How Firms in Developing Countries Manage Risk

Jack D. Glen
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How Firms in Developing Countries Manage Risk

Jack D. Glen

The World Bank
Washington, D.C.
The International Finance Corporation (IFC), an affiliate of the World Bank, promotes the economic development of its member countries through investment in the private sector. It is the world's largest multilateral organization providing financial assistance directly in the form of loan and equity to private enterprises in developing countries.

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Foreword

This discussion paper concentrates on the risks facing firms in developing countries and how managers deal with them. Risk management has increased in importance and sophistication in recent years in developed countries, but many of the techniques have been unavailable or not well known in some developing countries. IFC has played an important role in introducing these instruments to firms in developing countries and in educating managers in their use.

Guy P. Pfeffermann
Director, Economics Department
& Economic Adviser of the Corporation
Abstract

This paper considers the use of risk management techniques and instruments by firms in developing countries. Increased financial market volatility in recent years has led to the development of a number of new financial instruments for managing the risks associated with specific transactions. In most developing countries, however, firms face substantial obstacles to using these instruments. Despite that, developing country managers are becoming more and more aware of the need to manage risk. In many cases, they have turned to the International Finance Companies as a source of information on risk management and for assistance in accessing new risk management instruments.

In addition to the financial risks that often accompany transactions, many firms in developing countries suffer from exposure to other economic risks, especially the risk of long-run overvaluation/undervaluation of their local currency. This type of exposure is more difficult to measure and manage than purely transactional exposures, but can have very significant effects on competitiveness. Unlike the management of transaction exposure, which most often involves use of financial instruments, management of economic exposure requires operational and marketing strategies in order to be effective.
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Executive Summary

Thrust of the Paper

Global integration has been accompanied by increasing volatility in many commodity and financial markets. As a result, some business risks have grown in importance and with that, a new generation of sophisticated risk management techniques and instruments has been developed. While these developments have taken place largely in the world’s most advanced financial centers, developing country firms have also begun to suffer the pain associated with international market volatility and to search for ways to relieve it. This paper deals with innovative ways in which developing country firms are dealing with these complex problems.

Management of these financial and commodity market risks is centered on the use of a new breed of financial instruments called derivative securities. Based on concepts that have been used for centuries, these new securities have revolutionized the management of foreign exchange, interest rate and commodity price risk management. In some cases, these securities are traded on organized exchanges, most often in global financial centers. In other cases, over-the-counter markets have developed that offer customized features and service. Regardless of the manner in which they are marketed, the use of derivative securities for risk management purposes has become a driving force in international business.

To a large extent, however, access to these instruments has been restricted for developing country firms. Some developing country governments, for example, have not differentiated between market speculation and risk management and have prohibited the use of some instruments or have made their cost prohibitively high through taxation. In other cases, developing country managers have failed to keep up with the rapid progression of new instruments and how they are used. Perhaps most important of all, however, is the perception by the international markets that developing country firms lack the creditworthiness needed for the longer maturity instruments.

Despite these access problems, risk management is rapidly gaining importance in developing countries. Use of both old and new instruments has increased and further increases are to be expected as conditions improve and management awareness increases. In some cases, however, firms face risks that even the most sophisticated financial instruments are incapable of alleviating. For exposures that can not be easily measured or are of an ongoing nature, the use of financial instruments alone may be inadequate. For that reason, risk managers in some cases must look beyond financial methods and address the fundamental nature of a firm’s operations and markets. This strategic approach to risk management is gaining popularity in both developed and developing countries as the level of sophistication of management grows.

IFC’s Role

While the financial industry has developed a long menu of instruments for managing financial risks, use of these instruments in developing countries has been limited. The derivative products markets are credit sensitive and as most long term derivative securities involve credit risk, direct access generally is limited to companies having at least investment grade credit ratings. Access to some instruments may still be available to less creditworthy companies, but this access often is limited to short-term instruments or constrained by requirements that the company post collateral or some other form of credit enhancement which may make the cost of the instrument prohibitive.

IFC has been working for the past three years to improve its client’s access to risk hedging
IFC’s services have taken the form of: i) providing advice on defining hedging strategies and instruments; ii) intermediating the purchase of hedging instruments; iii) mobilizing the participation of international banks in such transactions on a risk sharing basis; iv) promoting the development of local capital markets by bringing these techniques to local financial institutions; and v) transferring technical know-how.

IFC is able to play these roles for several reasons. First, swaps have become an integral part of the Corporation’s funding and liquid asset investment strategies, as well as, more broadly, of the Corporation’s management of its own financial risks. Consequently, IFC has developed expertise in using derivative products and managing the risks associated with them. Second, over its 37 year history, the Corporation has developed the ability to assess and manage the credit risk of private sector companies in developing countries; a capacity not shared by most of the major participants in the derivatives industry.

IFC’s first risk management project was approved by the Board of Directors in June, 1990. Since then, the Board has approved 19 projects which enable clients to hedge up to about $1,560 million of liabilities. Geographically, IFC’s risk management projects can be found in almost every region where IFC has developing member countries.

The derivatives securities business has expanded greatly in the major financial markets and the management of financial risks has become indispensable for firms located in all countries. IFC’s risk management services have been designed to address the access problems which many of its client’s face, as well as to transfer knowledge of risk management instruments and to encourage private financial institutions to begin making these products available in developing countries. In this way, IFC is helping clients to manage problems which can adversely affect their profitability.
I. Introduction

The world economy has changed in three dramatic respects in the last twenty years: first, the collapse of the Bretton Woods system and the advent of floating exchange rates has led to unprecedented volatility in interest rates and exchange rates; second, the globalization of trade and finance has led to increased integration of markets with the result that disturbances in developed countries are rapidly transmitted to the developing economies; and third, commodity prices have become more unstable and are on a downward drift.

The Bretton Woods system of fixed exchange rates, created in 1946, fostered substantial increases in international trade and investment through the exchange rate stability that it provided. Even though interest rates and international commodity market prices varied over time, volatility was relatively low and financial risk management, though practiced, was not a significant factor for the majority of firms. The risk management that did occur was rudimentary in nature given the low level of sophistication of the risk management instruments available at the time.

With the collapse of the Bretton Woods system in 1973, the stability of fixed exchange rates was replaced by the volatility of market determined floating exchange rates. Subsequently, international capital flows have increased to the point where daily foreign exchange volume now exceeds $1 trillion and volatility has continued to increase, despite attempts at exchange rate stabilization such as the European Monetary System. This increase in volume and volatility in the foreign exchange markets has altered substantially the risk facing firms.

Surprisingly, the increased volatility in the foreign exchange markets that followed the collapse of the Bretton Woods system did not immediately spill over into the major money markets. But all of that quickly changed when, in 1979, the U.S. Federal Reserve Board altered its monetary policy targets. No longer was the Fed concerned with the level of interest rates and the result was a rapid increase in interest rate volatility. With increasing capital market integration, increased interest rate volatility in other major markets soon followed. Faced with increased volatility on both the foreign exchange and money market, not to mention the effects of the two oil price shocks on commodity markets, financial engineers quickly developed new financial instruments for managing these risks.

Prior to the 1970s, corporate managers in developed economies concerned themselves mainly with issues such as marketing strategy, production and inventory management, quality and cost control and the like. The risks they faced were largely related to production costs and the behavior of product markets. The advent of floating exchange rates and overall market liberalization has irrevocably complicated the management of business and altered the nature of the risks involved. Not only must an eye be kept on the usual risks involved in doing business, but with increased volatility in the financial markets, financial risks that are completely external to the firm have now achieved an importance never before seen. Volatility in financial markets can now bankrupt even the most efficient producers. As a result, financial risk management has quickly evolved into a sophisticated and important task in nearly all developed country corporations.

Similar to their developed country counterparts, corporate managers in developing countries were earlier preoccupied more with issues related to markets and efficiency, rather than financial variables. In some cases, developing country corporations were shielded from the volatility of international markets by the central bank or government, which frequently absorbed both currency and interest rate risk. But this is changing and developing country corporations are no longer immune to the market volatility experienced in more developed countries. Increasing use of international financial markets and emphasis
on international trade has left many developing country firms more exposed to exchange rate, interest rate, and commodity price risk, than ever before. In this respect, developing and developed country firms are similar: both must anticipate and deal with financial risks. Failure to do so can lead to costly bankruptcy no matter how well managed the firm is in other respects.

