
Lessons in Structuring Derivatives Exchanges

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The global deregulation of financial markets has created new investment opportunities, which in turn require the development of new instruments to deal with the increased risks. Institutional investors who are actively engaged in industrial and emerging markets need to hedge their risks from these cross-border transactions. Agents in liberalized market economies who are exposed to volatile commodity price and interest rate changes require appropriate hedging products to deal with them. And the economic expansion in emerging economies demands that corporations find better ways to manage financial and commodity risks. The instruments that allow market participants to manage risk are known as derivatives because they represent contracts whose payoff at expiration is determined by the price of the underlying asset—a currency, an interest rate, a commodity, or a stock. Derivatives are traded in organized exchanges or over the counter by derivatives dealers.

Since the mid-1980s the number of derivatives exchanges operating in both industrial and emerging-market economies has increased substantially. What benefits do these exchanges provide to investors and to the home country? Are they a good idea? Emerging markets can capture important benefits, including the ability to transfer risks, enhance public information, and lower transaction costs, but the success of a derivatives exchange depends on the soundness of the foundations on which it is built, the structure that is adopted, and the products that are traded.

Since the mid-1970s interest and exchange rates and prices of primary commodities have fluctuated widely. Major exchange rates—both nominal and real—have varied since the move to the floating-rate system in 1973. Commodity prices have been even more volatile, with large shifts in supply and demand for individual commodities. Unanticipated changes in exchange rates, interest rates, and commodity prices introduce risks that cannot be ignored.

Financial price risk has important implications for both the private and public sectors. Price fluctuations not only affect business profits but can also affect a firm's

survival (Smith, Smithson, and Wilford 1990). Changes in exchange rates intensify competition from other countries. Commodity price fluctuations result in changes in input prices and costs. Similarly, changes in interest rates can lead to financial distress as borrowing costs increase. Governments are also affected by volatile markets, particularly in developing countries, where commodities exports account for a large share of total exports, affecting tax revenues. Moreover, a significant part of the external debt of developing countries carries variable interest rates and often is denominated in currencies that do not match the currency composition of their exports.

During the 1980s and 1990s financial markets responded to price volatility by introducing a vast range of instruments for managing price risks.¹ These instruments, which are called derivatives, represent contracts whose payoff at expiration is determined by the price of the underlying asset (a specific currency, interest rate, commodity, stock price, or stock price index). Examples of derivatives include forward, futures, and option contracts, and swaps (see the definitions in the appendix). Derivatives are traded both in organized exchanges and over the counter (OTC) by derivatives dealers. Approximately 75 derivatives exchanges are in operation worldwide, most of them in industrial countries, although a growing number of emerging economies plan to establish their own derivatives exchanges. The enormous levels of global trading for both exchange-traded and over-the-counter products (Abken 1994; Beckett 1993; Remolona 1992; Stout 1996) have attracted the attention of academic literature and the popular press, but relatively little has been published about the internal organization and structure of derivatives exchanges.

A derivatives exchange can be defined as a trading forum or a system that links a central marketplace (such as a trading floor or an electronic trading system), where all those with buying and selling interests in a product designed to permit the shifting of risk can meet, with a mechanism (such as a clearinghouse) for intermediating, validating, and enhancing the credit of anonymous counterparts. Elements of exchange design accordingly need to address issues related to the facilitation of trades and the reduction of credit risk in transactions among market participants.

The primary function of a derivatives exchange is to facilitate the transfer of risk among economic agents by offering mechanisms for liquidity and price discovery. *Liquidity* refers to the ability to buy and sell large volumes of derivatives contracts in a relatively short period of time without affecting prices. If risks are to be transferred efficiently, there must be a large number of agents ready to buy or sell. In other words, there must be agents who desire to reduce risk (that is, to obtain price insurance) and agents who want to accept risk (that is, to provide price insurance). The exchange brings together a large number of participants, making quick transactions at high volumes feasible. *Price discovery* refers to the establishment of a price for an asset. The exchange collects and provides immediate information regarding the price of an asset as traders continuously offer to buy or sell. Participants outside the exchange can easily obtain this information and find what the price for the asset is at any moment.

