smaller size of LAC's domestic financial markets (as measured by the ratio of private credit to GDP) accounts for another substantial portion of the difference in volatility. Combined, all these factors account for roughly 95 percent of the difference in income growth volatility between LAC and the other regions, leaving only a small portion to be explained by the relatively higher presence of oil-exporting economies in LAC (which appear to display an extra degree of volatility not captured well by other economic variables) and a tiny unexplained residual. Thus, external factors, domestic policies, and financial market underdevelopment all contribute to LAC's economic volatility.³⁵

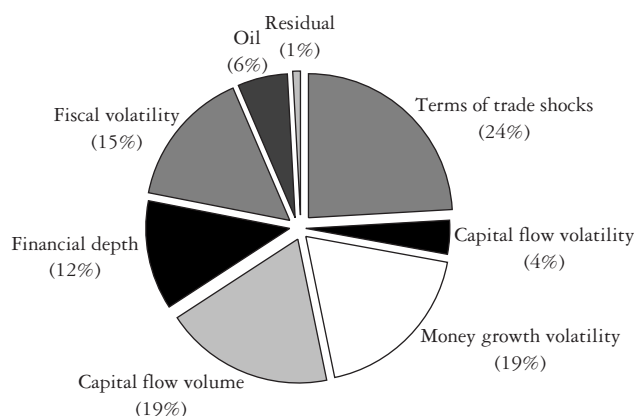
These results, while illustrative, also bring out the forces behind the observed improvement in LAC's growth volatility in the 1990s relative to the 1980s. Improving external conditions—less volatile terms of trade and capital flows—expanding financial markets at home and abroad, and more stable domestic policies, have all been contributing factors to the reduced instability of the 1990s relative to the 1980s.

Policies to Deal with Aggregate Volatility in LAC

What should be done to deal with LAC's aggregate volatility? Aggregate risk is not diversifiable within the domestic economy—since it affects all domestic economic actors—

FIGURE 4.23

Why is Latin America more Volatile than Industrial and East Asian Countries?



but it can be shared internationally if not all countries suffer the same shocks at the same time. International diversification would allow countries to eliminate their country-specific risk, so that they would face only the undiversifiable global risk of worldwide income fluctuations. This issue has received much attention in recent years, because if nations diversified optimally their consumption risk they would all end up with very similar (strictly speaking, perfectly correlated) consumption profiles, a theoretical implication which is clearly contradicted by the facts.

In essence, to achieve international diversification, domestic economic actors would purchase claims on the risky future incomes of foreign workers and firms, and sell claims on their own risky incomes. It is important to note that, for this to be a risk-reducing strategy, the incomes of foreign economies need not be less risky than those of

domestic economies. It is enough that they not be affected identically by the same disturbances. In this manner, copper exporters could share in the incomes of copper importers, countries specialized in agricultural products would trade part of their future incomes for those of countries specialized in manufactures, and so on. By pursuing this strategy, countries could entirely diversify away their idiosyncratic risks, and remain exposed only to global risks.

In the case of LAC, international risk-sharing along these lines would allow a considerable reduction in the volatility of consumption, resulting in a potentially very large welfare gain. Box 4.3 computes the gain that would have accrued to LAC countries had they been able to completely diversify their idiosyncratic aggregate risks in the 1990s. The calculations suggest the region's median welfare gain would have been equivalent to a permanent increase in the level of consumption around 7 percent per

BOX 4.3

The Welfare Cost of Volatility and the Gains from International Risk-Sharing

Many countries experience a high degree of volatility in their consumption path. To the extent that their citizens care about risk, their welfare would improve by reducing consumption volatility. This can be achieved through international risk-sharing, which would allow countries to shelter their standard of living from shocks by international diversification of their portfolios.

If countries were optimally diversified, they would fully eliminate the *idiosyncratic* (or country-specific) risk they face, so that they would remain subject only to *global*, or worldwide, risk. As a result, the *consumption* paths of all countries would become closely correlated. This is obviously not the case in reality, which provides proof of insufficient international diversification. Of course, one reason for this could be that the welfare gains from better diversification are simply too small to make this worthwhile. This possibility is explored below.

Quantifying Welfare Gains

The magnitude of the welfare gain from international diversification depends primarily on the degree of risk aversion (that is, how much value is attributed to reducing

risk) and the amount of risk that could be eliminated by diversification. The latter factor plays the key role in determining the size of potential welfare gains. In addition, these also depend on the implicit risk-free interest rate and the risk-adjusted growth rate for the domestic economy. Finally, the time horizon also matters: the longer the time horizon, the greater the benefits of hedging.