Increased volatility in international markets has led to an impressive array of sophisticated instruments for managing the associated risk. These "derivative" securities, which go by the names swaps, options and futures and numerous variations thereon, are no longer as arcane as in the 1970s and 1980s, when many were first introduced. The growth in demand for these instruments has been stimulated by the recognition that ignoring volatility and its implications on operating costs can destroy what is otherwise a profitable operation. To so. extent, however, use of these instruments remains the exclusive province of advanced market economies. Routine use of these instruments in developing countries has been hindered by a number of barriers:

- Credit considerations: very often, there is no track record or rating system that is available for developing country firms, making developed country institutions wary about dealing with them
- Information: use of these instruments requires a clear understanding of their pricing and payoffs, information that is not always readily available
- Regulation: domestic financial regulations often prevent firms from using instruments listed in international exchanges because of the associated exchange rate and interest risk and imperfect understanding of the difference between hedging and speculation; cumbersome approval procedures on a case-by-case basis act as a bottleneck; tax treatment of modern risk management instruments by local authorities may greatly increase their cost
- Transaction size: a given firm's hedging needs may be too small to be of interest to a risk management institution. Similarly, it may be too costly for individual firms to invest in the necessary financial technology, human resources, computer hardware and software and links to real time commercial databases.

These barriers are only slowly being overcome. Financial institutions and firms in some developing countries have begun to take advantage of the menu of instruments available in the international markets, but access in many cases remains limited for the reasons cited above. Where access is possible, maturities are often shorter than needed owing to credit concerns. Moreover, much of the risk facing developing country firms involves exposure with their local currency and interest rates and the instruments necessary for managing those risks are often absent or, where they exist, available only for short maturities.

The increasing integration of international markets means that firms in developing countries are no longer insulated from the shocks and uncertainties that have become a routine part of doing business in advanced market economies. Moreover, there is no reason to believe that the environment will return to its Bretton Woods stability. Therefore, it is likely that risk management in developing countries will continue to increase in importance and in sophistication. In order to better understand current risk management practices in developing countries, we interviewed a number of firms and financial institutions in seven developing countries. This paper presents specific examples obtained from our field work of
how firms in developing countries manage risk.

The layout of the paper is as follows. The paper first enumerates various sources of risk. This is followed with a discussion of measurement and management of risks arising from the financial and commodity markets, including a brief overview of the instruments developed in the international financial markets. The paper is peppered with concrete examples of risk management in situations typically encountered in developing country markets.
II. Sources of Risk

Exchange Rate, Interest Rate and Commodity Price Risk

Movements in exchange rates affect firms involved with international trade, as well as firms that have utilized international financing. Consider a South Asian fertilizer manufacturer that financed new investment with a dollar loan. During the construction period the local currency was devalued by more than 80 percent, with the result that project costs increased more than 70 percent and the ability of the company to service its international debt was jeopardized. The company has maintained its viability so far, but with all its sales in local currency, further depreciation of the currency could force it out of business.

Not all financial sources of risk involve cross-border transactions and foreign currencies. Movements in interest rates, either local or international, can prove to be equally devastating if left unmanaged. As an example, a Latin American financial institution became an active buyer of medium-term local government notes, which it financed through short-term borrowings. The expected profitability of this operation was based on the belief that the yield curve would slope upwards, i.e., that longer maturities would carry higher interest rates. During the first few years, interest rates declined and the company earned substantial returns through its speculative strategy of borrowing short maturities and investing in longer maturities. In the last year, however, interest rates have reversed direction. As a result, the interest rate earned on medium-term notes is below the firm’s cost of funding. With no secondary market in which to liquidate the notes, the company has incurred a loss of approximately $100 million, nearly 70 percent of the company’s equity.

Like financial variables, commodity price movements can be ruinous to producers and users alike. The case of a Caribbean cotton growing project provides an illustration. At the time the project was proposed, international cotton prices were near an historic low. With good soils, skilled management and the possibility of two crops per year, the project looked good on paper, even for prices 10 percent lower than those observed at the time, and well below informed forecasts. By the time the project had come on line three years later, however, international prices had dropped by over 40 percent following an increase in world production. The drop made the project unfeasible and, after various attempts at revival, the company went bankrupt.

The preceding examples capture risks often faced by developing country firms, and illustrate the real effects that financial risks of various types can have. These risks, however, are not always an inherent part of doing business. Sometimes, they arise out of decisions, good or bad, made by management. Moreover, the risks that many firms face, whether due to a conscious decision or not, can often be managed or even eliminated through the use of modern risk management techniques. Repeated experience shows that ignoring risk in cases where the loss from an adverse movement in critical variables is large compared to a firm’s net worth, can lead to bankruptcy. Therefore, it is vital that developing country firms vulnerable to such risks acquaint themselves with the possibilities available to manage them.

Other Kinds of Risk

While this paper concentrates on the type of risks discussed above, other important risks also exist. Insurable risks are those that firms can protect themselves against by paying an insurance
premium. The insurance company then bears any resulting liabilities or costs of damage. By insuring a large number of firms, insurance companies diversify their exposure and are able to absorb the risk that individual firms face at a lesser cost. Risks of this sort are often physical in nature and include fires, mechanical failures, and other accidents that seriously disrupt operations. Other examples include the liabilities that result from product flaws or byproducts of the manufacturing process. This type of insurance differs little from the use of other instruments to manage (insure) the risks mentioned earlier.

**Economic and political risks** originate from the nature of the economy and country in which firms do business. Interviews with developing country firms indicate a variety of philosophies and needs molded importantly by the local business and regulatory climate. There is no hard and fast rule for measuring economic and political risk, but any analysis should include the following: inflation, economic growth rates, the balance of payments, country risk, and regulation. Of course, everything else being equal, the rate of economic growth is also important as this vitally determines market size.

**Inflation Risk**

Both inflation and its uncertainty influence the planning horizon of firms and their commitment to financial management. Typically, high inflation is also volatile, inducing firms to devote more resources to the task of financial management. It also forces firms to shorten their planning horizons. At high rates of inflation, firms may spend more time worrying about financial management for the next month than they do about the corporate strategy for the next five years. In such a highly inflationary environment, risk management becomes a focal point for the firm. Unfortunately, basic business operations lose some of their importance and needed investment can suffer. Argentina illustrates this well. Following years of high inflation, management grew accustomed to financial operations generating the profits needed to keep manufacturing operations afloat. High import barriers kept competition at bay, thereby permitting continued operations without needed investment. Ultimately, however, inflation was tamed and import barriers reduced. Now Argentine firms are scrambling to improve the efficiency of their operations and reducing the emphasis on financial management.

High inflation typically reduces the maturity range of available financial instruments, which limits the ability of firms to deal with currency (or interest rate) exposures beyond a short horizon. This is seen clearly in the case of Brazil. The Brazilian capital markets are among the most sophisticated in the world with a broad range of different instruments available for managing a variety of risks. But Brazil is also experiencing inflation of more than twenty percent per month. As a result, firms and financial markets consider most positions in excess of 30 days to be speculative and market liquidity beyond that horizon is low. Thus, even with a high level of sophistication (which may well be a consequence of living with inflation), the uncertainty that characterizes the economy prevents the development of medium and long-term risk management instruments (such as cruzeiro swaps).

**Economic Growth Rates and the Balance of Payments**

Economic growth rates and the balance of payments also affect attitudes toward risk and risk management, but in a different manner. Higher growth rates may lead to a sense of optimism about the future, a perception that the local currency will be strong, and possibly a lower aversion to risk. Under such circumstances, management is often willing to accept higher levels of exposure to risk than otherwise. Similarly, a surplus in the current (or trade) account of the balance of payments may instill a feeling of confidence in a currency that induces firms to bear more exchange risk than normal. Thus, through the effects that they have on expectations, economic growth rates and the balance of payments
influence the risk management behavior of firms.

Following a period of substantial economic reform and prior to the present difficulties, most Indian businessmen interviewed expressed optimism about the country’s future. Reflecting this, many firms which had exposures to foreign currencies consciously made decisions not to hedge based on their expectations about the rupee. For example, when faced with a choice between rupee and dollar financing at substantially lower interest rates, dollars were sometimes shunned in favor of rupees owing to a belief that rupee depreciation would more than offset the lower dollar interest rates. In contrast, Brazilian businesses are facing a sluggish economy and an uncertain future. Consequently, firms there are risk averse, especially with respect to exchange risk, and prefer to hedge to the extent possible.

Country Risk

Closely linked to the economic factors mentioned above is the level of country risk perceived by firms, where country risk is the combination of macroeconomic and political factors upon which international markets base a credit assessment. And while all firms resident in a country may not be penalized to the same extent for any given level of country risk, the consequences will be similar: higher costs of funds and shorter maturities. This has important implications for risk managers because it can severely limit their access to some important derivative securities which have long maturities, as well as increase the cost of whatever instruments are available.

