Reengineering the Volatility Machine
How the IMF Can Help Prevent Financial Crises

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In October 1997, shortly after the economic collapse of Thailand and Indonesia, the International Monetary Fund (IMF) mission in Korea produced an optimistic evaluation of South Korea’s near-term future. “The situation in South Korea,” the fund noted, “is quite different to that in Southeast Asia, and our assessment is that the weaknesses in the financial sector are manageable if dealt with promptly. While there are obvious risks, macroeconomic fundamentals remain strong and the current account deficit is narrowing towards a more comfortable range.” The report went on to forecast a 6–7 percent growth rate for South Korea in 1998.

Within weeks, the South Korean currency broke down and the country’s financial system collapsed. Instead of rejoicing in the strong macroeconomic fundamentals identified by the IMF economists, investors fixated on the short-term dollar obligations owed by Korean institutions, which totaled well over $100 billion. Against this debt, South Korea’s central bank had less than $30 billion in reserves. As the currency dropped, investors refused to renew maturing loans and fled the country, causing further weakness in the currency. Korean companies with dollar debt saw it grow sharply relative to their assets, which were denominated in the falling Korean won. With rising debt levels comes the risk of default, and as corporate default risk escalated, the collapsing debt structure quickly undermined the real economy. In 1998, amid a 10 percent decline in real wages and skyrocketing unemployment, the South Korean economy contracted by 6 percent. Not surprisingly, the IMF shelved its October 1997 report.

One of the most common failings of development economists and policymakers has been their inability to distinguish between a country’s underlying economy and the condition of its balance sheet—that is, the ratio and structure of its assets (i.e., tax revenues, international reserves, the credibility of its central bank) and its liabilities (what it owes to domestic and foreign lenders, its guarantees to bank depositors, etc.). The IMF economists were embarrassingly wrong about South Korea’s susceptibility to crisis, as were, to be fair, most economists working at other financial institutions, but it was not the quality of their economic analysis that was at fault. They were probably correct in their evaluation of macroeconomic conditions, but they failed to understand how South Korea’s highly unstable debt structure would undermine its economic fundamentals. They were like auto mechanics who, having found that the engine parts were in working order, pronounced the car to be in good shape, all the while failing to notice that the wheels were about to fall off.

It is true that debt structure is less important in explaining a country’s development than macroeconomic fundamentals. It cannot move the country forward no matter how well constructed it is. If it is badly put together or on the verge of collapsing, however, it can cause the economy to crash. Debt structure consists of the debt and other fixed obligations of the government, which include not just contractual obligations, such as interest payments on...
outstanding debt, but also implicit obligations. For example, few governments permit large banks to fail to repay local depositors, so when banks get into financial trouble, a portion of their unpaid obligations often becomes government debt. There are many forms a country’s debt structure can take, and some are more prone to accident than others, as we will see.

A country’s debt structure on one side and its income and assets on the other constitute its balance sheet. The relationship between the two is an important factor in how an economy develops. The failure to understand this relationship explains the bewilderment with which economists have greeted each financial crash since the Mexican Tequila Crisis in 1994. In every case—in the various Asian crises in 1997 and the Russian crisis in 1998—an economy that had been doing reasonably well collapsed into financial chaos when a small currency adjustment had an unexpected impact on the country’s corporate and government debt, and the currency suddenly spiraled out of control. It was as if the debt structure was a huge volatility machine that transformed small shocks, through an explosive feedback mechanism, into calamities.

The Machine Revs Up
Volatility refers to changes in the values of assets, such as stocks, bonds, currency, real estate, and commodities, or changes in other variables that affect the economy, like tax revenues, interest rates, export revenues, political reforms, technological changes, even weather patterns. A shock occurs when volatility is dramatic enough to change the underlying economy in some qualitative way. For most of the financial crises of the past decade, the shock in question was a sudden break in the currency, which until then had either been pegged to a major currency, usually the U.S. dollar, or had floated within a narrow and defined price range.

