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Securing Stability and Growth in a Shock Prone Region: The Policy Challenge for Latin America

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Introduction

Latin America is volatile. On this there is not much controversy. But what are the reasons for this volatility? And what are its costs? On these more fundamental questions, there is as yet no consensus. And partly because of this, there is no consensus on the appropriate policy response to macroeconomic volatility in Latin America, and other shock-prone economies.

This paper provides new evidence on these contentious issues, and discusses policy implications for the region. The message that emerges is as follows:

- *Latin America is volatile:* We find that Latin America has experienced between two and three times the volatility observed in industrial economies, as measured by the standard deviation of key nonmonetary outcomes. Indeed, by these measures the region has been more volatile than any other region in the world, other than Africa and the oil dependent Middle-East. And in the volatility of monetary and inflation outcomes, the region stands alone.
- *Macroeconomic volatility is very costly:* We find that macroeconomic volatility is bad for economic growth, and for investment in both human and physical capital. If Latin America had experienced the same volatility as that registered in the industrial economies, economic growth could have been about 1 percent per year higher than, in fact, it was. At the same time, we find evidence that volatility adversely affects the income distribution and raises poverty rates.
- *Sources of macroeconomic volatility:* We also provide evidence that both domestic and external shocks contribute to volatility. But more importantly, macroeconomic volatility depends upon an economy's institutional structure and economic policy regimes. We provide evidence, for example, that deep financial markets are a "shock absorber", and that the exchange-rate regime has an important impact on volatility. In particular, pegged exchange rate regimes appear to stabilize the real exchange rate, at the cost of destabilizing real output, and that switches between exchange-rate regimes are highly destabilizing, which we interpret as evidence on the destabilizing nature of an unsustainable regime.
- *Policy matters:* Latin America is not volatile because it labors under some ancient and ineradicable curse. It is volatile because its institutions and policy regimes have been ill-equipped to cope with the large shocks that hit the region. This means that policymakers can do much to reduce macroeconomic volatility and its costs, if they focus on building appropriate institutional structures. We cover several elements of a strategy to manage macroeconomic volatility in this chapter, many of which are taken up in more detail in subsequent chapters.

Latin America is volatile

Table 1 (below) provides summary statistics on macroeconomic volatility in Latin America and the other major regions of the world. The volatility of real GDP growth in Latin America emerges clearly from the table. The volatility of the economic growth rate in Latin America is more than twice, and the volatility of private consumption growth nearly three times, that experienced by the industrial economies. By both measures, Latin America is also more volatile than other regions of the world, except for Africa and the Middle East and North Africa, which experience even more volatility than does Latin America.[1]

The highly volatile nature of Latin America is reflected in the fact that the region has more, and deeper, recessions than do most other areas of the world.[2] Table 2 provides evidence on the frequency, length, and depth of recessions in Latin America, and places the experience in an international context.

Table 1 Latin America is volatile							
	Latin America & Carrib.	**Industrial Countries**	**East Asian Miracle**	**South Asia**	**Other E.Asia and Pacific**	**S.Saharan Africa**	**Middle East & North Africa**
Macroeconomic outcomes							
Standard deviation of:							
Real GDP growth	4.7	2.2	3.0	3.4	4.1	5.3	7.9
Private consumption growth	5.6	2.1	4.1	5.4	4.0	10.3	8.2
Domestic investment growth	16.1	8.3	16.4	11.0	15.3	28.7	20.3
Change in real exchange rate	13.4	4.8	6.2	na	8.9	19.4	5.5
Annual inflation rate	463.5	3.9	6.2	7.9	10.8	88.7	7.0
Policy							
Standard deviation of:							
Fiscal deficit (% of GDP)	4.7	2.4	2.4	4.2	3.5	4.5	8.5
Pub. consumption (% of GDP)	2.5	1.6	1.1	2.1	4.1	3.7	5.5
Narrow money (% of GDP)	5.5	2.4	1.9	1.4	1.0	3.8	3.1
Monetary growth	211.1	5.6	13.6	7.4	13.3	93.7	13.1
External shocks							
Standard deviation of:							
Terms of trade (growth rate)	15.1	8.9	8.0	7.9	11.4	22.1	25.6
Int'l capital flows (% of GDP)	2.8	1.7	1.5	1.1	3.9	4.4	6.1
Standard deviations are computed over the 1970-1992 period. All statistics are weighted by 1992 population.							

During the 1970-1992 period countries in the region experienced, on average, 2.7 recessions, with an average length of 1.9 years, compared with the industrial economies' average of 2.1 recessions lasting 1.3 years. Thus, not only have countries in Latin America had more recessions than the industrial countries have had, but those recessions have been, on average, nearly 50 percent longer than those experienced by the industrial countries.

Table 2 Recessions in Latin America and other regions (1970-1992)			
	Number of recessions	Average length of recession (years)	Average depth of recession
Industrial countries	2.1	1.3	-2.0%
Latin America	2.7	1.9	-8.0%
E. Asian Miracle	0.7	1.0	-1.6%
South Asia	1.8	1.2	-3.5%
Other E.Asia & Pacific	3.7	1.5	-8.7%
Sub-Saharan Africa	3.9	1.5	-6.0%
Mid-East & N. Africa	3.2	1.7	-11.7%
Other	2.0	2.2	-18.3%
Note: A recession is defined as a year in which real GDP declines. Regional figures are population-weighted averages of individual country experience.			

Even more striking is the depth of the typical recession in Latin America, as measured by the cumulative decline in real GDP. Whereas in the industrial economies a recession means a total decline in output of roughly 2 percent, the average recession in Latin America generates a decline in production of 8 percent, four times that recorded in the industrial economies.

Latin America also experiences substantial volatility in prices. As Table 1 indicates, Latin America has experienced extremely volatile rates of inflation, more than 100 times as volatile as in the industrial countries, and also higher by far than any other region of the world. The standard deviation of Latin America's inflation, at over 460 percent per year, is more than four times as large as that of the next

most volatile region. The real exchange rate, too, experiences substantial volatility. The volatility of the real exchange rate in Latin America is nearly three times that recorded in the industrial economies, and more than twice that observed in the "East Asian Miracle" economies.

- **Policy is volatile in Latin America**

One reason for this volatility in macroeconomic outcomes in Latin America is a correspondingly large volatility in macroeconomic policy. This volatility is harder to interpret than that of the terms of trade, because while some changes in fiscal, monetary, and exchange-rate policy represent destabilizing policy "shocks" to the economy, others are responses, intentional or inadvertent, to economic disturbances that originated elsewhere. For example, the Venezuelan fiscal deficit is immediately affected by changes in world oil prices. Similarly, as the recent Argentine experience illustrates, under fixed exchange rates a contraction of the money supply is one mechanism through which adverse external shocks are transmitted to the domestic economy.

Having said that, much of the observed volatility in measures of fiscal and monetary stance undoubtedly reflects policy "shocks" to the economy, so that the measures of policy in Table 1 (above) are informative about the magnitude of such "shocks" in different economies. By any of the measures presented, Latin American macroeconomic policies are volatile. For example, though Latin America's average ratio of public consumption to GDP is roughly in line with that observed in most other regions of the world, the volatility of that ratio is almost 60 percent higher than it is in the industrial economies, and more than twice as volatile as in the "East Asian Miracles". Latin America's budget deficit is both large on average and highly variable over time; the volatility of this measure of fiscal stance is approximately twice as high as that observed in the industrial countries and the "East Asian Miracle" economies, and is higher than in any region other than the Middle East and North Africa.

Latin American monetary policy is volatile as well. The standard deviation of the monetary growth rate is nearly twenty times that experienced in the industrial economies, and the volatility of the ratio of money to GDP is more than twice that observed in industrial economies.

- **Latin America receives large external shocks**

The volatility of policy is only one reason for the volatility of Latin American macroeconomic outcomes. Another reason is the large external disturbances that routinely buffet the region. The most important of these are sudden changes in the terms of trade and in international capital flows.

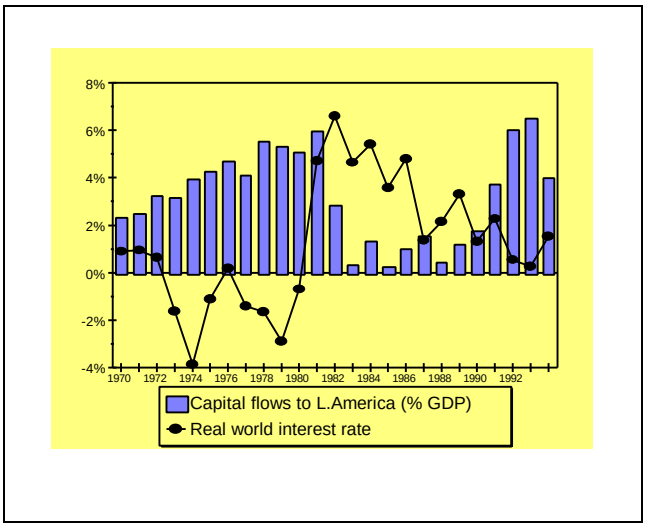
In Latin America, the standard deviation of changes in the terms of trade is 15 percent per year. This is nearly twice that observed in the industrial economies, the "East Asian Miracle" economies, South Asia, and Central Asia. Only Sub-Saharan Africa and the oil-dependent Middle-East and North Africa region exceed this volatility.

The Latin American countries with the most extreme terms-of-trade volatility are the oil-exporters Venezuela and Ecuador, where the standard deviation of annual changes in the terms of trade reaches 50 percent and 35 percent, respectively. Mineral-exporting Bolivia and the sugar and coffee exporters Colombia, the Dominican Republic, and El Salvador also experience very high terms-of-trade volatility. In those countries the standard deviation of changes in the terms of trade approach 20 percent per year.

As international financial markets have become increasingly integrated, shocks to the capital account have emerged as an additional source of macroeconomic disturbance to Latin America that is no less important than are terms of trade shocks. Figure 1 illustrates the very high volatility of capital flows to the region:[3] from a peak of about 6 percent of GDP in 1981, net flows to Latin America abruptly

dropped to roughly nil in 1983, and stayed close to that level until around 1990, when they increased almost as abruptly to 4 percent of the region's GDP in 1991, and to 6 percent in 1993 and 1994.

Figure 1
International capital flows to Latin America
Volatility and the role of external factors



In 1995, we have so far observed an almost equally impressive decline in capital flows to the region, generated by the unfavorable response of international investors to the December 1994 devaluation in Mexico.