Examples of country risk effects abound, especially in the use of currency/interest rate swaps. A Colombian company recently signed a multi-year contract for international freight services in order to ensure the availability of freight. The contract guarantees a fixed shipping cost, which reduces the risk of freight increases, but the payments must be made in Belgian francs whereas the company’s exports are denominated in dollars. The resulting currency exposure is unacceptable to the Colombians. The normal solution is a dollar/franc swap, but Colombia’s country risk is sufficiently high that the international swap market is unwilling to bear that risk. The solution is to find an acceptable financial institution whose view of the firm-level and country risk differs from that of the market, and which is willing to intermediate the transaction. This intermediary role has been played increasingly by the International Finance Corporation. Intermediation of this sort has been provided by IFC in a diverse set of countries, including Bolivia, Brazil, Chile, Jamaica, Mexico, Egypt, Ghana, Indonesia, and Turkey, and the service has been provided for a variety of derivative securities.

Regulation

Access to international markets is not always a function of country or credit risk; in some cases regulation prevents the use of certain financial instruments. Brazil is one example. With a large economy and many internationally-competitive export-oriented companies, the use of international swap markets would be natural for Brazil, in spite of country risk considerations. Worried about the level of international reserves, however, the Central Bank has prohibited the use of currency swaps, and only this year allowed the use of interest rate swaps. Consequently, Brazilian firms with foreign currency financing are forced to bear the ensuing risk.

Not all regulations are this strict. The Indian government has allowed firms to use most types of derivative securities, but each transaction must be approved. Although the approval process has not prevented the use of swaps generally, it slows things down, allowing time for market conditions to change. Despite this, Indian firms have access to the markets and have taken advantage of them.
Regulation of domestic financial markets also plays a role in risk management activities of firms. The development of forward markets is made easier by the existence of market-determined interest rates and a convertible currency. Both are lacking in many developing countries. Also lacking in most developing countries are local markets for managing commodity price risk. Some governments fix commodity prices in an effort to reduce company risk, but often at levels below the international market price.

Regulation can also influence risk management indirectly. For years, the Indian Government has licensed investment in the private sector. Consequently, as Indian companies grow, they often also diversify across sectors on the basis of license availability. This diversification acts as a sort of natural risk management tool; it is unlikely, for instance that two different sectors would have the same exposure profile to exchange rates. Consequently, to the extent that this sectoral diversification also results in risk reduction, the risk management philosophies of large Indian companies are affected by the licensing arrangement, whose primary motivation was to control investment.

Government control over currency convertibility and nominal exchange rates also influences both the risk facing firms, as well as the options available for managing that risk. In the early and mid 1980s, Nigeria maintained a fixed nominal exchange rate. This arrangement removed the transaction risk facing firms for some time, but by 1984 it was apparent that the rate had to change. Subsequent devaluations were significant, but, with the markets convinced of their imminence, the exposure was difficult to manage as everyone wanted to take the same position against the naira. From a risk management perspective, a fixed exchange rate reduces uncertainty, until the need for a devaluation arises. Once markets come to expect a realignment, forward transactions can be difficult (or impossible) to conduct. Witness, for example, recent events in Europe where threat of devaluation led to extraordinarily high short-term interest rates in some countries. On the real side, fixing the nominal exchange rate tends to increase the economic risk facing firms. As this risk is much more difficult to manage than transaction risk, government intervention in the markets can make life more, rather than less, difficult for firms.

All of these factors—the macroeconomy, country risk, the state of the local markets, and the regulatory environment—influence the manner in which firms in developing countries manage the risks that they face. Chile is an example that illustrates most of these factors. With strong economic growth, low inflation and a positive trade balance, Chilean firms are optimistic about the future. Moreover, with the Central Bank supporting the peso in the foreign exchange markets and ample foreign exchange reserves, few believe that there will be a depreciation of the peso in the near term. In fact, the peso has appreciated against the dollar in recent months. Taking note of this, most Chilean importers are not concerned about hedging dollar liabilities; many exporters, on the other hand, maintain dollar-based accounting systems. Forward contracts are available and used, but not with the sense of urgency that one sees in some other countries. The expectation of continued appreciation of the peso is nearly universal and influences the demand for risk management services. Despite this overall sense of optimism, however, country risk factors are limiting access for Chilean firms to the international swap markets. Access is possible, and the instruments are commonly used, but the maturities that are available are not as long as in developed countries.
III. Measurement and Management of Risk

This section contains an overview of recent international developments in the management of risks arising from exchange rate, interest rate and commodity price movements.

Risk and Volatility

Put most simply, risk stems from uncertainty about the future; risky projects (or transactions) have outcomes which may be better or worse than expected. The greater the uncertainty, the greater the risk. For many business people, this definition is a bit unorthodox; risk is often viewed only as the possibility of adverse movements in prices or other variables. But in most cases, managing risk using modern financial instruments eliminates all uncertainty, including both favorable and unfavorable outcomes. Such is typically the case with futures or forward contracts, which lock in values for a random variable. Some of the new financial instruments eliminate only adverse movements, but these are inevitably more costly to use. This is the case with options, which confer a choice of participating only in favorable outcomes.

Volatility, a word encountered every day in the financial press, is a measure of the riskiness of a variable. It has a precise meaning and formula for measurement, best illustrated by an example. The interest rate—six-month US dollar LIBOR—today is about 3.5%. If one were asked to predict its value a week from now, one would guess that it could go up or down, but is likely to remain close to 3.5%. However, if one were asked to predict its value six months from now, one would feel less certain about its value, as it could stray further from its initial value of 3.5%. The extent to which a variable can move away from its starting point is measured by volatility. As the example shows, the step size up or down or volatility increases with the time interval under consideration. Typically, it is expressed in annual terms, i.e., it measures the likely percentage change in a variable one year from now, although the volatility for shorter or longer time periods can be inferred from this.¹

Table 1 displays volatility for two dollar-based variables. Such volatility is highly relevant for developing country firms, as much project financing these days is in dollars, Deutsche marks and Japanese yen and most exports from developing countries are denominated in these currencies. Thus, many developing country firms have exposures to major currencies. The table shows a dramatic increase in volatility for all three variables in the 1970s, as discussed in the introduction, and it was following this increase that interest in risk management developed worldwide. Subsequently, financial instruments were developed that allowed the consequences of volatility to be managed. In the 1980s, volatility for both commodities and interest rates declined, although they were still substantially above their previous levels.

¹For the technically-inclined, the market formulae for pricing options typically assume that variables are lognormal random walks, with percentage changes normally distributed. The variance of this normal distribution is related to the volatility of a variable and increases with the time to maturity.
Table 1

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<tr>
<td>Commodities</td>
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<td>13.6</td>
<td>8.6</td>
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<td>$ Interest Rate</td>
<td>17.8</td>
<td>26.0</td>
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<td>DM/$</td>
<td>2.4</td>
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Risk Management Techniques

The so-called Rocket Scientists of Wall Street developed a bewildering array of new risk management instruments during the 1980s which came to be known as derivative securities, as they are derived from certain underlying transactions. For example, a dollar/Swiss franc currency swap would typically coincide or be preceded by an actual borrowing transaction in dollars and Swiss francs by the two parties, which would then swap the proceeds. However, derivative transactions have grown much faster than the underlying cash market transactions in recent years and there is no longer the one-to-one correspondence which existed when swaps were first introduced in the early 1980s.²

Derivative instruments can be constructed from two building blocks: forward contracts and options. With an understanding of these two instruments, virtually every other derivative security can be understood.

Forward and Futures Contracts

A forward contract is an agreement to exchange two cash positions at a single known future date. Generally, no cash is exchanged at the time the contract is made, only at the forward date. If those two cash positions are in different currencies, then the forward contract determines a forward exchange rate and can be used to fix the cost of a foreign exchange transaction. If the two cash positions are linked to a fixed and floating interest rate, then the contract is called a forward rate agreement and can be used to fix a future interest rate. Similarly, forward contracts based on commodity prices can be used to manage commodity price exposure.

Widely accepted by managers and readily available from most financial institutions, forward contracts on currencies are without doubt the most commonly used derivative security with daily turnover of about $400 billion for the major currencies alone. Forward contracts for foreign exchange appear to be the most commonly used derivative securities in developing countries as well, although information on volume is unavailable.

Futures contracts for many commodities have been traded for decades, if not centuries; but it is

²In international finance parlance, the underlying transaction is called a cash market transaction, or quite simply as the underlying cash position which a firm wishes to hedge. This is a generically used term irrespective of whether the underlying position refers to currencies, interest rates or commodities.
only beginning in the seventies that futures for currencies and interest rates were introduced. For major commodities, futures contracts are widely traded on organized exchanges in many countries. In contrast to forward contracts, which are tailor-made two-party agreements, exchange traded futures contracts are standardized with respect to quantity and delivery date. Furthermore, a security deposit or margin must be posted with daily payments for capital gains/losses on the futures position to minimize the loss from any possible default.

Futures markets in developing countries have also taken off; the Brazilian futures market offers contracts in dollars, commodities, interest rates and a stock index; a new commodities/futures exchange has opened in Hungary offering futures contracts on selected agricultural commodities. Other countries have also considered starting a local futures market, but unless sufficient local demand exists, it is unlikely that market liquidity will be sufficient to make the market successful. For that reason, it is unlikely that many additional markets will develop and most futures will continue to trade in the markets already established.