The calculations presented here follow an approach recently proposed by Athanasoulis and Van Wincoop (2000), from which we take most parameter values. Specifically, the risk-free real interest rate is 0.85 percent, the average growth rate of per capita consumption is 2.35 percent, and the coefficient of relative risk-aversion is 3. Undiversifiable or global risk is taken from the same source and is set at 0.00000225. For each country, the country-specific, diversifiable risk is then the difference between the variance of its respective growth rate of consumption and this undiversifiable risk. For illustrative purposes, we use the variance of consumption growth of each country during the 1990s. Finally, the welfare gain is computed for a horizon of 35 years and, in keeping with tradition, is expressed as the permanent percentage increase in expected consumption.

Table 4.2 assesses the welfare gains that would have been accrued to each country had it been able to diversify its idiosyncratic aggregate volatility in the 1990s. The table shows that the potential welfare gains would have been quite substantial for most LAC countries. The regional median exceeds 7 percent—a figure similar to those implied by van Wincoop (1999) for non-OECD economies, but about 6 times as high as the average for OECD countries.

TABLE 4.2

Estimated Welfare Gains from Diversification

(Latin America and the Caribbean, Percent of Private Annual Consumption)

COUNTRY	
Argentina	9.55
Bolivia	0.06
Brazil	6.99
Chile	3.71
Colombia	1.01
Costa Rica	2.95
Dominican Republic	22.39
Ecuador	0.02
El Salvador	13.65
Guatemala	0.27
Honduras	1.09
Jamaica	79.05
Mexico	8.49
Nicaragua	63.35
Panama	30.28
Paraguay	45.97
Peru	6.49
Trinidad and Tobago	97.01
Uruguay	8.58
Venezuela	6.48
Mean	20.37
Median	7.74
Industrialized Economies Mean	1.17
<i>Smaller Countries</i>	
Bahamas	—
Belize	7.54
Barbados	6.80
Guyana	27.58
Mean	13.03
Median	7.64
Overall Mean	19.13
Overall Median	7.02

Note: Variances are over sample period 1990–99. For Argentina and Barbados, total consumption has been used. Time horizon is 35 years.

Source: World Bank staff calculations based on Athanasoulis and van Wincoop (2000).

It is important to insist that this type of calculation only highlights direct welfare gains. Large as they may seem for LAC, for several reasons these figures still understate the true benefits of international risk-sharing. First, investment in risky assets with high returns would increase once risk is diversified away, which should raise growth and contribute to secondary-level gains (Obstfeld 1994). Second, portfolio diversification would reduce the incentives to use second-best distortionary measures (such as trade barriers) as risk-protection devices. Finally, risk diversification would allow financial markets to better fulfill their related functions of consumption-smoothing and optimal resource allocation.

Operationalizing Risk-Sharing

How would international risk-sharing be implemented? One conceptually simple way would be for residents in the different countries to trade claims on their respective risky national incomes. For example, residents of developing countries would sell claims on their GDP and buy claims on the GDP of industrial countries or other developing economies. Since not all economies suffer the same shocks at the same time, the result of this portfolio diversification would be a reduction in the risk faced by economic actors in each country. This is far from reality, however. At present, existing markets only allow trade in claims on firm dividends, which are a minor share of income in most countries, and ideally it would be necessary to develop “macro markets” to trade such national income claims.

If the potential welfare gains that such markets would allow are so large, why are they not already in operation? Their establishment involves a “public good” aspect that would prevent private firms and individuals from capturing the benefits of market introduction, even though they would have to bear the costs. Problems of measurement of national incomes and enforcement of market contracts would also be substantial. Finally, benefits of risk-sharing are far greater for the more volatile economies, and these economies are not necessarily the ones best positioned to lead in the creation of new markets that would be trusted by investors.

year—well above the corresponding figure for the average industrial economy. The more volatile economies in LAC would of course have benefited more from risk diversification, because they would have been able to more greatly reduce the variability of their consumption path, so their estimated gains would have been much bigger.

If the gains from international diversification are so large, why is it not already taking place? The answer is that the necessary financial instruments and the markets to trade them simply do not exist. At present, organized markets around the world only allow trade in the equity of a handful of firms accounting for a small fraction of world output. In other words, asset trading is limited to the sale and purchase of legal claims on the future profits of these firms, which represent a minuscule fraction of world incomes. And the available evidence shows that the degree of diversification generated by such trading is small. Table 4.3 presents the portfolio shares, relative to

total wealth, of a large group of industrial and developing countries.³⁶ Even for industrial economies, claims on capital held abroad are only about 5 percent of total wealth in the 1990s; domestic capital held by foreigners is of a similar magnitude. For developing economies, the figures are even smaller—less than 0.5 percent and about 3 percent, respectively.