These crises always followed the same pattern. A devaluation of the currency caused a rapid rise in the amount of debt owed by sovereign and corporate borrowers relative to their assets. This was because, as in the case of South Korea, local banks and corporations had borrowed dollars to purchase local assets denominated in the domestic currency. A depreciation of the currency meant that while the value of these assets stayed constant in local currency terms, the debt increased. This caused the probability of default to shoot upward.

In nearly every case, the IMF recommended sharp increases in domestic interest rates in order to shore up the currency, but since most of the non-dollar debt was indexed to short-term rates, debt burdens rose even further and so increased default risk. Investors responded predictably: they demanded repayment of the debt owed to them and fled. This only added to the crisis because their exit resulted in even weaker currencies and higher domestic interest rates, which further increased the debt burden and, with it, the risk of default. The causes and the consequences of the decline in the currency became mutually reinforcing. In such cases, there are only two possible outcomes: either an outside lender provides enough capital to repair the balance sheet, or the country spirals into default. In either case the economy contracts sharply.

Contrary to popular opinion, financial crises are not caused by political uncertainty, poor macroeconomic policies, or even fiscal irresponsibility. They occur when debt is structured in such a way that a shock, like a surprise currency devaluation, causes the value of assets and liabilities to shoot sharply in opposite directions with such force that this threatens to throw a country into bankruptcy. The impact of such a shock depends on how fragile, or unstable, the country’s balance sheet is. An unstable balance sheet is one in which investors and borrowers are forced to contribute to shocks by acting in ways that reinforce them.

For example, highly indebted South Korean borrowers were forced to react to the
devaluation of the won by selling assets and using the proceeds to buy dollars, thereby causing asset prices to fall and the currency to decline even further. Of course, fiscal mismanagement can contribute to a crisis by causing debt levels to rise, but it is only indirectly the cause of the crisis. Ultimately, it is the debt structure that makes a country vulnerable.

Debt Structure and Financial Fragility

A country’s debt structure, like that of a company, has three main functions. It defines how earnings and other changes in value are to be distributed among investors; it is the conduit through which external volatility is transmitted into the real economy; and it determines default probabilities. Each of these functions can affect economic behavior by changing the ways economic actors respond to risk and by transforming the risk as economic actors change their behavior. When the market believes a country can service its debt without financial hardship, these three functions will have a limited impact on economic performance. When debt levels are high, however, a borrower’s debt structure can transform the way economic actors behave and, through a reinforcing mechanism, can result in greater financial fragility. Thus, as the financial crises of the last decade demonstrate, predictions about macroeconomic performance for highly indebted countries can never be made independently of the structure of the balance sheet. In order to see why this is so, it is worth examining the three functions of debt structure in greater detail.

First, we should understand how debt structure determines who profits from economic growth. When a country is growing in a stable manner, the interest rate used to calculate future debt payments will tend to decline, corporate profits will rise, and the currency will remain strong. In such cases, equity-type investors, which include foreign direct investors, purchasers of stocks, and long-term local currency lenders to the government, usually benefit disproportionately from profits and changes in the market value of assets in the country. Foreign currency lenders also benefit, but less so since they will have agreed to fixed payments no matter how well or poorly the country performs. (For that reason, of course, they suffer the least when economic conditions deteriorate.)

These changes in profits and the market value of assets in the country are shared by different types of lenders and equity investors in a way that depends in part on how much foreign currency debt the country has, when loans mature, and the credit spread on different loans (or how much additional interest a lender receives for taking on risk). For highly creditworthy countries, most of these changes are absorbed by equity investors who have taken on riskier types of investment. As the credit spread rises, however, foreign currency lenders receive an increasing share.

This increasing share discourages new equity investment. A government that is running out of foreign reserves and is worried about its external debt is likely to hoard dollars and may even force local businesses to turn in any foreign currency reserves to the central bank, possibly at a rate favorable to the government. In such cases, it makes little sense for an investor to sink dollars into an export business because the country’s creditors will benefit at his expense.