Swaps

A significant development took place when risk management specialists decided to combine a string of forward contracts, each with a different date, in order to create swaps. Now one can choose from swaps for currencies, interest rates, and even commodities. The international swap markets have grown rapidly; outstanding principal amounts at the end of 1991 were $3 trillion for interest rate swaps, and $807 billion for currency swaps. By comparison, the market for commodity swaps (which is much younger) is much smaller. Swaps, like their building block, forwards, are offered over-the-counter (OTC) by many types of financial institutions and can be easily tailored nowadays to accommodate the needs of the customer. As expected, creditworthiness is a major factor in pricing and access, with limited international swap market access for many developing country firms. Compounding the problem, local swap markets have developed in only a few of the more sophisticated developing countries.

Options

An option on an asset gives the buyer the right to buy (or sell) the underlying asset at a fixed price over a fixed period of time. There is a variety of option types. Put options give the right to sell, call options the right to buy. Some options permit the buyer to buy/sell up to the expiration date (American options), others only at the expiration date (European options). For each option contract there is both a buyer and a seller; the buyer pays a price to the seller for the rights that the option conveys. The seller is commonly referred to as the writer of the option, while the price is called the premium, thus completing the analogy with buying insurance against adverse developments.

Options are sold both over-the-counter by financial institutions and on organized exchanges, and are available for a variety of assets, including many currencies, interest rate instruments and commodities. Developing country firms have access to many different types of options through international markets, but developing country option markets are not well developed. The Sao Paulo Commodities and Futures Market trades options on gold, dollars and cattle and the stock market index; stock options are traded in both Mexico and Chile; options on cattle are traded in Buenos Aires.

A significant advance made in the 1980s was the application of options to a broad array of assets and in a variety of ways. Through options, ceilings and floors can now be placed on interest rates, exchange rates and commodity prices. Moreover, two or more options can be combined to produce even
more imaginative ways to manage risk. For example, the purchase of a put option on dollars combined
with the simultaneous sale of a call option on dollars produces what is known as a collar that sandwiches
the future dollar exchange rate between two known values. Because the premium received from the sale
of the call offsets most (or all) of the cost of the put, the position is not costly and eliminates most of the
risk of exchange rate movements, but at the same time permits the buyer to profit somewhat from
beneficial exchange rate movements. Similar and more complicated option trading strategies have greatly
changed the manner in which risk is perceived in both industrial and, more and more, in developing
countries as well. As a result, international volume in option instruments increased to more than $1.7
trillion at year end 1991. The appendix provides a more detailed examination of options and forward
contracts.

**Brief Overview of International Risk Management Markets**

Table 2 contains the outstanding global volume by major type of instrument from 1986 to 1991. It shows (a)
the spectacular growth in the volume of transactions, both exchange-traded and OTC; and (b) that interest rate
and commodity instruments are used in far greater volume than currency instruments. Of the instruments
reported, swaps have the largest outstanding principal, followed by futures and then by options.

Numbers for developing country transactions are not available for all years. For the most recent
year available, 1989, the volume of currency swaps and options was $2.2 billion, less than one percent
of global volume. For interest rate swaps, the volume was $0.4 billion, again less than one percent of
global volume. Nevertheless, volume has increased substantially in developing countries, with the total
volume of derivative securities used by developing countries more than doubling in 1989 over 1988.

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<th>Global Markets for Selected Derivative Securities ($ billion)¹</th>
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<td>Exchange-traded Instruments</td>
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<td>Int Rate Futures</td>
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<td>Currency Futures</td>
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<td>Currency Swaps</td>
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<td>Option-related Securities</td>
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Sources: International Swap Dealers Association, Bank for International Settlements, and Commodity Futures Trading Corporation

1) Principal amounts outstanding at year end, except for commodity contracts.
2) Average number of contracts outstanding (thousands) at month end for U.S. exchanges.
IV. Managing Risk in Developing Countries

Despite the significant advances made in the use of derivative securities in many developed countries, risk management in most developing countries is still in its infancy. In some countries, governments prevent the use of many of the newer risk management instruments and in other countries credit risk or other barriers prevent access to the full menu of derivative securities. Despite these barriers, however, developing country firms are increasing their use of sophisticated risk management strategies and instruments as never before.

As mentioned in the introduction, however, barriers to the use of these instruments exist, one of the most important being the perceived creditworthiness of developing country firms. As a result, even when the more sophisticated instruments are available, the maturities are restricted, thus limiting their usefulness. As country risk is reduced, longer maturities should become available, but that can be a long process and is only now just beginning in the most advanced of the developing countries.

Another problem facing many developing country firms is the lack of instruments for managing the risks they face in their own local currencies. Lack of sophistication in the local financial markets has so far translated into a lack of derivative securities for dealing with both local currency exchange risk and interest rate risk. In many countries this will require substantial deregulation before the markets for appropriate instruments can be developed.

Despite these impediments, risk management is an important and growing field in developing countries. This section provides examples of how firms in some developing countries are managing financial risks.

Exchange Risk

Companies entering into foreign-currency-denominated transactions expose themselves to movements in the exchange rate over time; the result of this transaction exposure is termed transaction risk. Transaction exposure is quite common among firms engaged in international trade, but even firms not involved in international trade are sometimes exposed. For example, firms in developing countries often seek foreign-currency-denominated financing. If these firms do not have similarly denominated revenue streams, they too are exposed to transaction exposure. The long-term nature of such financing arrangements can lead to substantial exchange risk as the case of an Indian financial institution illustrates. Offered long-term dollar financing from a development institution at attractive rates, the Indian company used the funds to make rupee-denominated loans. What first appeared to be an attractive 10% dollar loan, however, ended up costing 23% in rupee terms once depreciation of the rupee was accounted for, somewhat more than rupee funding would have cost. Evidently, the cost of transaction exposure can be high.

This example illustrates the cost of not managing transaction exposure, which leads one to ask how such management is accomplished. The answer depends on the nature of the exposure—whether it is short or long term—the currencies involved and the nature of the financial markets.

Currency Forwards

Single transactions that are short term and nonrecurring are most often managed using forward
contracts. The net effect is to eliminate exchange risk by fixing the exchange rate at which a future trade will take place. An example involving exports will illustrate how forward contracts function. Consider a Mexican manufacturer of automotive components who has just exported products to the U.S.. Such a sale would normally be invoiced in dollars with payment to be received at a future date, perhaps 30 days, but the Mexicans must record the transaction in peso terms, thereby leaving the company exposed to foreign exchange gains or losses. These gains/losses can be offset by obtaining a forward contract which fixes the exchange rate at which the future exchange of dollars will occur. From an accounting perspective, gains/losses on the forward contract will exactly offset losses/gains on the product sale, provided that the full amount was covered in the forward contract. The Mexicans always have the choice of leaving a portion of the exposure uncovered if they have either offsetting exposures from other transactions or have a hedging philosophy that induces them to prefer an exposed position in dollars.

**Currency Options**

Option contracts involving the local currency are unavailable in most developing countries. In countries where they are available, for example Brazil, they are used, but not to the same extent as forward contracts. In contrast, forward contracts are available in many developing countries, although not for all maturities and all currencies. They are commonly used to manage transaction exposures, but firms also frequently choose to leave their foreign exchange exposures unmanaged when conditions are viewed as stable or the perceived cost of a forward contract is believed to be excessive. In this sense, transaction exposure management in many developing countries is quite sophisticated and is becoming even more so as managers learn the value of risk management and new instruments become available.

The existence of sophisticated derivative securities permits firms in developing countries to lower their cost of capital at the same time that they manage their currency exposure. An Indian company provides a good example. In search of long-term financing, the company agreed to take a dollar loan from a Swiss bank, but with a string attached; the loan included an option that allowed the bank to convert the loan into Swiss francs upon maturity. This embedded option reduced the cost of the loan substantially, but with dollar export revenues, it also represented a substantial currency exposure for the company. Ultimately, the company decided that holding the risk of a future Swiss franc liability was too unnerving and it bought an offsetting option to eliminate the exposure. In this case, they continued to profit from a net lower interest rate because in the time that elapsed between the two transactions, the markets had moved in their favor.