Of course, observed capital flows reflect a mix of supply (external) and demand (domestically-determined) factors. However, there is significant evidence that, to a very large extent, these flows reflect factors external to the region. First, as shown in Figure 1, there is a clear correlation between capital flows to the region and macroeconomic conditions in the industrial economies, as measured by the US real interest rate. Secondly, sudden capital inflows and outflows have been observed at a global and regional level rather than just at the national level, which is indicative of common external factors. In fact, during the 1990-1994 period, capital inflows surged, pretty much at once, to countries in a variety of different cyclical situations and with different macroeconomic policies. This all suggests the importance of external determinants of capital flows to Latin America.[4]

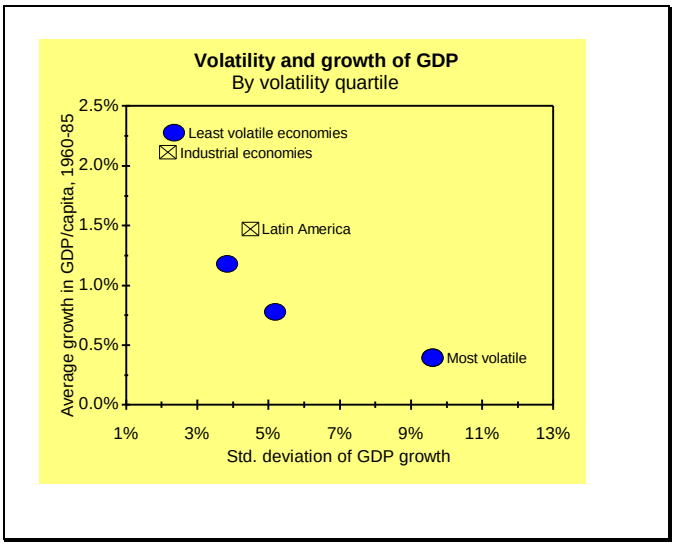
Volatility is costly

Latin America is volatile, in its macroeconomic outcomes, in policy, and in the external shocks that affect the region. Why should we care? In this section we draw upon our own and others' research to argue that macroeconomic volatility has been very costly indeed for Latin America. We also provide some evidence on the mechanisms through which volatility adversely affects economic outcomes.

PVolatility hurts economic growth and investment

We begin with a naive, but nevertheless revealing approach to the data. In Figure 2, below, we plot the long-run growth rate observed in a sample of about 130 countries against the volatility of real GDP. To clarify the relationship, we group countries into quartiles according to the volatility of their economic growth. A negative relationship between volatlity and growth clearly emerges from the figure.

Figure 2
Volatility and growth of real GDP per capita



The figure also shows that Latin America has experienced both higher volatility and lower growth than have the industrial economies, and leaves the impression that the two are related. Of course, this impression could be misleading; both volatility and growth are related to other variables, and the correlation that is apparent in Figure 2 could be spurious. To investigate this possibility, we adopted the by now conventional approach pioneered in Barro (1991), augmenting the standard specification to incorporate the potential impact of variables that measure the volatility of the macroeconomic environment.

More specifically, following Hausmann (1995). we added to a conventional "growth regression" measures of the volatility of: the terms of trade, of the real exchange rate, of fiscal and monetary outcomes. The results, described in more detail in Hausmann, Gavin and others (1995), are striking, and are summarized in Table 3 (below). That table uses the regression estimates to answer the following question: how would Latin America's economic growth have differed if the explanatory variables had taken on the values observed in the industrial economies rather than those actually observed in the region.

The table shows that growth in per-capita GDP was about 1 percentage point lower in Latin America than in the industrial economies. But Latin America began the period with much lower income per capita than that of the industrial economics, and the neclassical "catch-up" or "conditional convergence" term predicts that Latin America's growth should as a result have been nearly 2 percentage points higher than the industrial economies. The regression framework thus suggests a Latin American "growth gap" of nearly 3 percentage points during the period in question.

Table 3
How has volatility affected growth in Latin America?

Determinant of growth	Impact on predicted growth rate
Difference in average growth rates	-0.92
Minus predicted neoclassical "catch-up"	-1.96
Latin American "growth gap"	-2.88
Difference attributable to:	
Initial school enrollments	-0.92
Domestic investment	-0.44
Volatility*	-1.06
Other factors considered	0.04
Unexplained	-0.49
Note - impact of:	
Terms-of-trade volatility	-0.41
Real exchange rate volatility	-0.23
Monetary policy volatility	-0.29
Fiscal policy volatility	-0.14
TOTAL	-1.06

In each case, numerical estimates give the predicted increase in the growth rate that would have resulted if the indicated determinant of growth had taken the value observed in the industrial economies, rather than the one that was actually observed in the region.
*Includes effects of volatility in the term of trade, the real exchange rate, monetary and fiscal policy.

The framework also suggests some explanations for the disappointing growth performance. First, both secondary and primary school enrollments were substantially lower in Latin America than in the industrial economies, and the associated lower accumulation of human capital is estimated to have reduced Latin American growth by nearly a full percentage point annually. Investment in physical capital was also lower in Latin America: had the region's ratio of investment to GDP matched that observed in the industrial countries, growth would have been nearly .5 percentage points higher.

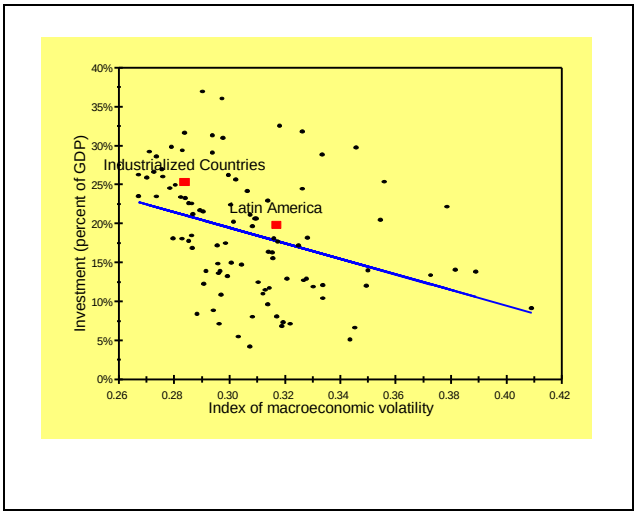
But, while these conventional explanations are important, they are not the whole story. Our regression framework suggests that, had Latin America experienced the macroeconomic volatility observed in the industrial economies, rather than the substantially higher volatility actually observed, its economic growth rate would have been about 1 percent per year higher than it was. Macroeconomic volatility thus appears to account for one percentage point, or roughly a third, of the "growth gap" identified above.[5]

This is so large as to seem almost incredible. But it turns out to be roughly in line with some existing estimates. For example, a recent study by Mendoza (1994) implies that, if the region's terms-of-trade volatility had matched that of the industrial economies, the growth rate would have been about 1 percent higher per year than it actually was, while the estimates in Ramey and Ramey (1994) imply that growth would have been 0.5 percent more rapid if the region's GDP growth had matched that of the industrial economies.[6]

It is, of course, possible that the impact of macroeconomic volatility on economic growth is due to some other factor, not included in the regression, but correlated with volatility. To test for this, we introduced a number of variables in the growth regression that have been proposed by other authors, including measures of political instability and price distortions, as in Barro (1991), measures of income inequality, as in Alesina and Rodrik (1994), financial depth, as in King and Levine (1993), and openness to international trade. The estimated impact of volatility on growth was robust to inclusion of these variables, and in most cases inclusion of volatility measures rendered the alternative explanators statistically insignificant.

We emphasize that these results compute growth impacts *conditional* upon rates of domestic investment and educational attainment. If volatility adversely affects these variables, there would be even larger effects on economic growth. And we uncover evidence that this is the case. Some of this evidence is summarized in Figure 3, which plots domestic investment rates against an index of macroeconomic volatility.[7]

Figure 3
Investment and macroeconomic volatility



There is clearly much variation in investment rates that macroeconomic volatility does not explain, but an economically and statistically significant negative relationship is nevertheless apparent. This conforms to the majority of recent studies on volatility and investment.[8] Unlike those studies, we explored mechanism through which investment may be affected by volatility. We found that measures of macroeconomic volatility are no longer statistically significant predictors of investment ratios once the depth of local financial markets has been taken into account.[9] We interpret this as evidence that an important mechanism through which volatility hurts investment is its adverse impact on the domestic financial markets that are responsible for financing such investment.

Not only in physical capital, but also investment in human capital appears to be adversely affected by macroeconomic volatility. The statistical analysis in Hausmann, Gavin and others (1995) finds a significant negative relationship between school enrollments and macroeconomic volatility. As in the case of physical investment, financial depth appears to play a key role in this.

- **Volatility worsens the distribution of income and raises poverty**

Volatility poses difficulties for all members of society. But there are good reasons for suspecting that poorer members of society are less well equipped to manage adverse economic shocks. A good example is the impact of volatility on educational attainment. While we have no direct evidence, it stands to reason that the groups whose children's education is most threatened by volatility are those with lower incomes, for whom education is barely affordable even in good times. If such a family is hit by an adverse shock, it may be forced to remove their children from school to help weather the shock. The effectiveness of schooling is seriously diminished by interruptions in attendance, and students who leave school are less likely to return and successfully complete their studies. Hence, economic crises can force poor families into compromising their children's education, in ways that are

less likely to happen among families with access to greater assets or credit instruments. A temporary shock may in this manner condemn large numbers of children from poor families into a life of unskilled, low-paid work, thus perpetuating the wide gap between their income and that of more fortunate families, and raising poverty.

What is the evidence? Unfortunately, systematic studies of volatility and the income distribution are rare, probably because comparable data on the income distribution are difficult to obtain. There exist some recent studies of inflation and the income distribution. A recent study of 18 countries, including Chile and Brazil, found that the level, and especially the volatility of inflation is positively associated with increases in income inequality.[10] Similarly, Guitián (1995) found that "the poorest quintiles more often lose share than do other quintiles. Similarly, the richest quintile is the most likely to gain from the inflation." But these studies made no attempt to assess the impact on the distribution of income of volatility in nonmonetary factors such as employment or national output. It seems plausible that these factors are at least as important in determining the distribution of income as is inflation.

To shed more light on the question, we investigated the relationship between income inequality and volatility in a sample of 56 countries for which we had two measures of inequality, one measured before the year 1970 and another after. We used as our measure of inequality the ratio of the income received by the richest 20 percent of the population to the income received by the poorest 40 percent. In the analysis, we focused on inequality in the later period (which ranged from 1975 to 1989, depending upon the country), and examined the roles of (i) initial inequality (which was measured between 1959 and 1974, depending upon the country), (ii) GDP growth, (iii) inflation, and (iv) the volatility of GDP in determining changes in the income distribution.

We found that initial inequality has a strong effect on subsequently-measured inequality, suggesting that income inequality is highly persistent, and perhaps the existence of country-specific determinants not considered in the analysis. Neither GDP growth nor inflation was found to bear a significant relation to inequality. But the volatility of real GDP was found to exert a strong, adverse effect on the distribution of income. More volatile economies are less egalitarian economies.[11]

Table 4
Income inequality is increased
by high macroeconomic volatility

	Index of inequality	Percent of difference
Income inequality		
Latin America	6.284	
Industrial economies	2.270	
Difference	4.014	100.0%
Impact of:		
Initial income inequality	2.047	51.0%
Growth in per-capita income	0.067	1.7%
Average inflation	0.029	0.7%
Volatility of real GDP	0.912	22.7%
Unexplained	0.959	23.9%

Source: Study calculations as described in the text.