In addition, other existing market-based insurance mechanisms for aggregate risks are limited in scope.³⁷ Even with better-developed markets, however, the insurance decisions of private individuals would likely lead to underinsuring anyway, because they do not take into account the fact that their individual actions may collectively add to economywide risk.³⁸ These facts call for policy action to deal with aggregate risks.

At the level of the national economy, what policies and institutions can help reduce aggregate volatility? Three broad types of measures can be distinguished,

TABLE 4.3

International Portfolio Diversification
(Ratios to Total Wealth)

	1966–73	1974–81	1982–89	1990–97	1966–97
Weighted Average					
Industrial Countries					
Foreign assets	0.013	0.007	0.000	-0.006	0.004
Capital owned by foreigners	0.025	0.024	0.029	0.042	0.033
Capital held abroad	0.028	0.029	0.032	0.053	0.039
Gross lending	0.041	0.061	0.124	0.158	0.112
Gross borrowing	0.031	0.059	0.127	0.175	0.114
Developing countries					
Foreign assets	-0.099	-0.037	-0.081	-0.065	-0.068
Capital owned by foreigners	0.039	0.022	0.023	0.029	0.028
Capital held abroad	0.004	0.002	0.002	0.005	0.003
Gross lending	0.024	0.060	0.048	0.041	0.045
Gross borrowing	0.088	0.077	0.108	0.082	0.088
Median					
Industrial Countries					
Foreign assets	-0.011	-0.028	-0.025	-0.037	-0.016
Capital owned by foreigners	0.021	0.021	0.030	0.061	0.035
Capital held abroad	0.007	0.007	0.023	0.053	0.028
Gross lending	0.046	0.050	0.119	0.140	0.105
Gross borrowing	0.044	0.083	0.161	0.199	0.145
Developing countries					
Foreign assets	-0.120	-0.116	-0.167	-0.139	-0.137
Capital owned by foreigners	0.039	0.027	0.031	0.033	0.035
Capital held abroad	0.000	0.000	0.000	0.001	0.001
Gross lending	0.028	0.043	0.045	0.056	0.051
Gross borrowing	0.105	0.128	0.174	0.155	0.160

Note: Weighted averages are computed over an unbalanced panel of eight-year averages for 68 countries. As a result, to a small extent changes across periods reflect changes in the composition of the sample. Results using a smaller balanced panel are similar.

respectively aimed at increasing (market) insurance, self-insurance, and self-protection against aggregate disturbances. Dealing effectively with macroeconomic risks requires a comprehensive strategy combining all three types of measures.

An overview of policies in each of these areas to deal with specific sources of aggregate volatility is outlined in Table 4.4. Rather than being comprehensive, the table's purpose is to illustrate the various alternatives available to governments to tackle the sources and amplification mechanisms of macroeconomic volatility. Because labor markets are examined again later in this report, we defer until then discussion of measures targeted at them. It is important to keep in mind that some policies serve more than one purpose—they may address more than one source of instability, or combine two or more of the insurance, self-insurance, and self-protection aspects.

Finally, the risk management policies reviewed below entail implicit and explicit economic costs. This does not mean they should not be undertaken, but rather that it is important to take such costs into consideration when assessing policy options. The cost and effectiveness of the various options depend on the economy's overall structure and institutional framework, so the optimal policy mix will differ across countries. The discussion below is meant to provide a guide or starting point for assessing the different alternatives.

Terms of Trade Risk

As with other aggregate disturbances, risk diversification provides the best response to terms of trade volatility. Diversification could be achieved by selling to foreigners the rights to a part of the country's income from the future sale of commodities. Then domestic agents will not have to bear the full brunt of its volatility and can hold other assets instead. In this regard, the boom of foreign investment in LAC in recent years plays, in part, a risk-reducing role or self-protection-augmenting role.³⁹

Hedging in international futures markets—for example, by selling tomorrow's copper or oil output at prices known today—is another way to diversify terms of trade risk. In spite of their expansion over recent years, however, futures markets remain limited in size, futures prices often fluctuate widely, and trading concentrates on short-term instruments. Currently, they offer limited scope for diversification over longer horizons.

Given the limitations of insurance markets, several LAC countries (for example, Chile and Colombia) have resorted to self-insurance, in the form of commodity stabilization funds, to deal with terms of trade risk. Such funds are designed to accumulate resources at times of high commodity prices and run them down when prices fall below a predetermined “reference” level. Unlike insurance mechanisms, stabilization funds do not involve any diversification of risk, only a precautionary transfer of resources from good to bad states.