**Swaps**

Forward contracts and options are ideal for hedging single transactions of a short-term nature, but increasing integration of financial markets has led many developing country companies to use medium-term project finance in foreign currencies. The resulting currency exposure can be significant as the following example illustrates. An Egyptian manufacturing concern secured low-cost yen financing in order to purchase Japanese equipment. The equipment gave the company competitive operating costs, but with mostly dollar revenues, the yen's appreciation in the latter half of the 1980s caused the company's financing costs to skyrocket and its profit margin suffered. It is estimated that each one yen decrease in the ¥/$ exchange rate cost the company an additional $300,000 annually in interest expense. The yen's appreciation over 1985-89 increased the company's outstanding long-term debt by more than $80 million due to exchange rate effects, even though all debt was amortized on schedule and no new debt was contracted. Finally, in order to prevent further erosion of their position, the company entered into a dollar/yen swap agreement that exchanged a portion of their yen financing for dollar financing.
As defined above, a swap consists of a set of forward contracts, a definition that reveals the underlying feature needed if a swap market is to flourish: long maturity forward markets. In most developing countries, forward markets for local currencies seldom extend to more than 6 months, and often markets at that maturity are illiquid. That is a major reason why swap markets for developing country currencies are scarce; however, such markets do exist and India provides a good example. Some Indian companies have had access to low-cost dollar financing, but such financing would result in considerable currency exposure given the domestic nature of their operations. At the same time, a few Indian financial institutions need dollar financing for their international operations, but do not have access to the low cost financing of their Indian colleagues; they can, however, readily obtain rupee financing. A swap of dollars and rupees provides an ideal solution to the circumstances and a small rupee/dollar swap market has developed to deal with this situation. Chile has developed a similar market under similar circumstances. These swaps can also be called back-to-back loans, a term that underlines the customized nature of the transaction. With inactive long-term forward markets in India (and Chile), no Indian financial intermediary would be able to sell its customer a (rupee/dollar) swap without the ability to cover its own resulting currency exposure. By teaming up offsetting transactions, however, the intermediary has no resulting exposure. In developed countries, such a pairing of offsetting exposures is made easier by a wholesale market for swaps, which is why the international swap markets have flourished so much.

Translation Exposure

For companies that have overseas operating subsidiaries there is another type of exchange risk that is often overlooked: translation exposure. Parent companies must consolidate the accounts and operating results of foreign subsidiaries into their own accounting records. When subsidiary records are maintained in a foreign currency, the consolidation also must include translation into the parent’s home currency. Although translations normally do not produce taxable gains/losses, nor do they result in any actual cash flows, parent company management often holds subsidiary management responsible for them and, as a result, subsidiary management often are concerned with managing this exposure as well. So far, translation exposure has played only a limited role among developing country firms, but this is beginning to change. More developing country firms are beginning to establish their own foreign subsidiaries and with these come translation problems. At least one developing country, Chile, has recognized the problem and permits companies that are major exporters to keep their accounts and pay their taxes in dollars, thereby eliminating translation exposure completely. The methods used to manage translation exposure do not differ substantially from those used for transaction exposure management.

Interest Rate Exposure

Variability in interest rates can have devastating consequences for financial and nonfinancial companies alike. As noted in the introduction, financial institutions in particular can be harmed by interest rate movements if the assets and liabilities on their balance sheets do not have matching maturity and interest rate profiles. But manufacturing companies, too, frequently suffer from interest rate movements, especially in developing countries where short-term funding is often relied upon to finance capital investments. Fortunately, the risk management revolution has made tremendous inroads in the area of interest rate management. For short-term exposures a number of instruments have been developed, including interest rate futures, forward rate agreements and various option type derivatives. For longer-term exposures, interest rate swaps have achieved great popularity.
Exchange-traded Contracts

The international futures markets trade standardized contracts that some developing country firms (and central banks) have found useful in managing interest rate risk. This is especially true in Chile, where the central bank has developed an extensive program for managing the cost of the country’s sovereign debt through the use of futures contracts. For corporations, the standardized contracts sold on exchanges may have less appeal than forward rate agreements and, equally important, they may be less accessible owing to either perceptions at the exchange about the creditworthiness of the company or prohibitions on the use of futures by the central bank. Regardless, futures have been used by developing country firms, as exemplified by a Chilean pulp producer that has long-term floating rate dollar debt, but is uneasy about not knowing its quarterly interest rate payments. Interest rate futures provide the company with a relatively low cost method for locking in its interest rate on a quarterly basis, which makes cash management much easier and should permit the company to hold a lower level of cash balances.

Forward Rate Agreements

Forward rate agreements (FRAs) are the interest rate equivalent to a futures contract, but FRAs are customized by banks to meet the needs of individual clients. For that reason they are popular and the international market for FRAs is large and liquid. As with futures contracts, FRAs are available only for shorter maturities; contracts up to six months are most common, but longer terms are available. For developing country firms FRAs often have advantages over futures contracts. First, they are customized so that the maturity and amount can be written to correspond more closely to the underlying exposure. And, second, they are arranged with a local bank, which means that creditworthiness can be more easily proven than is the case with a distant exchange. An example of an FRA in a developing country context is an Indian shipping company that borrowed floating rate yen in order to finance a capital investment. With international shipping revenues, the company is not worried about currency risk, but expected increases in interest rates would eat into profits. To avoid this, the company recently signed an eighteen month FRA that fixes the interest rate on the outstanding yen debt for the duration of the FRA. The FRA was made with the local subsidiary of an international bank and required the approval of the central bank. The FRA market is sufficiently liquid that, even at eighteen months maturity, the FRA provided better terms than a short-term interest rate swap, which would have accomplished the same thing.

Interest Rate Swaps

For companies that access international financial markets, use of medium-term floating rate debt has become widespread and is used more frequently than fixed-rate debt because the terms are generally better. But it also exposes firms to interest rate risk. The primary method for managing medium-term interest rate exposure (in international currencies) in developing countries is with interest rate swaps. With the decrease in dollar interest rates that occurred in recent months, interest rate swaps have served another useful purpose; many developing country companies have locked in lower financing costs by swapping their floating rate debt into fixed rate debt. In some cases, these have also been combined with currency swaps in order to eliminate a currency exposure.

An example of medium-term interest rate management in a developing country is given by an Indonesian textile manufacturer that financed a recent investment with floating rate Swiss franc bonds. With export revenues denominated in dollars, however, Swiss franc currency exposure was unacceptable. Moreover, decreases in fixed interest rates on dollars made the prospect of locking in a low dollar rate
appealing. The broad range of derivative securities available these days made eliminating the exposures easy to accomplish, but required complicated decisions by management. The company was presented with an array of instruments for dealing with the situation, including a currency swap (SF/$) and a list of interest rate instruments: caps, collars and swaps. Ultimately, the interest rate swap proved to be the most attractive, but the company was forced to examine closely not only its exposure to both interest rate and currency movements, but also its philosophy on the amount of risk that it is willing to bear. As mentioned earlier, many of the derivative securities remove all risk, which includes any possible gains from positive movements in variables. Other instruments allow participation in positive movements, but at a cost. More and more, similar risk management decisions are being faced by developing country firms as access to derivative securities improves.

**Commodity Price Risk**

The volatility displayed by commodities can destroy a firm's competitiveness through both the cost of its inputs and the price of its outputs. Consider a Central American nickel mining company which started operations in 1979 just as the second oil shock occurred. Unfortunately, the refining process for the firm's ore is relatively energy-intensive compared to many other producers. This increase in energy costs, combined with a drop in the world market price for nickel in the 1980s, forced the firm to mothball its operations. To date, the firm has been unable to restart operations and the original investment is nearly a total loss.

It is therefore no wonder that management of commodity price risk has a history even older than that of exchange risk management. Long before floating exchange rates made forward contracts important, futures contracts on rice, corn and other agricultural commodities were traded on organized exchanges like those in Japan, the U.K. and the U.S.. Those exchanges still flourish and, in addition to the traditional grain contracts, provide futures contracts for other agricultural products, metals, and petroleum products. Some developing country commodity traders have learned to use these organized futures markets to manage their exposure. In many other countries, central bank regulations prohibit use of international futures markets.

A soybean trader in Brazil and a silver producer in Mexico are among those who have established U.S. subsidiaries in order to hedge their exposure to commodity price movements using the U.S. futures markets. Some of the emerging Eastern European companies have started similar subsidiaries in the U.K. in order to trade on the commodities markets there. Using a subsidiary facilitates trading and provides easier access to the markets. Other developing country commodity producers/traders with lower levels of exposure do not need the services that a foreign subsidiary can provide and gain access to the futures markets through international brokers.

Commodity processors also have learned to use markets to manage price risk, as illustrated by the example of an Latin American oilseed crusher. Crushing oilseeds exposes the processor to movements in three prices: seeds, oil and (the byproduct) meal. The objective is to fix the price of all three in order to guarantee the crushing margin received. This can be done thanks to the existence of forward markets for both edible oils and meal. In order to ensure that seeds will be available, crushers make agreements with producers for future delivery, but with the price determined at the time of delivery. When the seeds are received, crushers can calculate their crushing margin on the basis of the forward price for oil and meal. If positive, the oil and meal will be sold forward and a margin locked in. If the margin is negative, the seeds are resold at the spot price without a loss.
Managing price risk on specific transactions through forward or futures markets reduces the risk associated with that particular transaction, but even the most efficient producers of commodities can have their profitability compromised by high financing costs combined with low commodity prices. Recent developments in the financial markets have extended the range of derivative securities to allow financing costs to be linked to commodity prices. This commodity-linked financing has evolved rapidly in recent years, with more effective instruments being developed to meet the needs of producers.