A critical element in the efficient transfer of risk among market participants is the microstructure of the derivatives exchange, which includes regulatory oversight, trading systems, settlement and clearing procedures, membership of the exchange, ownership of the clearinghouse, and products traded. An examination of the microstructure of derivatives exchanges around the world could yield recommendations for improvements in exchanges, as well as data for analyzing the relationships and linkages between critical exchange parameters and the broad economic environment.

In a well-designed derivatives exchange, resources are efficiently allocated, and risk-sharing arrangements are optimal. Merton and Bodie (1995) developed a framework that is applicable to derivatives exchanges and helps explain the institutional form of the exchange and the particular features of its microstructure. Perhaps the largest single influence has been the evolution of technology, such as communications, computer software, and electronic information systems (Chapman 1994; Stout 1996). The functions of a derivatives exchange may be performed under various organizational arrangements. For example, an American and a European derivatives exchange may have different arrangements for clearing and settling transactions, even though both exchanges may trade similar contracts.

This article provides information on key elements and characteristics of the exchange microstructure and identifies differences in organizational structure among derivatives exchanges. The information and analysis should be of particular interest to emerging economies seeking to develop a derivatives exchange.

Why Establish a Derivatives Exchange?

Economic reasons and national pride motivate the establishment of derivatives exchanges. A country's financial infrastructure is enhanced by the links among hedgers, speculators, and cash markets. A derivatives exchange can improve the allocation of resources, maintain efficient pricing and information flows, and act as a conduit for the transfer of risk within a country—and even across countries. Additionally, because derivatives exchanges make more information publicly available, credit systems and capital markets are more responsive, with uniform repayment regulations and market surveillance; transaction costs are lower; forward prices are more accurate; and resources are better allocated (Chang, Kaplan, and Knapp 1999, Peck 1985).

Derivatives allow risk-averse market participants (such as banks, farmers, processors, and traders) to offset risk among themselves or transfer it to other market participants willing to accept the risk-return ratio. In the process, derivatives attract additional participants who in turn increase the volume of transactions, thus contributing to the creation of a liquid market.

By definition, derivatives contracts traded at an exchange tend to be standardized; a clearinghouse guarantees transactions between parties, acting as buyer to all sellers

and seller to all buyers. By requiring that buyers and sellers deposit funds (margins) as security for their transactions and by adjusting these margins to reflect changes in market prices, the clearinghouse substantially reduces, or even eliminates, the performance (counterpart) risk among transacting parties.

In many emerging markets the price for an asset is difficult to determine. An active derivatives exchange plays an important role in facilitating an efficient determination of prices in the underlying cash (or spot) market by providing improved and transparent information on both current and future prices for an asset. For example, in commodity markets spot prices are often pegged to futures prices because the futures market provides excellent pricing information for the underlying product (for security markets, see Scott 1992). Prices on derivatives markets reflect anticipated supply and demand, and derivatives markets thus enhance the ability of market participants to make decisions about future production, processing, and trade.

The exchange writes the specifications for contracts traded, setting standards for grading, measurement, methods of transfer, times of delivery, and contractual obligations. The standardization makes these contracts conducive to centralized trading on an exchange. The ease with which transactions can be executed and positions opened and closed stimulates high trading volumes and higher usage than does the spot market. This ease of execution opens the exchange to almost anyone who wishes to trade, whether involved in the physical trade (spot market) or not, and contributes to reducing transaction costs.

Derivatives transactions using exchanges abroad or OTC markets can expose individual firms and financial institutions to greater risks, however. The increased exposure stems in part from the same source as the benefits: the ability to transfer risks easily means that some market participants are exposed to greater risk than would otherwise have been the case. In countries with weak accounting, auditing, and disclosure regulations, derivatives can be abused, which can potentially destabilize markets (Garber 1998).