What has this meant for Latin America? Table 4 shows that, had Latin America's GDP volatility matched that of the industrial countries, this measure of income inequality would have been reduced by about 15 percent, closing nearly a quarter of the gap between this measure of inequality in Latin American and the industrial countries.

Volatility adversely affects both economic growth and the distribution of income. It would therefore be astonishing if it did not contribute to poverty. But despite these good reasons for expecting that

volatility will worsen poverty, there is very little evidence on the empirical significance of the relationship. To help fill this gap, Hausmann, Gavin and others (1995) analyzed changes in poverty in 23 Latin American countries between 1980 and 1989. We find that changes in the percentage of the population below the poverty line are well explained by:

- the initial level of poverty, where it is found that, other things equal, countries that start out with more poverty exhibit a slight tendency to experience greater reductions in poverty;
- the rate of income growth, where it is found that countries with more rapid income growth experience larger reductions in poverty;
- the initial rate of primary school attainment, where it is found that higher educational achievement is associated with lower poverty rates; and,
- macroeconomic volatility, as measured by the standard deviation of real GNP[12], where it is found that higher volatility is associated with higher rates of poverty.

Macroeconomic volatility is found to have a strong impact on poverty rates, even holding constant the rate of economic growth and educational attainment - two variables that are themselves adversely affected by volatility. The estimates suggest that, had volatility in Latin America matched that of the industrial economies, roughly 7 percent of the region's population - 25 percent of the region's poor - could have been lifted out of the poverty in which they are now immersed. Taking into account the effects of the lower economic growth and reduced educational attainment caused by volatility would reveal an even larger impact of volatility on poverty.

Our results also confirmed that Latin America's relatively low schooling levels plays a critical role in explaining the region's relatively high poverty rates, and efforts to raise educational standards are thus an important tool in the struggle to reduce poverty. But the estimates suggest that the impact on poverty of reducing volatility to industrial-country levels would be almost as great as the impact of bringing school enrollments up to industrial-country levels, suggesting that efforts to reduce macroeconomic volatility are no less significant weapons in the struggle to reduce poverty.[13]

Causes of macroeconomic volatility

We hope by now to have convinced the reader that Latin America is volatile, and that volatility is costly. But what causes this volatility? Answering this questions is fundamental for designing a sensible policy response. For example, if it were true that macroeconomic volatility is due entirely to erratic economic policymaking, one would need to think about little other than measures designed to stabilize policy. If external shocks are important, then priority must be placed on crafting policy responses that reduce, where possible, the economy's exposure to the external shocks, and improve the economy's ability to absorb, rather than magnify, disturbances imported from abroad.

Surprisingly little is known about the underlying causes of macroeconomic volatility. This knowledge gap leaves the field open for widely disparate and extreme views, either that erratic policy is the only significant source of macroeconomic volatility, or that volatility is solely attributable to external shocks that buffet vulnerable economies, about which domestic policymakers can do little.

Our investigation suggests that both extreme views are wrong. We find that external shocks, both to the terms of trade and to capital flows, are an important determinant of macroeconomic volatility in the region, but that the volatility of economic policy is also very important. Furthermore, there are important interactions between external shocks and policy, that need to be accounted for in the design of policies for coping with shocks.

There is another and more fundamental sense in which monocausal explanations for volatility are misleading, for it is not shocks alone, but the interation of shocks with the the prevailing institutional structure and the economic policy regime, that determines macroeconomic volatility. Failure to account for this interaction leads to excessive emphasis on crisis management, when the best hope for reducing volatility lies, not in improving methods of short-term crisis management, but rather in ensuring that economic institutions and policy regimes are well adapted to a volatile economic environment, thus helping to absorb, rather than amplifying, shocks to the economy.

In this section of the paper we take up these issues. Having already demonstrated that Latin America's terms of trade are volatile, we probe more deeply, and show that the volatility of the terms of trade has a more fundamental cause in the structure of Latin America's exports. This suggests strategies to reduce the volatility that are taken up in the final section of this report. We also show that political instability, the magnitude of the external shocks that hit the region, and the volatility of monetary and fiscal policy are also important contributors to macroeconomic volatility in the region.

Throughout the section we highlight the role of institutional and policy regimes, arguing in particular that the weakness of the region's financial systems, and the exchange-rate policies that have been chosen by countries in the reason, have been important causes of the region's highly volatile policy environment. With a better understanding of the root causes of policy volatility, we are better equipped to stabilize the economy by attacking the underlying problems, rather than symptoms.

- **Why are Latin America's terms of trade so volatile?**

The primary reason for the volatility in Latin America's terms of trade is the concentration of the region's exports in primary commodities. While the share of primary commodities in Latin America's exports has declined considerably in recent decades, the region remains more reliant upon export income from primary commodity exports than does any region other than Sub-Saharan Africa and the oil-rich Middle East.

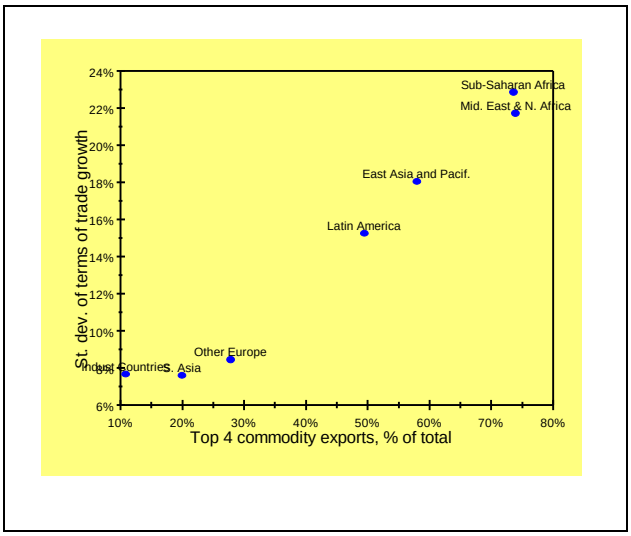
The important role of primary commodities in Latin American exports reflects that fact that it is a resource rich continent. It results in highly volatile export prices because natural resources tend to be product-specific, especially in minerals, energy and tree crops, as compared to capital or labor which are more mobile. The means that, when a resource intensive sector is hit by a shock, prices tend to play a more important part in the adjustment, causing greater price volatility.

Not only are commodity exports important for Latin America, but in most countries those primary exports are highly concentrated in only a few products; on average in the region, exports of the four most important primary commodities account for nearly 75 percent of primary exports, and 45 percent of total merchandise exports.

The reliance upon primary commodity exports increases volatility in the terms of trade because the world price of such commodities is very volatile. The highly concentrated structure of exports increases the volatility of the terms of trade because it fails to realize the price-smoothing benefits of diversification.[14]

Figure 4 indicates there is a very clear correlation between export concentration and volatility in the terms of trade; countries that rely on a narrow group of commodities for a substantial fraction of their export revenue suffer more volatility than countries with a more diversified revenue stream.

Figure 4
Export concentration and terms of trade volatility

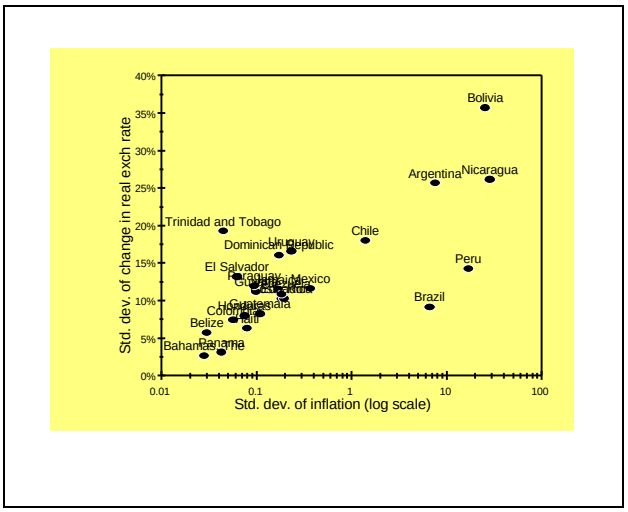


This suggests the importance of policies aimed at diversifying the region's exports and developing other strategies to reduce the large risks posed by volatile prices of important export commodities.

- **Why is Latin America's real exchange rate so volatile?**

We begin with a simple observation that emerges clearly from Figure 5, below: the volatility of the real exchange rate in Latin America is highly correlated with the volatility of domestic inflation. This correlation suggests that volatility in the real exchange rate has more to do with the management of monetary and exchange-rate policy than it has to do with real shocks.

Figure 5
Volatility of inflation and the real exchange rate in Latin America



That suggestion is confirmed by the statistical analysis in Hausmann, Gavin and others (1995), which extends the analysis by incorporating measures of fiscal and monetary policy in 103 countries from all regions of the world. The analysis demonstrates that both monetary policy and fiscal policy are important determinants of real exchange-rate volatility, though the effect of monetary policy is considerably stronger, and that about 40 percent of cross-country differences in real exchange-rate volatility can be explained by volatility in macroeconomic policies. (See column 1 of Table 5, below.)

Table 5
What explains the volatility of the real exchange rate?
Evidence from cross-country comparisons

	(1)	(2)	(3)	(4)	(5)
Monetary policy volatility (lgm1ar1)	.0365		.0343	.0217	.0218
	(7.0)		(6.3)	(3.5)	(3.5)
Fiscal policy volatility (defar1)	.3525		.4673	0.2959	.2880
	(1.6)		(1.8)	(1.1)	(1.1)
Terms of trade volatility (sho)		-.1041	-.1273	-.0135	
		(-1.0)	(-1.3)	(-0.1)	
Capital-flow volatility (kanet1)		.3594	.2193	.3204	.3143
		(1.5)	(1.1)	(1.7)	(1.7)
Number of revolutions and coups (revcoup)				.0906	.0907
				(3.5)	(3.5)
Pegged exchange rate (peg)				-.0283	-.0288
				(-1.7)	(-1.8)
Exchange-rate regime switches (switch)				.2014	.2019
				(2.2)	(2.2)
Number of observations	103	98	95	87	87
Adjusted R-squared	0.3918	0.0035	0.3913	0.4945	0.4938

Source: study calculations as described in the text. Dependent variable is the standard deviation of percentage changes in he real exchange rate between 1970 and 1992 (vreer2). Variables are defined in Appendix Table 1.