Commodity-linked finance can be as simple as tying the interest rate on a loan to the price of the commodity produced (or consumed). In the mid 1980s, a Zambian cotton grower expanded its operations with a loan whose interest rate was linked to the international price of cotton. This arrangement turned the loan into a quasi-equity instrument that protected the grower from downturns in cotton prices, but rewarded the lender with a higher return in situations where cotton prices were high. In a related risk management instrument, a Brazilian mining company negotiated an agreement with the local power authorities to link the price of electricity to the price of their product. Such risk sharing lowers the riskiness of a loan and can make financing easier to locate.

From that very simple beginning, risk management instruments quickly evolved into more sophisticated arrangements. Commodity swaps represent another innovation in commodity price risk management that has gained attention in developing countries. Perhaps the first developing country deal to involve a commodity swap was entered into by a Mexican copper producer in 1989 and involved a combination of an international loan, a copper sales agreement, and a copper swap, all arranged simultaneously. The Mexicans borrowed dollars from a consortium of international banks at a fixed interest rate and in order to ensure repayment of the loan, two additional transactions were entered into: a copper sales agreement for the life of the loan, and a copper swap. The sales agreement promised delivery of a fixed amount of copper at the future spot market price which would, of course, fluctuate over time. The copper swap converted the market-priced sales into fixed-priced sales, thereby guaranteeing that delivery of the copper would generate sufficient revenues to repay the debt. By arranging all three of these transactions simultaneously, the Mexicans were guaranteed more than adequate cash flows to repay the loan, which allowed them to borrow more than otherwise would have been possible, and they also received better terms. Of course, the lenders still face the risk that the company will be unable to produce enough copper to satisfy the sales agreement, but production risk is much easier for management to handle than is the risk of future price movements, and the sales agreement covers only about one fourth of the company’s historical level of production.

The first Mexican deal was sufficiently successful that the company entered into a very similar transaction for a like amount, but with different financial intermediaries, one year later. By this time, however, the markets had progressed sufficiently that the complexity of the deal was reduced substantially. In the second deal there were only two transactions: a secured loan and an associated hedging program that included a commodity swap, no sales agreement was needed. Both deals represented substantial breakthroughs in developing country finance; the 1989 deal was the first private sector corporate loan to Mexico following the country’s default on its international debt in 1982.

In both of the Mexican deals and the Zambian cotton loan, the net effect was to link repayment ability with ability to produce a commodity, thereby eliminating commodity price risk. Recently, commodity-linked financing has taken another step in this direction by introducing commodity loans where loan repayment is made in (the currency equivalent of) a fixed amount of a commodity. The net result is similar to the Mexican deals, but less complicated. A West African gold mining company took advantage of this innovation when it was searching for financing for a major expansion of its activities.
Excellent past operating results and high quality ore made the expansion a very reasonable proposition and conventional financing was available, but the company was wary of the effects of gold price movements on future profitability given the high level of investment required. This price risk was managed through gold-based financing; the company in effect borrowed gold and then will repay the loan with gold from its production. Of course, while the loan is denominated in gold, all transactions actually take place in the dollar equivalent (at the current market price) so that physical delivery is not a problem. This reduces the company's exposure to production risk alone; as long as the company produces the requisite amount of gold, it can repay the loan.

All of these commodity-linked deals represent important milestone for developing country commodity producers. They have led the way toward the use of many different types of commodity-linked financing agreements that allow commodity producers to locate international funding more easily and at lower cost. But these deals are by no means routine. They are complicated and require a close relationship with the financial institutions involved. Regardless, their use has grown and it is estimated that some $50 billion in commodity-linked financial transactions have been entered into by developing country borrowers in the last four or five years. More can be expected in the future.

Nonfinancial methods for managing commodity price risk are commonly used in developing countries as well. In sectors where operating costs are directly related to petroleum costs, sales agreements often allow sellers to pass price increases in the petroleum-based inputs on to buyers. Examples include the fuel costs of a shipping company, or the feedstock costs for a petrochemicals producer. Other users of commodities enjoy a similar advantage in the market, but sometimes in a more indirect manner. A Mexican company produces wire harnesses for the international automotive industry. A major part of its cost is copper wire, whose price fluctuates with the international price of copper. While cost increases may not be built into the company's sales agreements, all producers face the same input prices and so output prices adjust over time to reflect copper price movements. Thus, market conditions allow most of the price risk to be shifted on to consumers.

\footnote{Institutional Investor, February, 1992.}
V. Managing Economic Exposure

Economic Exposure and Real Exchange Rates

Most firms engaging in foreign trade or using foreign currency financing readily understand the effects of exchange risk. But longer term economic exposure to real exchange rate movements is less fully appreciated. In the long run, movements in the real exchange rate can affect the ability of firms to compete against both foreign and domestic companies. Whether that competition occurs in a company’s home market or abroad, real long term over- or under-valuations of a currency can have important effects on a company’s cash flows and profitability.

The concept of the real exchange rate is related to the idea that the exchange rate, which is the price of one currency in terms of another, should reflect the purchasing power of the two currencies. In practice, this means that if rates of inflation in two countries differ, the nominal exchange rate must adjust to offset the inflation differential. Many governments have chosen at one time or another to fix their exchange rates, at least for the short term, in order to bring “stability” to the markets or in an attempt to bring inflation down by making imports cheaper. But when inflation is higher, or lower, than its trading partners’, fixing an exchange rate leads to an over- or under-valuation of the currency in real (or purchasing power) terms.4

Long term changes in the real exchange rate have two distinct and important effects on companies. First, they have a conversion effect: the value in local purchasing power of a company’s foreign currency cash flows will be increased or decreased by changes in the real exchange rate. To the extent that a currency depreciates in real terms, its foreign currency receivables will increase in real terms; an appreciation will have the opposite effect. It is worth noting that real exchange rates can fluctuate even though nominal exchange rates remain fixed; and further, that the conversion effect involves a company’s set of future cash flows, not just past transactions involving foreign currency.

The second effect, called the competitive effect, addresses the implications of real exchange rate changes on the ability of firms to compete. If a company operates in international markets, then movements in the real exchange rate have an impact on company costs relative to those of its competitors. For example, real depreciations of a company’s home currency reduce its costs relative to those of companies operating abroad, thereby making the company more competitive. For companies that operate only in their local markets, real exchange rates can have similar effects. To the extent that inputs are imported or competitors manufacture abroad, a company’s competitiveness will be affected. In even more subtle cases of real exchange exposure, companies that have no apparent exposure may be indirectly affected by real exchange rate changes. For example, an overvaluation of the local currency may force a general economic slowdown that hurts purely domestic operators. Alternatively, an undervaluation may induce a large influx of foreign tourists, thereby increasing demand for services that are apparently immune to nominal exchange rate changes.

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4Managing nominal exchange rates is a complex topic beyond the scope of this paper. Fundamentally, consistency between fiscal policy (the size of the deficit and thus of the inflation tax) and exchange rate policy is vital. The “tablita” or crawling peg policies followed by a number of Latin American and other countries in the late 1970s and 1980s attempted to link nominal exchange rate changes and inflation differentials, sometimes leading to unanticipated and undesired expectations effects. This paper looks at the real exchange rate purely from a firm’s point-of-view.

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An example of the variability of exchange rates and the relationship between real and nominal exchange rates is displayed in Figure 1, which presents exchange rate indices for Cameroon. The indices are constructed to reflect the set of trade partners of the country; a rise in either index represents an appreciation of the currency.\footnote{Being part of the CFA zone, Cameroon has a fixed exchange rate vis-a-vis the French franc, but thereby floats against all other currencies. The real and nominal exchange rates shown are effective rates based on trade weights.}

![Cameroon Exchange Rates](image)

**Figure 1**

As shown in the figure, the nominal exchange rate has varied significantly, leading to exchange risk. There has also been substantial movement in the real exchange rate, giving rise to economic exposure. The figure illustrates that changes in real and nominal exchange rates can differ substantially over time. Despite the nominal depreciation of the CFA franc between 1980 and 1991, the real exchange rate had appreciated substantially over the same period.

**Examples of Economic Exposure**

A textile manufacturer in francophone West Africa sells its products both domestically and in Europe. With the CFA franc tied to the French franc there is little transaction exposure from its exports to the European Economic Community and, of course, none from its domestic sales. The company’s history, however, reveals a substantial economic exposure. Over the years, the CFA franc has appreciated in real terms relative to its neighbors. The result is that competitors from English-speaking West Africa have captured local market share, despite the presence of import barriers. Moreover, the company’s export market share has also been damaged owing to the depreciation of the dollar against the ECU, which has permitted Asian competitors (whose currencies are more closely linked to the dollar) to underprice the company. Thus, even with little to no transaction exposure, the firm is now
experiencing exchange rate effects that threaten its survival.