TABLE 4.4

An Overview of Policies to Deal with Aggregate Volatility

POLICY SOURCE/AMPLIFIER OF VOLATILITY	INSURANCE	SELF-INSURANCE	SELF-PROTECTION
Terms of trade	• International portfolio diversification • Hedging	• Stabilization funds	• Trade diversification • Trade taxes/subsidies
International capital flows	• Contingent credit lines	• Liquidity hoarding	• Debt management • Limits on current account gaps • Capital controls
Financial system	• Facilitate risk diversification through capital market development • Internationalization of the banking system	• Enhanced capital and liquidity requirements for banks • Deposit insurance	• Adequate bank regulation and supervision • Avoidance of portfolio mismatches
Fiscal policy		• Precautionary targets and contingent rules	• Tax base diversification • Public debt management
Monetary and exchange rate policy		• Clear and transparent exchange rate/monetary rules • Balance flexibility against credibility	

They entail opportunity costs from the returns foregone by holding those resources in the form of short-term assets rather than longer-term, higher-yield investments.

Reducing the economy's exposure to terms of trade disturbances (that is, self-protection) is another way to limit their potential damage. One way in which this may be achieved is through export diversification, which reduces the impact of commodity price fluctuations by lowering the degree of concentration of exports in a few primary commodities. Diversification is often a natural result of the removal of bad policies—trade barriers or overvalued exchange rates—imposing an anti-export bias in the economic framework.

A related, but much more wasteful approach entails the use of trade barriers to isolate the economy from fluctuations in world prices (see Eaton and Grossman 1985). This procedure, however, runs counter to diversification—it can impose a strong anti-export bias in the incentive structure in addition to the efficiency cost of the distortions it creates. On the whole, these side effects make trade barriers counterproductive from the point of view of sheltering the economy from terms of trade risk.

Capital Flows

Sudden reversals of international capital flows often leave emerging market economies deprived of external financing when they most need it. In the lack of developed market-based mechanisms to insure against such risks, the international financial institutions have often played a subsidiary role by supplying additional liquidity in emergency situations. But some market mechanisms are beginning to emerge. One example is that of contingent credit lines, which are prearranged and can be drawn upon by the borrower if needed. Mexico entered such an arrangement with a group of private banks in 1997 and drew upon it in 1998 following a deterioration in oil prices and external financing.⁴⁰ The potential role of international financial institutions in this area is also highlighted by the case of Argentina, the access of which to financial markets in 1999 was facilitated by a World Bank policy-based guarantee on repayments.⁴¹

While contingent credit arrangements are a promising phenomenon, their implications remain to be fully established. Specifically, it is not yet clear whether such arrangements represent genuinely additional financing, or just substitute for more conventional forms of financing, under

the action of international investors' portfolio diversification rules that limit the share of financing supplied to specific countries or regions.

Countries can also self-insure against capital flow shifts by hoarding international liquidity, in the form of foreign exchange reserves and short-term assets, and reduce exposure (that is, self-protect) to unanticipated capital flow shifts by managing external borrowing so as to prevent accumulation of large short-term liabilities and "bunching" of repayments. Importantly, such strategy should involve both public and private borrowing, because it is the repayment schedule of the country as a whole that matters—as shown by the East Asian crisis of 1997—and the private sector may tend to overborrow at short maturities.⁴² Yet this strategy entails high costs, from both holding large stocks of resources in short-term, low-yield instruments, and borrowing at long maturities, which involve an interest premium.⁴³

A more direct form of sheltering the economy from disruptions in capital flows is attempting to restrict them. This can be achieved by limiting the economy's financing needs, keeping the current account balance within narrow limits. While runaway current account deficits are a sure recipe for macroeconomic disaster, however, inflexible adherence to rigid current account targets tends to make adjustment to adverse disturbances unduly harsh. At the same time, it is no guarantee against sudden losses of confidence by international investors, as shown by the East Asian crisis of 1997.

Capital controls—on inflows, outflows, or both—also aim directly at restricting international capital mobility. In the aftermath of the Asia and Russia crises of recent years, they have received renewed attention, in particular given the Chilean experience with controls designed to have a stronger deterrent effect on short-term inflows, which are conventionally deemed the most volatile.⁴⁴ From the theoretical perspective, the drawback of capital controls is that they distort intertemporal saving and investment decisions, and hamper the efficient allocation of capital across countries.⁴⁵ From the practical perspective, the effectiveness of capital controls in deterring flows beyond the immediate future remains hotly debated—many argue that private investors sooner or later find ways to circumvent the controls. There seems to be some agreement, however, that controls may succeed in altering the composition of flows.⁴⁶

The Financial System

As noted earlier, the domestic financial system plays a dual role. It allows risk diversification through capital markets—mainly for idiosyncratic risks, but also for aggregate risks if foreigners participate in the market. It also provides the means to efficient self-protection against risk by individuals and firms.