Since investors are concerned about the possibility of default, countries with weak and declining credit usually see new investment dry up, to be replaced with capital flight. In such cases, macroeconomic analysis nearly always overestimates the impact of new investment on economic prospects. This was what happened, for example, in Argentina in 1999 and 2000, when most analysts consistently projected overly optimistic GDP growth rates, even though by then it should have been clear that so long as the country’s debt level was so high, in-
vestment would dry up and the economy would not grow. 2

Second, debt structure can exacerbate volatility through the feedback mechanism, which works as follows: when a negative shock—a political crisis, for example—causes a country’s deficit to grow, confidence drops. This forces interest rates to rise and the value of the currency to fall. As a result, there is an immediate increase in debt servicing costs, and so the deficit grows further and confidence declines even more. This vicious circle is repeated until the country collapses and defaults. A positive shock, such as the passage of major fiscal reforms, or a large IMF bailout package, works in the same way but in the opposite direction. As confidence rises, interest rates drop. This immediately reduces the deficit, and so further increases confidence, leading to the much beloved virtuous circle. The net result in either case is that all positive or negative shocks are immediately reinforced by sharp changes in debt servicing costs, and so the impact of shocks, destabilizing to any economy, is increased even further.

Third, debt structure can have an impact on the probability of default. The idea here is fairly simple: for a borrower, any increase in volatility automatically increases the probability of default. A debt structure that stimulates volatility through the feedback loop described above will increase the probability that at some point a mismatch between expected revenues and debt servicing costs will be large enough to force a country into default, such as occurred when South Korean assets fell in value relative to the dollar debt.

If debt levels are already high enough, the increase in default risk raises the cost of capital for all economic entities within the country. This slows economic growth. In addition, when a country is already facing financial crisis, the impact of an unstable debt structure on default risk can make investors behave in what at first seem like perverse ways when responding to fiscal and monetary policies aimed at relieving the causes of the crisis. For example, when the IMF advises a country to defend its currency by raising interest rates, the policy might seem a reasonable way to increase demand for the currency. Yet when we introduce balance sheet constraints, it becomes clear that the policy can actually undermine the currency even further. This is because investor flight is not caused by lack of confidence in the integrity of fiscal and monetary policy, but by a sudden increase in balance sheet fragility.

The only solution is to fix the balance sheet. This almost always means reducing debt-servicing costs. When, following the IMF’s advice, monetary authorities tighten liquidity and raise rates, debt-servicing costs rise. Since investors are fleeing because they believe the debt-servicing level is already too high, an increase in the burden only hastens their exit. Rather than increasing confidence by reinforcing monetary credibility, the exercise in austerity reduces it. This should not be a surprise. Austerity measures that increase the debt burden will raise the risk of default. These asset-side measures cannot repair liability-side problems except by improving growth prospects in the long term, but if the market is concerned about short-term default risk, the long term does not matter.

Misplaced Blame

One consequence of financial crises has been that they often result, fairly or unfairly, in the discrediting of the macroeconomic reform policies that preceded them. The Latin American debt crisis of the 1980s discredited the import substitution policies of the 1970s just as the Asian financial crisis of 1997 was seen as evidence of the failure of industrial policy and trade protectionism. The Argentine financial crisis of 2001 undermined the neo-liberal consensus of the 1990s, which entailed deregulation, privatization, and (in theory at least) balanced budgets. We may not know which economic
policies are most likely to deliver equitable growth, but blaming a set of macroeconomic policies for financial crises is misguided. It was poor liability management and excessive borrowing—not the wrong set of macroeconomic policies—that caused these crises.