The example underlines the main point in economic exposure: it is not the currency composition of a firm’s costs/revenues that is the center of attention; what matters is how that composition compares with the currency composition of competitors. Thus, a company whose product has neither competition nor substitutes will be largely immune from exchange rate effects. In contrast, manufacturers who compete with goods produced in other countries will often have to worry about the effects of exchange rate changes on their relative cost structure and, consequently, their market share and revenue stream. This point is also illustrated by the following example.

A Costa Rican banana grower exports most of its product to the U.S. market. Its exposure is apparently to the dollar/colon exchange rate. But if the company’s main competitor is in Ecuador, then movements in the dollar/sucre will have as important an effect on the competitiveness of the Costa Rican firm as direct movements in the dollar/colon. With economic exposure, it is competition that matters most, not the currency in which transactions are denominated.

Unfortunately, there is no easy way to measure economic exposure. Academicians have advocated a statistical approach that involves calculating the correlation between cashflows and exchange rates. But that approach has both theoretical and practical drawbacks. Few firms have a sufficiently long history to allow them to calculate with any precision the historical relation desired; and, second, even if one is able to calculate the historical relationship, the future may differ from the past. Appendix 2 outlines the fundamentals of the statistical approach to economic exposure measurement.

An alternative approach consists of three parts. First, a firm must know its costs and how these are affected by exchange rate changes. Second, firms must also understand the cost structures of their competitors and how those can be influenced by currency factors. Third, firms must know how market demand will respond to price movements; what is the effect of a price increase on quantity demanded? In sum, the object is to know the markets and how a firm’s own and its competitor’s costs are affected by exchange rate movements. There is no magic formula for this; and unlike exchange risk, it requires inputs from all members of the management team, not just the finance wizards.

Managing Economic Exposure

Economic exposure arises from all aspects of a firm’s activities. Managing that exposure, therefore, requires the attention of not only financial management, but of operations, procurement, marketing and planning personnel as well.

Financing decisions play an important role in economic exposure management. Sources of project finance in developing countries are often in short supply, forcing firms to choose foreign currency denominated financing. That choice affects the firm’s economic exposure and should therefore be made judiciously as illustrated in the following example.

A Tunisian manufacturer of ceramics wants to expand its operations, with the increased output being used both locally and exported to Europe. With no medium-term financing available locally, management is considering funding with either dollars or deutsche marks. Market conditions are such that the dollar funding has a substantially lower interest rate. On the other hand, the export revenues will be in European currencies which are closely linked to the DM. Funding in dollars introduces an economic (and transaction) exposure that the firm decided against. Despite the appeal of a lower interest
rate, if the dollar appreciates against the European currencies, the effective cost to the Tunisian firm could eventually exceed the cost of DM funding.

**Production management** also plays an important role in economic exposure management. Through the choice of technology and the manner in which it is put to work, production management determines most of a firm's operating costs. As economic exposure reflects competitiveness, efforts by production management to reduce costs will also reduce economic exposure, and the relationship between efficiency and economic exposure should not be underestimated. Most of the firms interviewed for this study, even those who have access to sophisticated financial instruments, stressed that controlling costs through efficient production management is their primary means of economic exposure management. The following example illustrates.

Production management often requires an evaluation of the tradeoff between labor and capital. As labor costs rise, more capital may be needed in order to maintain competitiveness. A Chilean copper producer faced the labor/capital decision when expanding its operations recently. Labor has historically been relatively inexpensive in Chile, but relying on a continuation of low wages is risky and, moreover, if the Chilean peso were to appreciate against other currencies, a labor intensive production process would be at a disadvantage. Management chose instead to employ a state-of-the-art capital-intensive production process. This reduced the project's exchange rate exposure substantially. In retrospect, this production decision was the correct one. Both labor rates and exchange rates moved against the company, but the effects were minimized by the choice of production technology.

Production efficiency may not remove a company's economic exposure, but it may be the only response available to developing company firms. The Egyptian firm used in an earlier example illustrates this point well. With Japanese equipment and yen financing, the company was able to bring its plant on line under (dollar) cost projections. But once operations began, movements in the yen/dollar exchange rate made the burden of yen interest expenses overwhelming, given that revenues were all in dollars. For nearly three years the company was forced to accept this mismatch because the international swap markets were effectively closed to them. This meant that it was up to production management to keep the company afloat, which it did by making the company one of the most efficient in the industry. Production was pushed to more than 10% over the estimated nominal capacity of the plant. Equally important, product costs were reduced by more than 40% from the projected costs through more efficient use of raw materials, lower use of energy and reductions in staffing. Quality was maintained at international levels. In the end, even though the firm's economic exposure was largely due to its financing decisions, operating efficiency allowed the company to maintain its profitability. Ultimately, a currency swap reduced the company's exposure to further appreciation of the yen.

**Procurement decisions** also allow a firm to control its operating costs in the face of currency realignments. This can be done through the use of three methods. First, procurement may be conducted in the same currency as a firm's revenues, a practice that may require that suppliers absorb the exchange risk. Second, whenever possible, long-term purchase agreements can fix a firm's costs, at least in the short term, thereby insulating them from short-term exchange rate effects. And third, in recognition of exchange rate effects on supply costs, management may continuously seek new suppliers whose cost structure will help to reduce exchange exposure; this may require shifting to offshore suppliers whose cost structure more closely resembles the firm's revenue flows, or who are most competitive given the exchange rate.

**Marketing** personnel can play an important role both in identifying a firm's exposure, as well as
in developing and implementing an appropriate response. First, it is their responsibility to understand the markets in which a firm operates, and this understanding is a critical part of evaluating the firm’s exposure. Of all the management functions, the marketers should best be able to evaluate the likely effects of exchange rate movements on prices, sales volume and market share. Second, marketing decisions can affect the firm’s operating costs, both directly and indirectly. By adjusting the product mix and moving up market with higher value-added products, for example, marketing decisions can directly affect both operating costs and margins. Indirectly, these same decisions also have a cost effect; through price, promotion and credit policies, marketing decisions can influence the overall volume of sales, which affects the economies of scale achieved and the marginal cost of a product. Making the marketing personnel aware of the important role they play and requiring that they plan for exchange rate effects will improve their response time and allow more in-depth analysis than what might otherwise be possible.

A Sri Lankan manufacturing company illustrates the importance of marketing management in combating the effects of real exchange rate movements. Following substantial domestic inflation the rupee appreciated by 30 percent in real terms over a period of three years. The effect on the firm’s competitiveness was substantial, but the marketing team made important progress in offsetting the exchange rate effects. The firm introduced several new products directed at different industries. Prices were kept in line through cost cutting measures. As a result, the firm was able to increase its market share by 25 percent over the last two years. Without this improvement, the real appreciation of the rupee would have strangled the company.

Corporate planning processes also play a significant role in managing a firm’s economic exposure. Incorporating exposure management into the investment decision process is the primary example. Corporate investment programs can diversify away much of a firm’s economic exposure by investing in foreign countries in order to diversify direct effects of currency movements or by directing investment into new products/sectors which are affected differently by currency movements. Both approaches are observed in developing countries.

For example, some Mexican companies have recently begun to diversify their production facilities geographically through the purchase of foreign subsidiaries in industrial countries. Similarly, some Chilean companies have begun to make investments in Argentina following the liberalization that has occurred there, as have some Venezuelan firms invested in Colombia. In Southeast Asia there has been movement to invest across borders as well. Economic exposure management is not necessarily the primary motivation for such cross-border investments. But management is normally aware of the exchange rate implications of these investments and appreciate the exposure reduction that they provide.

Another phenomenon frequently observed in developing countries is cross-industry diversification. Conglomerates are not uncommon, sometimes arising owing to constraints imposed by the government, at other times, to the interests of management. In either case, diversification across sectors, similar to investment across borders, reduces exposure to currency movements and other types of risk. Such reductions may have been secondary in importance at the time an investment decision was made, but the exposure management effects are real and long lasting.

To summarize, economic exposure to currency movements is difficult to measure, can strike firms which do not expect it, and requires a reaction from management in operational, as well as support departments. At the risk of oversimplification, the best defense against its effects is a careful matching of currency denominations on cash inflows and outflows, as well as constant attention to efficiency.
VI. Conclusions

The globalization of trade and finance markets means that developing country firms are less and less insulated from the volatility that has become a routine part of doing business. Failure to manage the ensuing risks can have disastrous consequences, wiping out the net worth of companies and leading to bankruptcy. Spurred by this recognition and the fruits of bitter experience, developing country firms and financial institutions are turning increasingly to the risk management instruments developed in New York, London, Paris, Singapore and other financial centers. Indigenous markets for trading commodity and stock-index based contracts have also developed.