In LAC, enhancing the first of these two functions requires development of deeper capital markets open to foreigners. This in turn raises the need for regulatory reforms aimed at improving firms' transparency and accountability and enhancing corporate governance. In the banking system, in particular, one way to diversify risk internationally that has been employed by several LAC countries is to allow entry of foreign banks, the overall portfolios of which are less subject to the risks affecting domestic banks. The other side of the coin is that foreign banks might increase financial contagion by retrenching in the domestic market when hit by adverse developments in other markets.

As argued earlier, weak banks tend to amplify shocks rather than help absorb them. They hamper efficient self-insurance against aggregate shocks by discouraging individuals from holding deposits and other banking system liabilities when the health of banks is perceived as suspect. In such cases, they are also vulnerable to losses of confidence. Maintenance of high capital and liquidity ratios can self-insure against such events. Such ratios should be higher the lesser the degree of financial market development, and could be made procyclical—rising in economic booms and falling in recessions. They are not without economic costs, however, because they will be reflected in higher costs of credit for borrowers. Deposit insurance can also raise savers' confidence in the banking system and thus encourage saving, enhancing economywide self-insurance (it may also enhance self-protection by making the system less vulnerable to runs). To limit the impact of disturbances on the banking system, adequate prudential regulation and supervision of banks is also a high priority. In particular, regulatory norms should aim at avoidance of unhedged currency mismatches in bank portfolios—mismatches that may arise directly in their balance sheets, or indirectly through the balance sheets of their borrowers.

Fiscal Policy

Unstable fiscal policies are perhaps at the core of LAC's aggregate volatility. Ensuring fiscal stability is therefore of

high priority in the policy agenda. The first step, already achieved in many of the region's economies, is to set public finances on a sustainable path. To reduce aggregate volatility, however, it is also necessary to allow fiscal policy to carry out a countercyclical role. To a large extent, this will only be assured with development of stronger external financial links and deeper domestic financial markets. However, specific steps can be taken to reduce the impact of shocks on the fiscal accounts and the amplifier role played by fiscal policy.

Effective implementation of precautionary targets, and contingent fiscal rules that create room for action in bad times by accumulating resources during good times should be at the top of the policy agenda. Precautionary schemes to accumulate fiscal revenues in good times and run them down in bad times—as in the case of Chile's and Colombia's stabilization funds—are a good example. However, these rules should ideally be extended to all revenues, not only to those derived from natural resources. In addition, adoption of contingent rules relating fiscal policy to developments in the terms of trade, world capital markets, and so forth would also speed up and facilitate management of shocks, especially if such rules are preannounced. Adequate fiscal institutions and transparent budgetary procedures are necessary to ensure that such systems work as intended, and their resources are not misused for political objectives. In this regard, Brazil's Fiscal Responsibility Law represents an important step in the right direction.

To limit the effects of disturbances on public revenues, countries need to diversify their sources of fiscal revenues by expanding tax bases. This is particularly important in economies whose public sectors are heavily dependent on commodity revenues (such as Mexico or Venezuela). While any tax system entails deadweight losses, the international experience provides valuable hints on ways to limit such costs. Finally, management of the public sector's external borrowing program along the lines described earlier could also go a long way toward reducing fiscal vulnerability to financial shocks and, hence, fiscal and aggregate volatility.

Monetary and Exchange Rate Policy

Regarding monetary and exchange policy, the key concern is to strike a balance between flexibility and credibility. Hard pegs and flexible rates offer different advantages and disadvantages in terms of self-protection and self-insurance against economywide risks. Flexible exchange rates and

independent monetary policy may help ease adjustment to real shocks, and thus reduce volatility. To deliver these benefits, however, credible monetary policy should follow clear rules, which could be explicitly made contingent on external developments, to facilitate the management of shocks.

Monetary independence may be curtailed by low credibility, large private sector foreign currency liabilities, or extensive de facto dollarization, when most real and, especially, financial transactions are carried out in foreign currency. In such cases, a rigidly pegged exchange rate may be a preferable alternative to impose financial discipline and establish credibility. However, it needs to be matched by well-managed fiscal policy and flexibility in labor markets, since these become the major adjustment mechanisms to shocks in the absence of independent monetary tools. In addition, the absence of a lender of last resort that can help domestic banks in the face of adverse disturbances will require imposing high liquidity requirements on banks (like in Argentina) to self-insure them against shocks.

The upshot, however, is that there is no universally valid exchange rate and monetary regime for LAC economies. The key recommendation is to adopt simple and transparent monetary and exchange rate rules, a precondition to establish credibility (see Frankel, Schmukler, and Servén 2000). Hard pegs—in the extreme, dollarization—or floating exchange regimes—as in Brazil, Chile, and Mexico—provide the best options in this regard.