This is perhaps unsurprising. Somewhat more surprising is the finding that external volatility is less closely correlated with the volatility of the real exchange rate. Indeed, our measures of volatility in the terms-of-trade and in capital flows explain by themselves a neglible fraction of the cross-country variance in real exchange rate volatility, as can be seen by inspection of column 2 of Table 5. When we condition on a number of other determinants of volatility in the real exchange rate, some weak evidence emerges that the volatility of the real exchange rate is related to volatility in capital flows.

Political instability, which we measure by the number of revolutions and coups, appears to be strongly associated with real exchange-rate volatility. This is easy to understand: political turbulence tends to generate capital flight, which is reflected in exchange rate depreciation, both real and nominal. As Table 5 indicates, this variable enters with a high degree of statistical significance, and as we shall see below, it is highly significant for Latin America in economic terms as well.

We also find that pegged exchange-rate regimes are associated with substantially reduced volatility of the real exchange rate: the estimate in column 5 of Table 5 suggests that countries that continually peg their exchange rate can expect, other things equal, a decline in real exchange-rate volatility of nearly 3 percentage points. Again, this is not particularly surprising. A more subtle but nonetheless important result concerns the stability of the exchange-rate system itself, rather than of the rate. We find that, holding other determinants of exchange-rate volatility constant, countries that frequently switch between exchange-rate regimes tend to have substantially higher volatility of the real exchange rate than do countries that maintain the same system for long periods of time. This highlights the importance of choosing exchange-rate policies that are sustainable, a point that we will reinforce below.[15]

How do these factors add up for Latin America? Table 6 uses the findings summarized above to explore the reasons for the high volatility of the real exchange rate in Latin America. Again, the benchmark is the industrial economies, and the question is: why is Latin America more volatile than those economies?

Table 6 Why is Latin America more volatile than the industrial economies? The real exchange rate		
	Actual difference	Percentage of difference
Difference in volatility of the real exchange rate	8.403%	100%
Amount due to:		
Monetary volatility	3.386	40.3
Fiscal policy volatility	0.708	8.4
Capital-flow volatility	0.480	5.7
Revolutions and coups	2.272	27.0
Pegged exchange rate	-1.004	-11.9
Exchange-rate regime switches	1.520	18.1
Unexplained	1.041	12.4
Source: study calculations as described in the text. *Impact of differences in financial depth not caused by monetary volatility.		

The answer emerges clearly from the table: the region's real exchange-rate volatility is primarily due to monetary policy and political instability, which together explain about two-thirds of the 8.4 percentage point difference between real exchange-rate volatility in Latin America and the industrial economies. The volatility of capital flows is statistically significant, and as we shall see it is economically significant for some countries in the region, but for the region as a whole the factor of overriding importance is the monetary instability that has characterized much of Latin America in recent decades.

This is not to say that capital-account shocks are of negligible importance. These account for roughly 0.5 percentage points of the difference between Latin American and industrial-country real exchange-rate volatilities, an increase in volatility that would be quantitatively significant in an environment of lower monetary instability, and in some countries the influence has been larger. Furthermore, this figure probably underestimates the actual contribution of volatile capital flows to the volatility of the real exchange rate, because capital inflows and outflows tend themselves to generate monetary shocks.

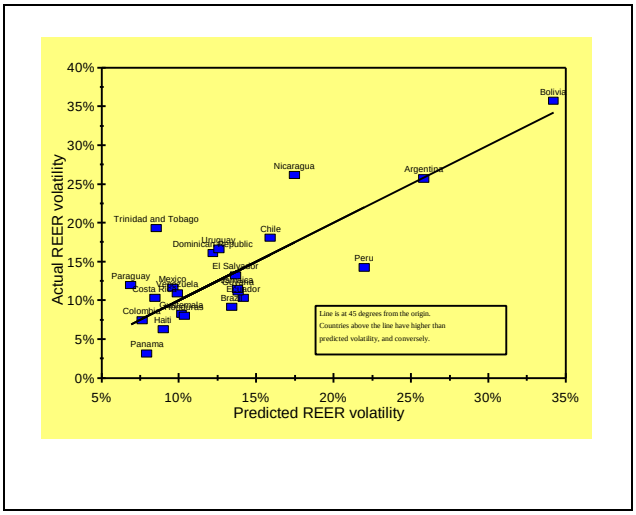
The recent Argentine experience provides a clear example of this: that country's recent and severe monetary contraction is not due to erratic policymaking *per se,* but has instead been created by a shock to the capital account. Similarly, the reserve accumulation that was associated with capital inflows during the capital inflows episode of 1990-1994 led to monetary expansion in many Latin American economies.[16]

An interesting and important lesson emerges from the effect of exchange-rate arrangements in Latin America. The region has, on average, tended to operate under pegged exchange rates to a substantially greater degree than have the industrial economies. This, taken by itself, would have lowered the volatility of the Latin American real exchange rate by roughly 1 percentage point per year. However, the exchange-rate commitments proved in many cases to be unsustainable, with the result that the region switched exchange-rate regimes much more frequently than did the industrial economies. The result of these switches was an increase in real exchange-rate volatility of about 1.5 percentage points, undoing the stabilizing benefits of pegging the exchange rate, *and more.* Latin America thus appears to have experienced the worst of both worlds in its exchange-rate polices, paying the price in terms of output volatility for its exchange-rate commitments, without obtaining a corresponding reduction in the volatility of the real exchange rate.

While the framework described above has drawn from the experience of roughly 90 countries from all regions of the world, it does a good job of explaining the Latin American experience, including both

the behavior of the region as a whole, and of variation among countries within the region. Figure 6 (below) compares actual real exchange-rate volatility for countries in Latin America with those predicted by the framework summarized in Table 5, visually documenting the relatively high explanatory power of the estimated statistical relationship for Latin America.[17]

Figure 6
Actual and predicted volatility
of the real exchange rate



Why do some countries in Latin America have so much more volatility in the real exchange rate than do others? Rather than attempt to summarize the experience of all 26 Latin American countries in the sample, we compare the five most volatile with the five least volatile economics in the region. In the most volatile economies, the volatility of the real exchange rate averaged 19.5 percentage points more than the roughly 5 percent volatility recorded by the of the industrial economies. Of this:

- 8.0 percentage points (41 percent) is attributable to higher monetary and fiscal-policy volatility;
- 4.4 percentage points (23 percent) is attributable to higher political instability,
- 1.8 percentage points (9 percent) is attributable to higher volatility of capital flows and a destabilizing exchange-rate regime, and
- 5.3 percentage points (27 percent) is unexplained.

On the other hand, in the five least volatile economies, macroeconomic policy exhibited about a third the volatility displayed by the Latin American average, external shocks were smaller, and exchange-rate policy contributed to stability.

Inspection of individual country experiences reveals the substantial potential for exchange-rate regimes to stabilize or destabilize the real exchange rate. Mainly because of frequent switches among regimes, the choice of regime has been particularly destabilizing in Chile, Jamaica, and Uruguay, where it has added 3 to 3.5 percentage points to the volatility of the real exchange rate. By contrast, the stable regime of quite consistently fixed exchange rates in Panama is estimated to have reduced the volatility of the real exchange rate by 3 percentage points, compared with the industrial economies. The difference between the least and the most stabilizing exchange-rate regimes experienced in Latin America thus amounts to an impact on real exchange rate volatility of more than 6 percent per year, a

very large figure by any standard, which illustrates the importance of exchange-rate management for achieving stability of the real exchange-rate.

PWhy is Latin America's real GDP so volatile?

We have seen that long-run economic performance has been undermined by the volatility of real GDP as well as that of the real exchange rate. We also saw that Latin America's GDP growth is roughly twice as volatile as that of the industrial economies. What explains this higher volatility? Some answers are suggested by the regressions summarized in Table 7.

Table 7
What explains the volatility of real GDP?
Evidence from cross-country comparisons

	(1)	(2)	(3)	(4)	(5)
Monetary policy volatility (lgm1ar1)	.00594		.00545	.00130	.00147
	(2.5)		(2.8)	(0.6)	(0.8)
Fiscal policy volatility (defar1)	.1258		.0776	.0245	
	(3.0)		(0.9)	(0.3)	
Terms of trade volatility (sho)		.1086	.1197	.0594	.0667
		(4.2)	(4.2)	(2.2)	(3.0)
Capital-flow volatility (kanet1)		.1764	.1502	.1052	.1112
		(2.5)	(2.2)	(1.7)	(1.9)
Number of revolutions and coups (revcoup)				.0129	.0132
				(1.7)	(1.7)
Financial depth (llly)				-.0091	-.00915
				(-2.4)	(-2.5)
Pegged exchange rate (peg)				.0170	.0164
				(3.1)	(3.3)
Number of observations	128	111	107	93	94
Adjusted R-squared	0.1164	0.2768	0.3426	0.4489	0.4648

Source: study calculations as described in the text. Dependent variable is the standard deviation of GDP growth from 1970-1992 (ggdpst).

The table indicates that monetary and fiscal volatility, taken alone, are closely to GDP volatility, and that these factors alone explain about 12 percent of the cross-country variation in the volatility of real GDP growth. (See column 1.) However, once a measure of financial depth is introduced in the equation, the significance of fiscal and monetary volatility vanishes, suggesting that a key means through which volatility in policy is transmitted to the volatility of real output is through its effect on financial depth.

Do external shocks explain GDP volatility? Once again, the answer is yes. As can be seen in column 2 of Table 7, volatility in the terms of trade and in capital flows together explain roughly 28 percent of the cross-country variation in GDP volatility, and these variables remain statistically significant in regressions that account for policy volatility and other determinants. Thus, countries that face volatile external environments have volatile real output.

Our evidence suggests that financial depth is a "shock absorber"; other things equal, countries with deeper financial markets are more stable, suggesting that deep domestic financial markets promote effective adjustment to shocks.[18] And finally, we find that pegging the exchange rate, instead of adopting a more flexible regime, increases GDP volatility. As we shall see below, this effect can be quite large.

Having identified these factors we are in a position to ask discuss the quantitative implications for Latin America. Table 8 addresses this issue by asking: why is Latin America so volatile compared with the industrial economies?

In Latin America the volatility of real GDP is about 2.5 percentage points higher than that of the industrial countries. The single largest contributor to Latin America's GDP volatility is the region's tendency to commit itself to pegged exchange rate regimes. We estimate that the cost of these commitments has been an increase in the volatility of real GDP of more than 0.63 percent per year, accounting for nearly a quarter of the difference between Latin American and industrial-country volatilities.

Table 8
Why is Latin America more volatile than the industrial economies?
Real GDP

	Actual difference	Percentage of difference
Difference in GDP volatility	2.506%	100%
Amount due to:		
Monetary policy	.445	17.8
Terms of trade volatility	.243	9.7
Capital flow volatility	.180	7.2
Political instability	.328	13.1
Financial depth*	.510	20.4
Exchange-rate pegs	.632	25.2
Unexplained	.158	6.3

Source: study calculations as described in the text.
*Impact of differences in financial depth not caused by monetary volatility. The impact of differences in financial depth that are caused by higher monetary volatility is included in the impact of monetary volatility.