The experience of developing country firms shows that the mystery surrounding derivative securities is rapidly fading and that firms are becoming quite adept at managing risk. As soon as governments and economic circumstances permit, local markets for hedging instruments develop and, when those are inadequate, access to international markets is sought. Although developing country firm access to some of the more sophisticated financial instruments is limited, indications are that this will change for the better as economic and financial liberalization proceed.
Appendices

Appendix 1 - The Building Blocks of Financial Risk Management

Despite the advent of a multitude of new financial instruments in recent years, most of these innovations are based on combinations of two basic instruments: forward contracts and options. This section provides a brief introduction to the use of forward and option contracts and describes how they can be combined to produce more exotic instruments. The examples will illustrate the use of the instruments for managing foreign exchange exposure; application of the instruments to other risks is straightforward.

Consider an account receivable denominated in foreign currency, for example the Mexican peso. If that receivable is not due for thirty days, then its US dollar value will depend on the exchange rate prevailing at the time it is received. Graphically, the future receipt can be presented as in Figure 1.

![Figure 2](image)

Figure 2

One of the simplest methods for eliminating the relationship between future exchange rates and proceeds from foreign exchange denominated receivables is through the use of forward contracts. These contracts permit parties to fix in advance the exchange rate at which a future transaction will take place. Readily available from commercial banks in developed countries for terms of up to one year and beyond, these contracts have become the standard form of hedging exchange rate risk for many types of transactions. With a forward contract, the dollar payment received from a foreign currency denominated receivable will appear as in Figure 2.

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Note that the forward contract provides a perfect hedge against future exchange rate movements. A transaction covered with a forward contract will always return cashflows at the forward exchange rate (100 in the figure), whereas the cashflows on transactions not covered will vary one for one with the future spot exchange rate.

The pricing of forward contracts in the markets of developed countries is easy; arbitrage possibilities prevent a forward rate that differs from the rate suggested by interest rate parity. That is, the difference between a spot and forward exchange rate will equal the difference between a domestic and foreign interest rate. In developing countries this relationship is broken to some extent due to the lack of arbitrage opportunities between local and foreign currency denominated deposits. Regardless, interest rate parity still provides the fundamental determinant for forward exchange rates.

Forward contracts have been around for years. More recently, however, financial engineers developed a new instrument, the swap, which has gained widespread popularity. Swaps involve an agreement between two parties to exchange a series of cash flows over a period of time. This sounds quite complicated, however, closer inspection reveals that a swap is nothing more than a series of forward contracts.

Forward contracts are perfect for situations where no risk bearing is acceptable, but they do have limitations. Gains and losses on them must be reported in a company’s financial statements and, perhaps even more importantly, they allow no room for judgement on the part of management. In some circumstances, management may be willing to hold some of its foreign exchange risk in return for the possibility of profits when exchange rates move in their favor. In such circumstances, foreign currency options are appropriate.

Foreign currency options are available both over the counter from commercial banks, as well as from organized options exchanges in Philadelphia and London. While available only in a few developing countries for local currencies, future financial market development in the emerging markets should result in the introduction of options to those markets as well.
Options come in two types: puts and calls. A put is a contract that gives the buyer the right, but not the obligation, to sell the underlying currency at the specified exchange rate (the strike price) up to (or at) a specified future date. Calls are similarly defined, but give the right to buy the underlying currency. This definition points out the differences between option and forward contracts.

First, options must be bought (or sold). For both types of contracts there are two parties involved, but forward contracts involve no exchange of payment at the time the contract is entered into. By comparison, every option contract involves a buyer and a seller, with the buyer paying the seller a premium for the option contract. The magnitude of the premium will depend on the relationship between the current exchange rate and the strike price, as well as the perceived distribution of the future exchange rate.

Second, the buyer of an option contract has the right to exercise the option up to (if it is an American option) or at (if it is an European option) the expiration date. Unlike forward contracts, no obligation is entailed so that the buyer can take advantage of favorable movements in the exchange rate, but is protected against unfavorable movements.

Consider first the use of a put option to hedge a foreign currency denominated receivable. Because a put gives the buyer the right to sell the foreign currency, buying a put option is an ideal instrument for a receivable. The profit obtained from purchasing a put is presented in the following graph.

![Graph](attachment://put_option_graph.png)

**Figure 4**

Profits from the purchase of a put option depend on both the strike price, in this case $95, and the premium, in this case $0.2. The graph illustrate a peculiar feature of options: they divide the set of future exchange rates into two groups, those where the option produces a profit and those where it produces a loss (equal to the cost of the premium). The strike price (more or less) determines the dividing line between those two regions. As a result, investors in options have an opportunity to profit from favorable movements in the exchange rate through the use of options. Combining the purchase of
a put option with the foreign currency receivable produces the dollar cash flows illustrated in the following graph.

Purchase of the put option established a floor on the value of the foreign currency receivable without giving up gains that can be obtained when the dollar depreciates. But this upside potential is not free, as a premium was paid in order to purchase the option. The premium shows up in the right side of the graph as the vertical distance between the two lines representing the spot rate and the option strategy.

Call options can also be used with foreign currency denominated receivables, but because they bestow the right to buy a foreign currency, are more commonly used for foreign currency denominated payables. In the case of a receivable, the call must be sold, not purchased. The profits obtained from the sale of a call option—strike price=105, premium=0.2—is presented in the following graph.
As with the put strategy, selling a call option partitions all future exchange rates into two sets: those where the call produces a profit equal to the premium and those where the call produces a loss. Combining the sale of a call together with the long position in the foreign currency produces the dollar cash flows presented in the following graph.

Under most normal circumstances a company would not want to use the sale of a call option to hedge a foreign currency receivable due to the nature of the instrument's profit structure. In this case the call limits the upside potential of the foreign currency, but allows unlimited downside potential. Nonetheless, over a substantial range of future exchange rate values, the call does produce a profit from
the receipt of its premium and this cash flow can be useful in reducing the cost of hedging, as we will see in the next example. More commonly, call options are used in order to cover foreign currency denominated payables where a ceiling on the local currency cost is desired.

One interesting aspect of option contracts is the many ways in which they can be combined in order to synthesize hedging instruments that meet a variety of needs. One important example of this is the "collar", which combines a put and a call. In the case of a foreign currency denominated receivable, the appropriate collar would be built by buying a put and selling a call. The strike price of each can be varied in order to reduce or increase the amount of risk carried and to influence the net cost of the collar. The proceeds from a foreign currency denominated receivable combined with a collar is presented in the following graph.

![Foreign Exchange Rate Collar](image)

Figure 8

This appendix has presented an introduction to the use of the building blocks of derivative securities: forwards and options. While quite simple when used separately, they can be combined into a wide array of useful risk management instruments. Indeed, it is on the basis of these two building blocks that the entire risk management revolution of the 1980s occurred.
Appendix 2 - Measuring Economic Exposure

One way to determine a firm's exposure to real exchange rates is to look at the firm's historical cash flows and then to measure the statistical relationship between those cash flows and the exchange rate. If the change in the firm's cash flows for any period \( t \) are represented by the variable \( CF_t \) and the change in the exchange rate at the same time is represented by the variable \( e_t \), then the exposure of the firm's cash flows to exchange rates can be measured by the ordinary least squares regression equation:

The regression coefficient, \( \beta \), measures the exposure of the firm's period \( t \) cash flows to exchange rates

\[
CF_t = \alpha + \beta e_t + \epsilon_t
\]

at time \( t \). To the extent \( \beta \) differs from zero, the firm has an exchange rate exposure. If the measured coefficient is equal to, for example, one, then each one percent change in the exchange rate will induce a similar change in the firm's cash flows.

This approach to exposure measurement has one serious flaw: markets for goods do not necessarily respond quickly to changes in financial variables. It may be that a firm's cash flows are very sensitive to exchange rate changes, but the effect takes some time to appear. The regression equation above restricts the effect to contemporaneous effects. In reality lagged effects may also be important. This is easily remedied through the use of a more general regression equation of the following form:

In this case the exchange rate effect is allowed to influence cash flows with a lag of up to \( n \) periods.

\[
CF_t = \alpha + \beta_1 e_t + \beta_2 e_{t-1} + \ldots + \beta_n e_{t-n} + \epsilon_t
\]

Through judicious choice of \( n \), any exchange rate effect is sure to be captured.
### IFC: FINANCIAL RISK MANAGEMENT

**FY90-FY93**

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*The actual aggregate amount to be hedged under the facility will depend on the types of transactions that are executed.*

*USD equivalent of guarantee for aggregate principal swap amount and annual fees.*
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Tokyo
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Chiyoda-ku
Tokyo 100, Japan

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