Supranational Action

In a broad sense, international financial integration is too limited rather than too broad. So far, it has not led to sufficient development of markets and instruments capable of providing adequate risk-sharing opportunities for developing economies to diversify much of the risk they face. While some progress in this direction has been made in recent years—with the expansion of world futures markets to trade commodity risks, and the emergence of contingent credit lines supplied by private investors to countries like Mexico—deep international markets for insuring aggregate risks remain a distant dream.

In this context of market imperfections, two lines of supranational policy action could speed up the process toward better international risk-sharing. Coordinated government action could speed up the development of adequate markets and instruments for international risk diversification. This, however, is a long-term undertaking. In

the meantime, the international financial institutions (IFIs) could play a major role, along two dimensions: first, by explicitly deploying their lending anticyclically, to counteract in part the fluctuations in private capital flows; and second, by helping expand the use of other insurance mechanisms, such as contingent credit lines. Their provision by the IFIs could serve as a catalyst for their further development by the private sector. Enhanced use of these or similar instruments by the IFIs—such as the policy-based guarantee recently obtained by Argentina—would serve to strengthen LAC's links with world financial markets and address the core of its economic instability.

Of course, important issues would need to be worked out. Key among them would be designing these contingent systems so that countries eligible to access them would nevertheless retain strong incentives for sound economic management so as to avoid moral hazard problems that could hamper such implicit insurance schemes. Clear definition of such policies, and design of adequate monitoring mechanisms and certification procedures that determine a country's eligibility status, are a prerequisite for implementation of the system. These issues should be at the top of the international policy agenda.

Annex 1

This annex describes the methodology used in Figure 4.23 to identify the contribution of different economic factors to the “excess” aggregate volatility in Latin America—that is, the difference between the region's growth volatility and that observed in industrial countries and the East Asian miracle economies.

To perform the decompositions, we estimated empirical equations relating GDP growth volatility during 1975–99 (the period for which comprehensive data, particularly on capital flows, are available) to a number of variables discussed in the text, describing external and policy shocks and the depth of domestic and foreign financial markets. Specifically, the explanatory variables include the standard deviations of terms of trade shocks, public consumption growth, and reserve money growth; the coefficient of variation of gross private capital flows; and, to capture domestic and foreign financial market depth, the logarithm of the private credit/GDP ratio and the sum of private capital inflows and outflows relative to GDP. For credit, we use the logarithm to allow for the nonlinear effect on volatility mentioned earlier in the text. In addition to these vari-

ables, we also include a dummy variable taking the value of unity for countries specialized in oil exports. All the variables are constructed over 1975–99 or the longest period available within this time span.

The empirical sample includes all industrial and developing countries outside of Eastern Europe and Central Asia with population above 250,000 in 1995 for which the necessary data were available. From this initial sample, six countries (Cameroon, Chad, Gabon, Jordan, Sri Lanka, and Syria) were dropped because they presented extreme values for at least one of the variables of interest, which distorted the empirical results. This left a sample of 82 countries.

Estimation results are presented in Annex Table 1. Before reviewing them, some caveats should be noted. Most important, some of the explanatory variables may be themselves affected by growth volatility, so that the empirical association detected here may not reflect exclusively their impact on growth volatility but partly also reverse causality flowing in the opposite direction. The methods employed here (Ordinary Least Squares [OLS]) do not make any attempt to correct this problem. Some of the explanatory variables are strongly correlated, making it difficult to identify their individual contributions to explaining growth volatility.

The table lists the regression coefficients obtained using alternative empirical specifications. Coefficients in italics are statistically different from zero at least at the 10 percent confidence level.

Column 1 starts with a specification including only terms of trade shocks and macroeconomic policy volatility, omit-

ting all financial factors. It can be seen that these “real” factors all significantly contribute to explaining growth volatility. Column 2 adds (the log of) credit depth to the specification in column 1; it carries a negative and significant coefficient, suggesting that deeper domestic financial systems contribute to reducing volatility. Addition of the credit variable, however, makes fiscal volatility insignificant, as both variables display a high correlation (around -0.50).

Column 3 replaces domestic financial factors with foreign ones, as represented by the volatility of gross private capital flows and their average volume (of inflows plus outflows), both relative to GDP. The former carries a positive coefficient, as expected, while the latter carries a negative coefficient. Thus, given capital flow volatility, deeper financial integration with foreign markets tends to reduce growth volatility, as argued in the text.