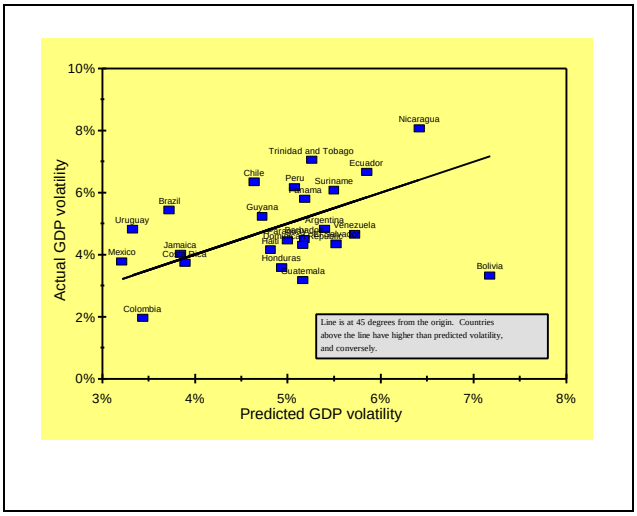
We also find that Latin America has paid a heavy price for political instability and weak financial systems. The former, as measured by the number of revolutions and coups, accounts for about .33 percentage points (13 percent) of the difference between Latin American and industrial-country GDP volatilities, while Latin America's relatively low financial depth[19] accounts for .51 percentage points, or roughly 20 percent, of the difference.

Monetary policy and external shocks also help explain Latin America's higher GDP volatility. Monetary policy accounts for roughly .45 percentage points (or 18 percent) of Latin America's higher GDP volatility. This arises from sources of monetary volatility other than external shocks and political instability. Terms of trade and capital-account shocks accounts for another .423 percentage points (17 percent) of the difference between the region's GDP volatility and that of the industrial economies. Of this total effect, terms of trade shocks account for somewhat more than half.

Thus, both policy and external volatility matter, but this analysis highlights the role of domestic shock absorbers such as the exchange rate regime and the financial system.

These empirical regularities, though they were based upon the experience of a large number of countries from every region of the world, do a good job of explaining the volatility of Latin America as a region. They also do a reasonably good job of explaining why some countries in Latin America are volatile and other are not. The major outlier is Bolivia, which is much less volatile than predicted.

Figure 7
Actual and predicted GDP volatility
in Latin America



For example, the five most volatile countries in Latin America experience GDP volatility that is, on average, 4.5 percentage points higher than that of the industrial economies. The factors identified above explain 2.9 percentage points, or roughly two-thirds, of this excess volatility, leaving roughly 1.6 percentage points unexplained. In the five least volatile economies (excluding Bolivia) monetary policy, the terms of trade, capital flows, and political shocks were all on average substantially below those recorded in the rest of the region, and exchange rates were on average more flexible - thus, the factors identified with stability are, in fact, observed in the more stable economies of Latin America.

Despite the general applicability of the relationships derived from the global sample, there is some evidence that the determinants of GDP volatility in Latin America differ somewhat from those that apply, on average, to the world as a whole. In particular, Latin America seems to be somewhat less sensitive to terms-of-trade and political volatility, and more sensitive to capital-account volatility, than is the case for the world as a whole.

Causes of volatility vary greatly in the different countries of Latin America. The terms of trade was the dominant source of volatility in Barbados, Ecuador, Guyana and Venezuela, while monetary volatility has been particularly harmful in Bolivia, Argentina, Nicaragua, and Peru.

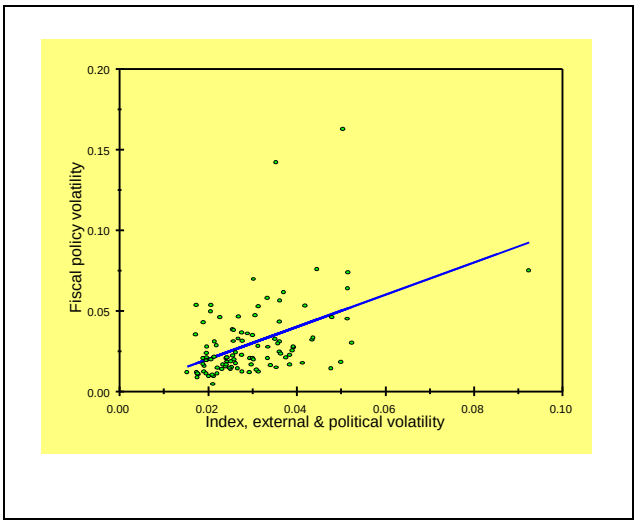
PWhy is policy so volatile in Latin America?

The preceding discussion has highlighted the importance of policy volatility in Latin America. The question arises: what determines that volatility? The question is interesting in its own right, and also because it provides an illustration of the role that shallow financial markets play in amplifying macroeconomic volatility.

When trying to understand policy, there are at least two points of departure. One is that policymakers are simply erratic, and some regions are simply endowed with more erratic policymakers than others. An alternative view is that policy is determined by a political process that can be disturbed either by external events that impinge upon the economy, or by a breakdown in the political process itself. This view leads us to explore the role of external shocks and domestic political instability as explanations of observed policy volatility.

Figure 8 illustrates the actual link between these factors and fiscal volatility. It plots the relationship between fiscal volatility in 99 countries and an index of terms-of-trade volatility and political instability. Both terms-of-trade volatility and political instability significantly increase fiscal volatility, and taken together the two factors explain about 20 percent of the cross-country variation in volatility. The two factors go a long way toward explaining why Latin America's fiscal policies are so much more unstable than are those of the industrial economies, accounting for about 30 percent of the difference between fiscal volatility in Latin American and the industrial countries.

Figure 8
Fiscal volatility is explained by external and political instability

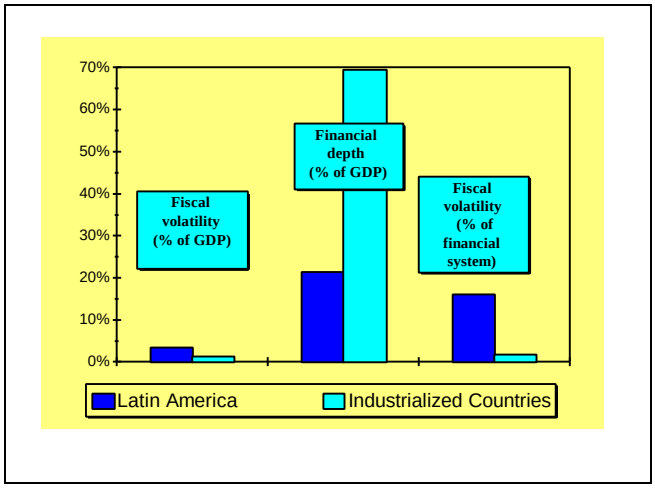


While the volatility of fiscal policy is high in Latin America, the region really stands out for its monetary volatility. Why has monetary policy been so extremely volatile? Explanations must begin with fiscal policy, but it seems unlikely that they can end there, if only because the volatility of Latin-American monetary policy is so disproportionately large.

Our explanation for this is grounded in fiscal fundamentals, but emphasizes an aggravating link between fiscal and monetary volatility: the financial system, and its effect on the economy's ability to absorb fiscal shocks. This arises because the inflationary impact of a given fiscal deficit depends upon the size of the deficit relative to the financial system, rather than relative to the overall economy. Amplifying this effect is the fact that high and volatile fiscal deficits, by generating high and volatile monetary policy, themselves cause the financial system to contract, making the system even more vulnerable to fiscal shocks.

This point is highly relevant for Latin America, as is illustrated by Figure 9. In the region, the standard deviation of shocks to the fiscal deficit averages about 3.4 percent of GDP, compared with 1.2 percent of GDP in the industrial countries. But the region's financial system is much smaller; our measure of financial depth is 20 percent of GDP compared with nearly 70 percent in the industrial countries. Thus, the volatility of fiscal policy is Latin America is very large relative to the economy's financial system. In Latin America the standard deviation of fiscal shocks averages over 17 percent of the financial system, almost 10 times the 1.8 percent of GDP observed in the industrial economies.

Figure 9
Latin America's fiscal volatility is very large relative to its financial system



Do these considerations help explain observed monetary volatility? To see if they do, Hausmann, Gavin and others (1995) attempt to explain observed monetary volatility in a sample of 93 countries using a measure of fiscal volatility, measured relative to the size of the financial system, financial depth itself, and a measure of political instability. These factors do a good job of explaining the volatility of monetary policy, though much remains to be explained by other factors. Taken together, the identified factors explain about 32 percent of the cross-country variation in monetary volatility.[20] They also explain about a third of the difference between monetary volatility in Latin America and the industrial economics.

Institutions for economic stability

How can policy respond to the problem of volatility? We focus on five key areas of policy, most of which receive more detailed treatments in later chapters of this volume. These are: (i) managing terms of trade risk, (ii) ensuring fiscal stability, (iii) adapting monetary and fiscal policy to a volatile environment, (iv) designing financial systems for effective adjustment, and (v) adapting labor market policy to promote efficient and equitable risk sharing.[21]

- **Managing terms of trade risk**

Our evidence suggests that terms-of-trade volatility directly reduces economic growth, and is also an important factor underlying the volatility of real GDP and of fiscal policy, with effects spilling over to the entire economy. While there is little that can be done at the national level about volatile international commodity prices, much can be done to reduce the impact of price fluctuations on the domestic macroeconomy. Initiatives that promote this objective include:

? *Efficient diversification of production through open trade and investment regimes:* One way to reduce terms of trade volatility is to diversify exports. And it is well known that inward-oriented, protectionist trade policies tend to discourage, rather than promote the desired diversification of exports because they create an anti-export bias, reducing exports of all but the most profitable activities, which are likely to be those based upon the very resource endowment from which it is desired to diversify. But diversification can be promoted through open trade and investment regimes, which are most likely to exploit other efficient investment opportunities. In fact, the growth and

diversification of exports that has followed unilateral liberalization and integration agreements among countries in the region is a clear indication of this trend. The problem is that terms-of-trade volatility itself makes it difficult to sustain open regimes, for while openness may promote efficiency, it also creates risk, and protectionist trade policies are often used as a way of reducing the risk.[22] The challenge, therefore, is to find efficient ways of dealing with the risk generated by terms-of-trade volatility, so that trade and investment can remain unrestrained.

? *Regional economic integration:* In this context regional integration plays a key role. The outstanding aspect of the trade that has grown between members of regional trade blocs such as Mercosur, the Andean Pact countries, and the Central American Common Market, is its commodity composition: while trade with the rest of the world is heavily concentrated in volatile primary commodities, trade between members of a subregional trade agreement tends to be more diversified and concentrated in industrial, rather than primary commodites. This can substantially reduce an economy's exposure to volatile commodity prices.