This point also extends to the controversy over liberalizing capital flows. The degree of openness of capital flows is simply part of a country’s debt structure. The liquidity mismatch between assets and liabilities is a major source of balance sheet risk for developing countries, and employing or removing capital controls is one way of controlling the speed at which liabilities can be withdrawn. This would suggest that any particular degree of capital flow openness need not be a permanent policy. Instead, countries can permit free capital flows during normal periods in order to take advantage of the associated lower costs of capital, and during periods of turbulence, like that which Malaysia experienced in 1997, they can use controls to reduce the liquidity mismatch caused by assets that are financed by “hot” money. This is not much different from the practice of calling bank holidays that was employed during banking panics in the United States a century ago.

The selective use of capital controls could be particularly helpful in protecting countries from the effects of financial contagion—the spreading of crises from country to country—which is another important balance sheet issue that has been misdiagnosed by policy experts and bank analysts alike. Despite the idea beloved of journalists that contagion derives from some strange virus of terror that spreads from investor to investor, the interesting thing about contagion is not that it is so mysterious but rather that it is so mechanical. Financial contagion usually occurs not because of real or psychological links between the affected economies but because investors are locked into strategies that involve selling in declining markets and buying in rising markets. These strategies, which include margin buying, or the use of derivatives and portfolio insurance, always result in trading behavior that increases volatility.

A typical example is an investor who buys stocks on margin. When prices rise, his buying power also rises, whereas when they drop he is forced to sell part of his position. By forcing traders to reinforce price movements with their own trading activity, the positive feedback implicit in these strategies adds volatility to the market, which can quickly spread if enough investors are locked into similar strategies. To date, every case of financial contagion has occurred in markets in which investors who held assets in one crisis country also held assets in another, and where there were very large margin and derivative positions.

Too Much Debt?

When are debt levels too high? A great deal of ink has been spilled on this question. Domingo Cavallo, the former economy minister of Argentina, famously argued in 2001, mere months before his country’s default, that since Argentina’s debt-to-GDP ratio was substantially lower than Ireland’s, Belgium’s, or Italy’s, it was incorrect to say that Argentina had too much debt unless one also agreed that those other countries did too. Some analysts have promoted the requirement for entry into the European Monetary Union of a debt ceiling equal to 60 percent of GDP as a one-size-fits-all debt limit. But it is no more reasonable to propose an appropriate debt limit for all countries then it is to propose one for all corporations. As with companies in different industries, the measure of what is manageable varies tremendously from country to country. Less volatile, more diversified economies can support higher levels of debt than countries with volatile, single-industry economies—just as large utility companies can support more debt than internet startups.

In addition, the structure of the debt matters. For example, China, whose obliga-
tions consist mostly of domestic currency debt with maturities of up to 30 years, can sustain a significantly greater debt load relative to GDP than Brazil, most of whose debt is short-term dollar and domestic currency debt. A negative shock that causes currency depreciation or a sharp rise in interest rates will have no effect on China’s interest payments, which are locked in for many years. In fact, the inflation that is likely to follow such a shock will actually make it easier for China to pay off its debt.

In the case of Brazil, however, a negative shock will cause interest payments on both the dollar debt and the domestic currency debt to rise sharply in a matter of days or weeks. The debt burden will automatically increase, unlike in China, where it will automatically decline. Thus, the potential impact of negative shocks must be part of the calculation of what constitutes a reasonable debt burden. What matters in the end is not the amount of debt relative to GDP, but whether projected net revenues are sufficient to cover debt servicing costs under a wide range of possible scenarios.

So how do we decide when a country has too much debt? The answer is simple. A country has too much debt when its debt trades at a high enough credit spread—when investors demand more compensation to offset increasing risk—to set into motion the volatility machine. High credit spreads are the trigger because they discourage new investment, as we have seen, and because when they reach a certain level they create what the economist and former head of the World Bank Joseph Stiglitz calls backward-sloping credit curves, in which no interest rate is high enough to justify the lending risk. The costs associated with borrowing at those high rates dangerously increase the risk of default. When this happens there is no new lending and the prices of government and corporate bonds spiral downward.