Column 4 in the table combines the preceding two by adding both domestic and foreign financial variables to the initial specification. This is the column used to construct Figure 4.23. Because of the relatively large cross-correlation already mentioned among some of the explanatory variables, two of them are not individually significant—the volatility of capital flows and the (log of) private credit. However, when considered jointly, they are significant at the 10 percent level. This means that these two variables jointly make a significant contribution to explaining the observed variation in growth volatility across countries, even though their individual contributions cannot be accurately estimated. For this reason, the calculations in Figure 4.23 should be viewed as illustrative rather than definitive.

ANNEX TABLE 1

Empirical Determinants of GDP Growth Volatility

(Dependent Variable: Standard Deviation of GDP Growth, 1975–99)

VARIABLE	(1)	(2)	(3)	(4)	(5)
Constant	0.024	0.043	0.021	0.030	0.025
Volatility of terms of trade shocks	0.002	0.002	0.002	0.002	0.002
Volatility of public consumption growth	0.015	0.013	0.013	0.012	0.012
Volatility of reserve money growth	0.066	0.042	0.050	0.040	0.043
Log average of private credit/GDP ratio		-0.005		-0.003	-0.003
Volatility of capital flows			0.013	0.012	0.013
Average volume of capital inflows+outflows (x100)			-0.025	-0.019	-0.020
Average per capita GDP					0.001
Log population 1995					0.000
Oil-exporters dummy	0.011	0.011	0.011	0.011	0.010
R-squared	0.51	0.54	0.57	0.58	0.58
Number of observations	82	82	82	82	82

Note: Coefficients shown in italics are statistically significant at the 10 percent level or better. Significance tests use heteroskedasticity-consistent standard errors.

Finally, the last column adds to column 4 per capita real income and country size (as measured by population), the two variables found in Chapter 2 to be significantly associated with growth volatility. They are not significant either separately or jointly, and their addition changes little the coefficients on the other regressors, which appears to confirm the ability of the preferred specification to identify the economic roots of volatility.

Notes

1. Aggregate volatility also reflects other noneconomic factors, such as climatic changes, natural disasters, and political developments. While these are important for some countries—for example, climatic factors in the Caribbean subregion—they are not covered in this report.

2. That is, the four commodities with largest export volume for each country. They are not necessarily the same for all countries.

3. It is important to note that the data required to compute terms of trade shocks are not available after 1998. In 1999, several economies in the region (such as Argentina and Chile) experienced terms of trade disturbances of significant magnitude.

4. Terms of trade shocks are defined as the change in export prices times the share of exports in GDP, minus the change in import prices times the share of imports in GDP.

5. This information is available on a comprehensive basis only for the 1990s.

6. See Gavin, Hausmann, and Leiderman (1997) for a comprehensive analysis of the evolution of capital flows to Latin America.

7. The operation of margin calls in financial markets has also been singled out as a source of contagion, as investors incurring losses in one market are forced to sell in other markets to meet their liquidity requirements.

8. Terms of trade are also determined in part by domestic factors in the case of countries which possess a major share of the world market for their imports and exports.

9. The coefficient of variation of gross capital flows relative to GDP is a more appropriate measure than the standard deviation because the average level of this ratio is of a relatively large magnitude that varies considerably across world regions and over time. This is in contrast to most of the other macroeconomic variables examined so far, which are typically small in magnitude. To perform cross-country comparisons of the variability of capital flows, it is therefore convenient to adjust for their average size.

10. In fairness, policy volatility could also result from policy-makers' attempts to stabilize a highly volatile economy through swings in fiscal and monetary policies. In practice, however, this "good" volatility is unlikely to account for much of Latin America's observed policy instability, with the possible exception of a few economies such as Chile.

11. We use public consumption rather than the overall public deficit for two reasons. First, the former is under the direct control of the authorities, while the latter varies endogenously with tax collec-

tion, itself dependent on the level of economic activity, and with interest rates, which determine the burden of domestic debt service and are themselves affected by inflation. Variation in inflation rates across countries and periods then hampers comparability of public deficit figures. Second, data on public consumption are much more widely available than data on the public deficit. The ideal measure of fiscal stance would be the cyclically adjusted primary deficit (that is, the deficit exclusive of interest payments and adjusted for endogenous changes in tax collection). Such information, however, is available only for a small number of countries and years. In any case, the picture that results from using the standard deviation of public consumption growth (as in the text) as the measure of fiscal volatility is very similar to that obtained using instead the coefficient of variation of public consumption relative to GDP. By this latter measure, Latin America would also display higher volatility in the 1990s than in the 1980s, exceeding in the former decade all other world regions.

12. Figure 4.9 plots the (log) standard deviation of base money growth against the standard deviation of public consumption growth. The sample includes all countries, except those in Eastern Europe and Central Asia, with populations of more than 250,000.

13. Figure 4.10 plots the standard deviation of terms of trade against that of public consumption growth, for the same sample of countries as in the previous figure.