? *Diversification of ownership:* One of the easiest ways to reduce risk is to export it, which can be done, not through the complicated and costly process of changing the sectoral composition of production, but instead, by diversifying ownership of the risky sector internationally. If domestic residents were to reduce their claims on the revenues generated by a risky sector - for example, by selling their shares to foreigners - they would be able to diversify their portfolio into less risky assets. In so doing, they would cushion the impact of external shocks on the domestic economy. Now, selling assets that already exist is a once and for all proposition. To sustain diversification over the longer term, the relevant question is the ownership structure of the newly accumulated capital. If new firms are created through foreign direct investment or if private firms are transformed at some point in their lifetime into joint stock publicly listed companies, then this process of risk sharing through the capital market will be sustained. Hence, when it is deemed desirable, international diversification of ownership, both through foreign direct investment and open capital markets is a potentially powerful mechanism to reduce the amount of domestic economic risk caused by terms of trade volatility and other aggregate forms of risk.

? *Hedging:* For several reasons, some governments have been reluctant to permit unrestricted foreign ownership of domestic productive assets. Among these reasons is the fact that ownership often involves not only a claim on the firm's profits, but also control over the firm's assets, that is, the ability to make decisions on a firm’s future. The need, in these cases, is to find alternative mechanisms for transfering risk, that do not involve at the same time transfering control of the firm. One mechanism is through hedging. By using futures and options markets, a firm can reduce the price risk it faces.[23] Hedging strategies are becoming more common in many developing countries and are likely to be used increasingly as part of a general strategy of risk management. For example, both PEMEX (the Mexican petroleum company) and CODELCO (the Chilean copper company) have actively used futures and options markets to manage their risks. nother area of increasing activity is in domestic agricultural markets where privatization of warehousing and distribution has allowed the appearance of a private market for warehouse receipts which can be hedged using international options and futures markets. Initiatives in this direction have been taking place in several countries of the region including Colombia, Venezuela and Mexico.

Hedging strategies are not without their limitations. First, there may be a problem with the size and liquidity of the market, because for some commodities and some countries, the markets are currently small in comparison with the amount of risk that the country may want to hedge. If markets are not deep enough, the attempt by a large country to hedge much of its risk may move prices against it,

making the strategy very expensive. This problem is particularly severe for longer-term contract, as the market is predominantly short-term. Futures and options markets are liquid only for short maturities, typically less than a year. This is not much of a solution to the longer term problem of uncertainty, which is important in most investment decisions. There is a need, therefore, to find alternative schemes to provide insurance against terms-of-trade shocks.

? *Self-insurance:* One instrument which has been used in this context is domestic commodity stabilization funds. These institutions work as a self insurance and income smoothing instrument. Typically the fund buys the crop from producers at a price calculated based on a moving average of previous prices. Hence, in periods of high prices, the fund buys the crop at lower prices and makes a profit which it is supposed to save. In periods of low prices, the fund buys the crop at a higher price and covers the loses with its savings. A good example of such a scheme is the *Fondo Nacional del Café* in Colombia. Such self-insurance mechanism are complementary to the hedging operations discussed above. Futures and options contracts are essentially insurance devices and as such are appropriate instruments to manage risk or uncertainty. They accomplish little if any price or income smoothing since the futures prices tend to be about as volatile as the spot prices. Stabilization funds, on the other hand, are essentially a spending and savings rule and are more suited to smoothing expenditure or consumption.

? Ensuring fiscal stability

We have presented evidence that volatile fiscal policy contributes directly to volatility of the real exchange rate, and is also a major factor underlying monetary volatility. At the same time, we have provided evidence that the volatility of fiscal policy is not randomly determined, but is instead systematically related to underlying factors including political and external shocks. This suggests that achieving fiscal stability requires that attention be paid to underlying causes of volatility, not mere exhortation.

Fiscal outcomes may be unstable for several reasons. First, fiscal policy may be volatile because it is subject to unusually large shocks, either to income or to available financing, particularly when the policy process does not have adequate means to adjust quickly to shocks. Fiscal volatility may also arise when governments periodically adopt unsustainable fiscal commitments, which must eventually be reversed.

But whatever the source of volatility, the fact is that many Latin American countries face large shocks and limited access to credit, so that policy response must be swift. The political obstacles to such a response can be formidable. However, there are concrete policy strategies that can ameliorate the problem. We outline the elements of a strategy here: some of these issues are developed at more length in Hausmann and Stein (this volume).

? *Minimize the risk faced by the fiscal accounts through revenue policy:* Much of the volatility in the fiscal accounts comes through revenues. These are generated by taxes which are applied on different flows: corporate profits, personal income, consumption, specific expenditures, wages, imports or natural resource rents. All these flows carry some volatility, but some are more volatile than others. For example, consumption is typically the most stable of the major taxable flows. Taxes on exports or on natural resources (such as royalties on mineral production) are particularly volatile, given the instability in the region's terms of trade. By the same token, taxes on imports are also unstable given that countries in the region often need to make drastic changes in their import bill in order to adjust to external shocks and this typically affects tariff revenue. Income taxes are less volatile but are still very much so, given that they reflect mainly corporate profits, which are cyclical. By choosing taxes on relatively stable flows, such as a broad based value added tax, instead of taxes on very unstable flows,

such as international trade, government revenues can be made more stable and predictable. This accords well with the traditional advice of keeping taxes on exports and imports low in order not to distort international trade. This does not mean that governments should forgo revenue from natural resource rents, just because they are unstable. Indeed, on other grounds taxation of such rents may be a very efficient strategy. It does mean that governments may want to adopt special treatment for particularly volatile flows, as will be discussed below in the section on contingent spending rules.

? *Set precautionary fiscal targets:* When facing fiscal shocks, governments confront an important asymmetry. Financial markets always allow them to save in good times, but may not allow them to borrow during bad times. In fact, a country hit by an adverse shock may well lose its creditworthiness and face a decline in its borrowing capacity, just when it needs it most. When setting fiscal targets it is important to recognize this asymmetry and target a large enough fiscal surplus, or carry enough financial assets, so that the fiscal accounts remain viable even after a negative shock of standard size. This presupposes a precautionary surplus and a significant reserve cushion.

? *Adopt budgetary rules and institutions that deliver quick responses:* Political systems in Latin America and the Caribbean need to make swift fiscal adjustments, both because they face large shocks and because the financial markets may dry up if the deficit persists. But there is an inherent tendency in the political process to delay adjustment or to become bogged down in gridlock. An important way of addressing this risk is by adopting budgetary rules and institutions designed to minimize the risk of gridlock and maximize the probability of a timely and appropriate response to shocks. The elements of such a strategy, laid out in more detail in Hausmann and Stein (this volume), include:

- Ensure that the Executive internalizes the constraints on the budget.
- Establish formal, *ex ante* limits on the acceptable budget deficit.
- Provide for transparency of the budge, so that rules are not abused by willfully mis-estimating revenues and expenditures, which would make political discussions and negotiations more difficult.
- Promote budgetary universality, in order to avoid off-budget items, which are usually abused by governments in periods of fiscal difficulty.
- Establish incentives for Congress to limit gridlock and come to an agreement on the budget.
- Limit earmarking of expenditures, in order to provide more flexibility in budgetary adjustments.
- Impose stringent restrictions on the ability to make budgetary increases within the budgetary period, so as to harden the budget constraint faced by spending ministries.

While they are no substitute for a fundamental societal consensus on economic and budgetary policy, there is evidence that insitutions matter, as is discussed in Hausmann and Stein (this volume).

? *Institutionalize contingent rules for shock management:* Fiscal accounts are going to be hit by shocks and surprises. But in the absence of predefined rules about how to respond to such shocks, the adjustment may be inappropriate or delayed and serious instability may emerge. One way to improve the odds of obtaining more appropriate responses to future shocks is to institute "contingent fiscal rules", which specify automatic fiscal responses to large macroeconomic shocks: commodity stabilization funds are one example of such rules.

? *Adopt measures to assure fiscal sustainability:* One source of fiscal volatility is the fact that policy may become unsustainable and abrupt changes become necessary, causing instability. Institutional reforms can track the intertemporal soundness of policy, and thus help avoid the perils of unsustainable fiscal commitments. Discussed in more detail in Hausmann and Stein (this volume), these reforms include:

- Formal medium term budgetary projections should accompany the annual budget.
- Governments should limit the use of unfunded pay-as-you-go pension schemes either for civil servants or for the general public, given the difficulties in keeping them actuarially sound.

? *Public debt management*: All countries should accumulate prudent levels of debt. However, volatile countries need to be particularly careful because they are subject to larger shocks. If the shock is negative, the country may not be capable of servicing the debt, which was accumulated when the country was thought to be more creditworthy. This would express itself in a loss of financial market access, debt crises and financial instability, all aggravating the initial negative shock. Secondly, if the shock is positive, a country that has limited market access may suddenly find itself awash in capital inflows and offers of fresh money to finance its development. This would cause capital flows to act procyclically, thus amplifying the size of the initial positive shock. Moreover, the accumulated stock of public debt may interact with the shocks themselves and cause them to have even more destabilizing effects. An example of this is when a negative shock causes a collapse in the demand for short term government debt, causing interest rates to spiral up and the fiscal deficit to widen. This means that governments in shock-prone regions need to manage their debt much more carefully than may be required in more stable economies. Among other things, this means that countries must:

? *Minimize use of short-term debt:* Short-term finance has important drawbacks for economic stability: it is subject to the possibility of self-fulfilling negative expectations similar to that of a bank run. The disruptive consequences of this dynamic were seen in the aftermath of the Mexican devaluation of December 1994, when holders of a short term debt instrument called the tesobono realized that, if other investors did not agree to roll over the existing stock, the government would be unable to pay. This prompted an attack which sent interest rates spiraling up, reserves down and contributed to a collapse of the exchange rate. By contrast, Argentina which was also affected by a similar disturbance, did not have a stock of short term debt and consequently could avoid issuing new debt during the worst months of the crisis, until it could deliver an adjustment program and a credible financing plan. The fact that Argentina did not have to go to the market to finance debt amortizations during the height of the crisis was a crucial advantage. Thus, short term debt can aggravate economic instability - governments should minimize their reliance upon it even if longer-term debt is apparently more expensive. To guard against negative effects of short-term debt that is issued, it is important that the Central Bank hold a significant proportion of the expected debt service (including amortization) of the following quarters in highly liquid and readily available international reserves. This implies that if the debt is short run, it would have to have almost full backing in international reserves, over and above the coverage that is required to assure prompt payment of imports and fluctuations in the demand for base money.