When falling debt prices lead to further selling by investors, policymakers often de-ride this “self-fulfilling prophecy” phenomenon as representing irrational behavior by investors. Yet investors are right to behave the way they do. If the balance sheet is badly structured, once credit spreads are high enough the debt itself becomes the problem.

So What Can the IMF Do?
An understanding of how a country’s capital structure affects its economic prospects is probably the single most important thing missing from IMF country evaluations. IMF economists are very good when it comes to advice on how to improve the workings of the “asset” side of an economy—on development policy, fiscal and monetary credibility, tax structures, the health of the business community, and infrastructure needs. Their analysis of debt structure, by contrast, has been fragmented. They have failed to look systematically at what the optimal debt structure for any particular country should be, how existing debt structures incorporate reinforcing tendencies, and how a particular structure might react to shocks.

This must be remedied. The analytical tools for assessing financial vulnerability already exist and are to be found in corporate finance theory. Adjusting these tools for analyzing countries would not difficult. Just as researchers at investment funds look at companies, country analysts could evaluate a country’s long-term growth prospects by examining underlying market conditions, the quality of fiscal and monetary management, and a host of other asset-side factors that may affect long-term growth. They could also look at the country’s debt structure for signs of balance sheet fragility and evidence of financial distress.

Since the IMF has taken on the responsibility of evaluating the economic prospects of developing countries and managing financial crises, it is the institution best placed to develop a balance sheet framework for identifying and minimizing financial risk and for promoting this framework throughout the investment community. By creating a separate liability management
team and integrating its analyses into its asset-side macroeconomic analyses, the fund could play a constructive role in forecasting financial crises and minimizing their impact on the real economy. It could identify those countries with debt structures that make them susceptible to destabilizing shocks. And it could make it easier to determine whether a country in crisis was merely experiencing a liquidity crisis or was truly insolvent.

It is not enough, however, simply to instruct IMF economists to be more aware of debt structure. They are already fully aware of the importance of debt. The problem is that in many cases they lack the tools and market knowledge to understand balance sheet instability, financial distress effects, and the feedback process between borrowers and investors. They tend to focus narrowly on specific aspects of sovereign debt structure and not on the interrelationship between government debt, private sector debt, the banking system, tax structures, the local investor base, and the components of a country’s debt structure. They are often poorly placed to analyze the connections between global capital flows, international liquidity conditions, the international investor base, contagion mechanisms, and domestic debt structure. And they often do not understand the idiosyncrasies of financial markets.

The IMF should employ finance specialists whose primary function would be to evaluate the structure of international capital markets and the financial fragility of an individual country’s balance sheet in order to identify the risks of a balance sheet crisis. These specialists would study market signals and the behavior of local and foreign investors to determine whether the risk of extreme reinforcing behavior was imbedded in a country’s debt structure. Where the risk was high, they could propose concrete steps to minimize it—how, among other things, to lower debt to safer levels, make it easier to roll debt over during a crisis, increase the domestic currency portion of the debt without crowding out investment or sparking inflation, or protect economies from sudden shifts in short-term investment flows.

It is difficult for countries to grow steadily when they suffer from regular financial crises that undermine the functioning of the real economy and cause brutal and often unnecessary policy shifts. This is why it is so important that the IMF redoubles its effort to understand and minimize the impact of financial crises by changing the way it evaluates a country’s economic prospects. It must incorporate a balance sheet approach that integrates traditional macroeconomic analysis with an analysis of a country’s financial health. By combining the two, it will be better prepared to minimize shocks and respond to future financial crises so as to minimize the destruction they wreak.

Notes


3. The way an economy reacts to shocks depends on how inverted or correlated the country’s capital structure is. Correlated capital structures are ones in which financing costs and operating revenues are correlated, so that when revenues rise (fall), debt-servicing costs also rise (fall). Inverted capital structures have the opposite effect. While correlated structures are highly stable, inverted capital structures are not.