14. Although participation of foreigners in the domestic capital market also allows international sharing of aggregate risks.

15. The following discussion draws extensively from Caballero (2000).

16. This is documented by Caballero (1999a, b, c) for several major Latin American economies.

17. The progress of financial development in Latin America was reviewed in World Bank (1997).

18. The present value effect is computed assuming an AR(4) process for the spot price of copper, a constant growth rate for copper production (7 percent), and a fixed discount rate (7.5 percent).

19. A similar picture emerges if we use instead another standard measure of banking system size, namely the ratio of banks' liquid liabilities to GDP.

20. Banking systems are highly developed in a few smaller economies that are international financial centers, notably the Bahamas, Barbados, and Panama.

21. This does not mean that LAC countries should embark on a runaway expansion of the banking system. As experience has shown, the speed at which the banking system can safely expand is closely dependent on the strength of the regulatory and supervisory framework.

22. The graph omits Sub-Saharan Africa and the Middle East and North Africa due to the small number of countries from those regions for which information is available.

23. Sensitivity is measured by the regression coefficient of absolute equity price changes on trade volume.

24. The importance of these financial issues for macroeconomic management is discussed in Easterly, Islam, and Stiglitz (2000).

25. A similarly negative association emerges if we use instead the ratio of banks' liquid liabilities to GDP as our measure of financial depth. Furthermore, the results are robust to also controlling for the level of per capita income. This is necessary because financial depth indicators are strongly associated with per capita income across countries.

26. This resulted from a regression of GDP growth volatility on the logarithm of the credit/GDP ratio.

27. Easterly, Islam, and Stiglitz (2000) obtain the same empirical result.

28. This procyclical behavior of fiscal policy is documented in Inter-American Development Bank (1995) and World Bank (1997).

29. However, procyclical fiscal deficits might also be viewed as a second-best response to financial constraints, since at times of financial distress the government may not necessarily be the actor that can make the best use of scarce funds from the social point of view.

30. See Ghosh and others (1998) for a comprehensive empirical assessment of the macroeconomic effects of alternative exchange rate regimes. They find that pegged exchange rates are associated with lower inflation and higher variability of real income growth than flexible rates. However, the robustness of these results is questioned by Edwards and Savastano (1999).

31. This "devaluation refrainment" is examined by Calvo and Reinhart (1999) and Hausmann and others (1999).

32. See Perry and Lederman (1999) for a discussion of the real effects of nominal devaluations in Latin American and East Asian economies following the 1997 crisis.

33. Some caveats are in order, however. First, some of the potential explanatory factors are themselves affected by volatility (for example, capital flows, as noted above), and hence their causal effect on volatility may be blurred in the observed empirical association between both variables. Second, some of the explanatory variables are strongly associated among themselves, so it is difficult to disentangle from the data which one is responsible for what effect. This is particularly the case as our measures of fiscal volatility move closely with terms of trade shocks and monetary factors (positively with monetary volatility and negatively with credit depth).

34. The figures in Chapter 2 presented regional medians, while the empirical methods used here employ unweighted regional averages. They also exclude economies with populations under 250,000 in 1995, and economies for which data on any of the relevant variables was missing.

35. In several respects, these results are in fact rather similar to those reported by the Inter-American Development Bank (1995) and Easterly, Islam, and Stiglitz (2000). The former also finds a large effect of monetary instability and financial depth on Latin America's volatility, and both studies fail to find large effects of capital flow volatility.

36. The table is taken from Kraay, Loayza, Servén, and Ventura (2000).

37. This situation parallels the lack of development of market insurance for catastrophic risks in industrial countries.

38. This is analyzed by Caballero and Krishnamurty (2000).

39. With foreign resource ownership, however, an adequate taxation system is necessary to capture natural resource rents.

40. The line of credit was refinanced in 1999.

41. The guarantee was based on a number of specific policy reforms.

42. Long-term debt can be viewed as short-term debt plus an implicit rollover insurance. By neglecting their contribution to the overall repayment schedule, individual borrowers may undervalue the implicit insurance and tend to overborrow at short maturities.

43. Ironically, borrowing only long term and holding large short-term reserves would be considered poor financial management in most corporations of industrial countries. Several major economies in Latin America (especially Chile) already hold very large precautionary balances; see Caballero (2000) for details.

44. A similar scheme has been used by Colombia.

45. Capital controls may also hamper another function of capital flows, namely the contribution of equity inflows to improving corporate governance in destination countries. Moreover, an unintended side effect of controls is that they may create opportunities for rent-seeking and corruption.

46. On the effectiveness of capital controls see, for example, Edwards (1999), Montiel and Reinhart (1999), and Kaminsky and Schmukler (2000).