? *Manage debt denomination:* If the stock of domestic debt is large and is denominated in domestic currency, it may be difficult to extend its maturity, given the inherent exchange risks involved and the volatility in inflation and interest rates. Also, it may be subject to self-fulfilling expectations of inflation.[24] One means of reducing these problems is to denominate government debt contracts in a more stable unit of account (dollarization), or to provide a mechanism to adjust returns, protecting them from the ravages of inflation (indexation). Dollarization and indexation help to insulate interest rates from changes in the public's expectations of inflation or of exchange rate movements. Moreover, by protecting investors from changes in inflation, exchange rates and domestic interest rates these denominations may allow the government to extend the maturity of the debt. However, if the government policy is unsustainable and will require, eventually, a major adjustment of the exchange rate or an acceleration of inflation, the stock of dollarized or indexed debt will be made effectively more expensive, precisely at the time when debt service is harder to maintain. Hence, denominating the

debt in dollars or in an indexed unit should never be made as a means to postpone a needed adjustment, but if it is done in the context of a sustainable program, it may help to shelter the program against self-fulfilling expectations and to extend debt maturities.

? *Place of debt issue:* Should public debt be issued domestically or abroad? This distinction is becoming less relevant with the liberalization of the capital account so that foreigners can buy debt issued domestically and residents can buy bonds issued abroad. Nevertheless, there are two important elements which should be taken into account. First, it is important to determine whether the debt is purchased by the domestic banking system, something that is more likely to happen with domestically issued debt. This is so because banks purchase these instruments with resources obtained through very short term deposits. Moreover, they typically have a guaranteed access liquidity from the Central Bank in case of need. Usually, short term domestic debt can be used for repurchase operations with the Central Bank. Hence, in practice, domestic debt held by banks is equivalent to interest-bearing money. It is, therefore, more inflationary than debt held by foreigners but it is somewhat less sensitive to changes in international interest rates because it is demanded in part for liquidity purposes. By contrast, demand for foreign debt may be more volatile since it usually represents very small percentages of the holder's portfolio and these fractions may be very unstable. If it is short term, this could pose very serious problems. Consequently, short term foreign debt may not be as inflationary as domestic debt but may be a dangerous source of volatility.

? *The stock of debt, privatization and reserves:* Debt can become an additional source of instability and may augment the volatility coming from other areas of the economy. Hence, it would be best for countries to have very little of it. This cannot be achieved simply by targeting a balanced budget, because there will be an inherited stock of debt, and even if governments target fiscal surpluses, the inherited stock of debt would not disappear overnight. Hence, a policy toward the stock of debt is required. Here, governments may be well advised to look at their overall assets and liabilities and restructure them. One important instrument is the sale of assets through privatization, and the use of the revenues to retire specific classes of debt so that the overall profile improves. In this respect, governments should prefer long term foreign debt to domestic debt and should be careful to cover short term debt with sufficient international reserves.

- **Adapting monetary and exchange-rate policies to a volatile environment**

Our results document the economic costs of volatile monetary policies, in terms of the stability of both output and the real exchange rate, in terms of growth, and of welfare more generally. Some degree of fiscal stability is a precondition for monetary stability, but even if this is achieved there remain difficult decisions to be made about monetary and exchange-rate policy. The issues are complex because monetary and exchange-rate policy involve difficult tradeoffs between flexibility and commitment, tradeoffs that are all the more acute in volatile economies like those of Latin America, because volatility raises the value of both flexibility and commitment. We focus on this tension, a broader and more detailed treatment of issues surrounding the choice of exchange-rate regime is provided in Bufman and Leiderman (this volume).

Flexibility and commitment: The volatile environment to which Latin America must adapt creates a need for flexibility in monetary and exchange-rate policy. The value of exchange-rate flexibility is reflected in our finding that pegged exchange rate systems are associated with substantially higher volatility in real GDP growth than are more flexible regimes. But the benefits of flexibility must be set against those of "discipline" or "commitment". The need for commitment and discipline arises because, if unconstrained by relatively simple rules, monetary policy makers often face short-term incentives to act in ways that are self-defeating or worse in the long run, even if the policymaker has

the best interests of society at heart. One way in which societies have tried to tie the hands of their central banks is by requiring them to maintain a fixed exchange rate. By eliminating much of its ability to make policy, this system insulates the central bank from the problem of time consistency. Thus, fixed exchange-rate systems may provide the benefit of increased monetary-policy "discipline", at the cost of reducing the degree of flexibility available to monetary policymakers.

Sustainability: While there is room for debate about the insulating properties of alternative exchange-rate regimes, there is little doubt about the destabilizing consequences of being forced to abandon a regime that proved impossible to survive an external shock or the accumulated effect of fiscal and monetary policies inconsistent with its maintainence. As the recent Argentine experience illustrates, defense of a fixed exchange rate regime may require a very determined and politically costly fiscal response to external shocks. The sustainability of a fixed exchange-rate regime thus depends upon the degree of political commitment to the system, upon the responsiveness of the supporting policy - and particularly the fiscal policy - environment, upon the magnitude of the shocks with which the system must cope, and upon the ability of the financial system to withstand the contraction in domestic credit that may be generated by an adverse shock. Volatile economies with weak political support for the exchange-rate regime, fiscal institutions that cannot guarantee a rapid and appropriate response to shocks, and fragile financial institutions may be unable to sustain a fixed exchange-rate system, and should probably not therefore contemplate one.

Striking a balance: Is all, then, lost in the struggle for discipline and commitment? The answer is no. Advocates of rigid exchange-rate regimes or unbreakable monetary rules as the only mechanisms available to solve the problem of time inconsistency in monetary policy may be unduly pessimistic. What matters is not that there be a single, unbreakable rule, but rather that policymakers communicate to the public a set of principles for policy formation that preclude "opportunistic" actions. But such principles need not preclude a policy response to changed circumstances, as long as the response is understood by the public to be part of a sensible and predictable regime.[25] For example, both Chile and Colombia operate under relatively wide exchange-rate bands, which move according to fairly well-defined rules. In response to large capital inflows in 1994 and 1995, both countries found that adherence to the exchange-rate would have generated rapid monetary growth and higher inflation than they preferred to accept. They therefore revalued their currencies, a policy action that was seen not as a violation of its policy commitments or a fundamental change in the "rules of the game", but rather a as response to an external shock in a manner wholly consistent with the underlying "policy regime".

- **Designing financial systems for effective adjustment**

A theme that runs throughout our attempts to understand the causes and consequences of volatility is the importance of the domestic financial system. On the one hand, an important way in which macroeconomic volatility undermines development is by weakening the financial system. At the same time, deep financial markets appear to be "shock absorbers": by facilitating adjustment to shocks, they appear directly to reduce GDP volatility. Deep financial markets also mean that given fiscal volatility translates into less monetary volatility. Policy measures that strengthen the financial system may therefore be multiplied through a virtuous circle, with measures to strengthen the financial system leading to lower volatility which, in turn, further promotes the development of the financial system.

The challenge, then, is to create a policy framework that encourages the private lending required for growth and adjustment, while at the same time protecting taxpayers, the financial system, and the entire economy against the fragilities and potential for abuse created by weak regulatory structures. This challenge has two dimensions. First, there is the need to establish a regime of supervision and

prudential regulation to ensure that the banking system is robust enough to cope well with shocks, and does not amplify or itself become a source of macroeconomic disruption. Second, there is a need to promote the depth and sophistication of financial markets so that it can efficiently intermediate between savings and investors, thus supporting development and bringing about adjustment to the shocks that will inevitably hit the economy. We review here some key policy issues, which are the subject of more detailed treatment in Rojas-Suárez and Weisbrod (this volume).

? *Balance costs and benefits of supervision and regulation:* Even in relatively stable economies, banking systems have often amplified or create economic disturbances. Financial institutions pose special policy problems because of well-understood information and moral-hazard problems that exist in banks, and that are particularly germane in shock-prone economies.[26] The first line of regulatory defense against potentially destabilizing behavior by banks is establishment and enforcement of standards for capital adequacy, which reduce incentive problems by ensuring that bank owners have plenty to lose by risky behavior, and which provide a crucial "buffer stock" standing between shocks to income and insolvency. Because Latin American banks must operate in a much more volatile environment, they need a larger "buffer stock" of capital, and the required capital levels should be higher than established in the Basle framework. But this requirement will accomplish little in the absence of a strengthened supervisory framework, that permits supervisors to enforce honest accounting, to identify banks with especially risky portfolios, and to pressure those banks to make adequate provisions for loan loss, thus ensuring that the bank's capital base is realistically stated. Finally, the regulatory structure needs to account for that fact that, unlike in industrial economies, Latin American banks are occasionally subject to very large liquidity shocks. But because the costs of illiquidity are often partly socialized, banks may not have incentives to remain sufficiently liquid to weather such shocks, so that authorities may need to impose minimum liquidity requirements.[27] The recent experience in Argentina shows the usefulness of reasonably high, and actively managed liquidity requirements. A timely reduction in these requirements permitted the authorities to offset the economic impact of the dramatic decline in deposit demand that occurred in early 1995, and thus prevent even larger economic and financial crisis.[28]

? *Indexation, dollarization, and the role of the exchange- rate regimes:* The volatile macroeconomic environment that exists Latin America, as in many developing economies, inhibits long-term lending. This creates interest-rate risk and "rollover risk" for borrowers, and may discourage long-term projects required for healthy economic development. The Chilean experience, in particular, suggests that indexation can promote longer-term lending, though the development of indexed securities is not instantaneous. The recent Argentine experience illustrates a potential stabilizing feature of dollarization. In the wake of the Mexican financial crisis, many Argentine depositors developed concerns about prospects for the banking system and, apparently, for the peso. This led them to withdraw their deposits from the banking system, but dollar deposits declined by substantially less than did peso deposits. This suggests that the banking system contracted much less than would have been necessary had depositors not had the option of holding dollar-denominated deposits.

? *Internationalize the financial system:* A key reason for the vulnerability of Latin American financial markets is that the institutions that make up the market are highly exposed to a volatile domestic economy. In this context, foreign financial institutions may play a particularly stabilizing role because their portfolio is more diversified of local risk than is that of local banks, and they may have greater access to foreign exchange in a crisis, when domestic financial institutions may lose access to international currency and capital markets. By the same token, foreign activity by domestic banks permits domestic banks to diversify their loan portfolio, reducing their vulnerability to domestic

economic shocks, thus strengthening the banking system and the economy. Indeed, during periods of financial tension and crisis in Latin America, depositors have often fled from relatively weak domestic banks to stronger, locally-based foreign banks. This has been a stabilizing influence, for it is far better for the economy to keep funds in foreign banks at home than in foreign banks abroad. The main risk of internationalization is that cross-border lending will permit banks to find ways around prudential regulation. To avoid this, bank regulators should step up their cooperative activities and their efforts to harmonize legal and regulatory practices.

? *Promote long-term credit markets:* As we have emphasized, the excessive reliance upon short-term finance has been both a cause and a consequence of macroeconomic volatility in the region. The weakness of long-term credit markets provided one rationale for directed-credit programs, public-sector financial institutions, and other "market unfriendly" policies in Latin America, and elsewhere. However, direct attempts by policymakers to micro-manage the price and allocation of credit have in practice not worked well in Latin America or elsewhere, because the decisions were typically made by officials with the wrong incentives. The need, therefore, is to find ways to promote the development of long-term private credit markets, rather than to institutionalize substitutes for such markets. Apart from the maintenance of a stable macroeconomic environment, and to manage indexation, dollarization as discussed above, there are ways in which this end can be pursued. First, governments are responsible for providing the institutional and legal framework that is required for private productive activity, and efforts to reform the state and particularly the judiciary can provide a more secure foundation for long-term private finance. If managed carefully, privatization programs may provide the additional benefit of contributing to the development of long-term bond and equity markets.[29] Finally, if carefully managed, pension-fund reform can create a class of investors with a long-term perspective who have at their disposal a relatively stable pool of capital available for long-term investments. The Chilean example illustrates that, while it may take some time for pension funds to emerge as suppliers of long-term funds, the eventual payoffs to the reform can be large.

- ***Adapting labor market policy to promote efficient and equitable risk sharing***

A volatile world is one that frequently demands effective adjustment to changed circumstances, and nowhere are those demands more urgent than in the labor market. A volatile world is also a risky world, and because the costs of adjustment are often highly concentrated on those relatively few unfortunate workers whose jobs have been eliminated by the economic shock, workers are particularly exposed to the risk. Unfortunately, the demand for insurance against risk often motivates policies that inadvertantly undermine the ability of a labor market to adjust to shocks, thus raising the overall costs of volatility. We focus on one policy challenge raised by this risk; Cortázar (this volume) provides a broader and more detailed discussion.

A commonly-adopted policy has been to use public employment as a buffer against rising unemployment. This, however, tended to permanently increase public employment, especially under systems which guaranteed job security in civil service. In addition to the direct costs, these practices also reduced incentives to perform on the job and interfered with the efficient provision of public services.

In the formal sector, labor legislation has provided for high severance payments, as well as directly restricting employers' ability to fire workers, in order to improve job security. This has the effect of transferring risk from individual worker to firms, who presumably are better equipped to manage it. These policies have implicitly raised the cost of hiring workers in the formal sector, creating incentives for firms to evade the restrictions by outsourcing from other firms too small to be covered by the labor code, and thereby limiting other protections and benefits available to those employees.

For those firms that remain in the formal sector, the costs and difficulty of dismissing workers makes labor a "quasi-fixed" investment, which undermines the flexibility of the labor market. Unemployment insurance creates fewer rigidities in this regard, but as the Western Europe experience illustrates, such programs have other costs, as they appear to increase the duration of unemployment and turnover. An alternative policy framework that has been proposed in several countries would establish individual employee accounts, funded with payroll deductions and employers contributions. The worker could automatically draw upon this account in the event of dismissal or leaving the firm, thereby eliminating administrative and judicial costs of determining whether the employer or employee are "at fault" for termination. The worker would have access to these funds to use as he or she sees fit for maintaining consumption levels during a spell of unemployment, retraining, job search costs, as initial capital for self-employment, or as savings toward retirement. In cases where insufficient funds had been accumulated, public funds could provide credit against contributions from future employment. The individual's ownership of the account would internalize the cost of delaying entry to a new job and thereby solve most of the incentive problems posed by standard unemployment insurance programs.

Conclusion: shocks, "shock absorbers", and policy response

This paper has argued that Latin America is a volatile region, has put forth evidence that macroeconomic volatility is costly, and has explored some causes of this volatility, emphasizing the importance of institutions and policy regimes. We find that Latin America has paid a high price for the volatile macroeconomic environment in which it is embedded, in terms of economic growth and inequality. We also find that institutional "shock absorbers" are critically important determinants of macroeconomic volatility; in particular, our evidence points toward the importance of both the exchange-rate regime and the depth of the domestic financial system. This suggests that much can be done to reduce the magnitude and costs of volatility if policymakers carefully tailor policy regimes the the requirements of a volatile macroeconomic environment, and promote markets and institutions appropriate for such an environment. Toward that end, we have discussed several policy initiatives for managing macroeconomic volatility, in areas that are discussed in more detail in the chapters that follow.

So that it does not become lost in this more specific and detailed discussion, we conclude with the fundamental, underlying message of this chapter: *macroeconomic stability is a development issue*. This is true in two senses: first, instability undermines, and stability promotes, healthy economic and social development. Second, sustained macroeconomic stability is unlikely to be achieved through an 18 month stabilization program, or even a sequence of them, in which the question is how to react to the latest destabilizing shock. Instead, achieving stability involves a long-term and painstaking process of designing and constructing institutions that take account of the fact that shocks are inevitable, that are strong enough to withstand shocks, and that "absorb", rather than amplify the destabilizing consequences of shocks.

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1 [1]It is noteworthy that the volatility of consumption in Latin America, unlike in industrial economies, is greater than the volatility of real domestic production. This is true for most other developing countries as well, and it poses a puzzle because we expect consumers to respond to income shocks by adjusting their saving and borrowing so as to make consumption more stable than income. The high volatility of observed consumption, both in absolute terms and relative to the volatility of GDP, is due in part to higher terms-of-trade and fiscal volatility. But even after accounting for these factors, poorer countries tend to exhibit more volatile consumption than do wealthier economies. This probably reflects a lower ability by poor countries to draw down assets and to use domestic and international financial markets to smooth consumption in the face of income shocks. Developing economies like those of Latin America are thus doubly exposed to macroeconomic volatility: not only is the volatility that they face larger, but the constraints that they face in dealing with it are more severe, thus generating even higher welfare costs.

2 [2]In the following discussion, a recession is defined as an episode in which real GDP declines.

3 [3]This figure is taken from Gavin, Hausmann and Leiderman (1995), which also provides evidence on the macroeconomic impact of volatile capital flows to Latin America.

4 [4]See Calvo, Leiderman and Reinhart (1993) for a formalization and quantification of this argument.

5 [5]Note that about 0.4 percentage points of the "growth gap" is unexplained. This is statistically significant, in the sense that a dummy variable for Latin America (and Africa) enters the regression with a negative and statistically significant coefficient, as in similar regressions that do not account for the impact of volatility. These coefficients are, however, smaller when volatility measures are included in the regression, suggesting that volatility is part, though not all, of the explanation for these regional "growth puzzles".

6 [6]The Ramey and Ramey (1994) results are consistent with our finding that GDP volatility seems to have a smaller impact on growth than does volatility of the terms of trade and the real exchange rate, and in fact, when all forms of volatility are incorporated in the growth regression, GDP volatility does not enter with a statistically significant coefficient, while the volatility of the terms of trade and the real exchange rate do.

7 [7]The index of macroeconomic volatility gives weight to the volatility of both real GDP and the real exchange rate, with the weights determined in a standard regression framework. Both measures of volatility enter the equation with statistically significant negative coefficients.

8 [8]See, for example, Leahy and Whited (1995), Serven and Solimano (1993), Aizenman and Marion (1993), Pindyck and Solimano (1992), Faini and de Melo (1990), and Cotanni, Cavallo and Khan (1990). However, Ramey and Ramey (1994) fail to uncover a significant relationship between GDP volatility and investment.

9 [9]Our measure of financial depth is "liquid liablities of the financial sector, as proposed and utilized by King and Levine (1993), and it basically measures the size of a broadly-defined banking system in the domestic economy.

10[10]Bulir and Gulde (1995).

11[11]Other measures of volatility, including volatility of the terms of trade, of capital flows, and of inflation, were found to have no statistically reliable effect on income distribution.

12[12]The measure used is nominal GNP deflated by the consumer price level.

13[13]These particular estimates should be considered preliminary and subject to future research, coming as they do from a study of only 23 countries. But the general finding that volatility is bad for the poor finds support also in Morley (1994), which finds that the poor suffer more from downturns than they benefit from booms.

14[14]Formal evidence for the role of primary commodity exports and export concentration was found in a cross-country regression of terms of trade volatility on a measure of the share of primary exports in total and of the four-product concentration ratio. These variables explained about 50 percent of the cross-country variance in our measure of terms-of-trade volatility.

15[15]The variable "switch" did not enter significantly in the analysis of GDP volatility. Similarly, "financial depth" is excluded from the equation for real exchange-rate volatility, because it did not enter with a statistically-significant coefficient.

16[16]See Gavin, Hausmann and Leiderman (1995).

17[17]However, the analysis seems systematically to underestimate the impact of capital account volatility on the volatility of Latin American real exchange rates, and exaggerates the impact of political shocks, suggesting once again that Latin America is somewhat more sensitive to capital account shocks than is the rest of the world.

18[18]Some of our recent work casts some doubt on the robustness of this result. In particular, the statistical significance of financial depth appears to depend upon including African countries in the sample, and in regressions that exploit time-variation as well as cross-sectional variation in the data, financial depth is not a statistically significant determinant of GDP volatility, while monetary and fiscal volatilities become more significant determinants. Other conclusions appear to be robust to the extended analysis.

19[19]This refers to differences in Latin American and industrial-country financial depth that are caused by factors other than Latin America's more volatile monetary policies. The latter effects are categorized as "indirect effects" of monetary policy volatility.

20[20]If the 8 countries with monetary volatility greater than 50 percent are excluded from the sample, these factor explain about 40 percent of the variation.

21[21]These issues are discussed in substantially more detail in Hausmann, Gavin and others (1995).

22[22]See Diaz Alejandro (1978), Newberry and Stiglitz (1981), Eaton and Grossman (1985), and Dixit (1987, 1989). Bates, Brock and Tiefenthaler (1991) provide support for this insurance explanation by drawing on two predictions from the preceding analysis.

23[23]Claessens (1993) discusses these instruments, and their application to risk management in developing countries. Claessens and Duncan (1993) discuss a number of case studies.

24[24]If investors believe that inflation will accelerate, they will demand a higher interest rate which will aggravate the fiscal deficit and may force the government to accommodate the expected higher inflation.

25[25]See Calvo (1992) for a discussion of this point.

26[26]See Gavin and Hausmann (1995) for a theoretical and empirical discussion of the Latin American context.

27[27]We speak of "liquidity" rather than "reserve" requirements because there is no need for these liquid assets to be non-remunerative, and therefore impose a tax on financial intermediation. In this sense the ongoing Argentine replacement of high (non-remunerated) reserve requirements with liquidity requirements that are satisfied with interest-bearing but highly liquid assets is illustrative.

28[28]See Banco Central de la República (1995) for a discussion. Liquidity requirements can also be manipulated to "lean against the wind" during bank lending booms, thus helping prevent the banking crisis that often follows such booms. See Gavin and Hausmann (1995) for a discussion.

29[29]Privatization has contributed to the financial-market development in countries as diverse as the Czech Republic, France, Jamaica, Mexico, and Turkey. See Gavin (1993) and references cited therein.