Should emerging economies establish their own derivatives exchanges? The two key benefits from establishing a domestic derivatives exchange are improved price discovery and a higher correlation between the prices of derivatives products and cash prices. In this respect domestic derivatives markets may be more closely correlated with local cash market conditions. These benefits should be compared with the risks and benefits of using already established derivatives exchanges that are more liquid and that stress prudential regulation. Higher transaction volumes usually lower transaction costs, which can outweigh the benefit of having a derivatives contract closely associated with local market conditions. The major risks when using established exchanges are the lower correlation between exchange contract prices and local cash prices, and the risk associated with fluctuating exchange rates.

The establishment of derivatives exchanges in emerging markets requires certain preconditions, including well-functioning cash markets, a large number of traders

and speculators, a legal structure that includes a system of property rights and enforceable contracts, well-functioning credit institutions, the support of the government and policymakers, adequate financial resources (particularly for the clearinghouse), and the absence of competing derivatives products and exchanges (Leuthold 1992).

The Microstructure of Derivatives Exchanges

The success of a derivatives exchange is determined to a large extent by the soundness of the foundation on which it is built. Thus, the design of the formal structures and systems created to ensure orderly trading and execution of exchange transactions is crucial. The microstructure may become a form of competitive advantage to the degree that it motivates, facilitates, or enables price discovery and eliminates asymmetric information.

The microstructure of derivatives exchanges is important for several reasons. It provides insights into the workings of the market through an examination of the features of the exchange and of the linkages that allow a disciplined flow of orders and execution of transactions, and it plays an important role in creating and disseminating market information. Both trading activity and price determination are sensitive to institutional arrangements. Moreover, the microstructure ensures the smooth execution of transactions. Finally, market arrangements have implications for the long-term properties of derivatives contracts and the returns on underlying assets. Important elements of the microstructure include trading mechanisms, clearing arrangements, the regulatory structure, and the choice of derivatives products to be traded.

Trading Mechanisms and Clearing Arrangements

Depending on the automation and sophistication of the market, trades can be executed on the floor (open outcry) or through electronic trading (Domowitz 1995; Genotte and Leland 1994). Increasingly, electronic trading is preferred (Chang, Kaplan, and Knapp 1999; Pirrong 1994).

Clearing trades typically involves processing of transactions, including reporting to transacting parties; confirmation of trades; and matching of orders. The function of the clearinghouse is to eliminate or reduce the counterparty credit (performance) risk by standardizing and simplifying the processing of transactions. The clearinghouse matches all purchases and sales on a daily basis. After all the trades have been matched, the clearinghouse becomes the seller to all buyers and the buyer to all sellers, thereby guaranteeing the contractual obligations of each transaction. Thus, the clearinghouse provides security in transactions and absorbs settlement failures

should these occur (Hentschel and Smith 1994; Mengle 1995). The ability to absorb failures is dependent on the provisions for capitalizing the agents involved (Iben and Brotherton-Ratcliffe 1994). Exchanges can own their own clearinghouse, or the clearinghouse can be owned by other exchanges or financial institutions, such as banks.

Exchange Regulation: Monitoring, Control, and Enforcement Functions

The proliferation of derivatives exchanges is a rather recent phenomenon, and governments are uncertain about how to regulate this market. Although there are signs of some tendencies toward convergence, the variations in legal and regulatory environments and in trade and business practices, together with the availability of derivatives products and the extent of domestic involvement in them, imply that systems will vary among countries. Despite the institutional choices available, the government's main objective is to monitor the exchange's activities and to set broad parameters for its operation. Minimum standards should be in place in areas such as contract design, market surveillance, reporting and record keeping, market transparency, safeguarding customer funds and assets, ensuring the financial integrity of the trading process, and protecting customers from fraud and markets from manipulation and trading abuses. Alongside these controls, a derivatives exchange needs to develop the capability to self-regulate by monitoring trading activities, ensuring contract execution, resolving disputes, enforcing rules and sanctions, and promoting professional conduct in order to increase investors' confidence (van der Bijl 1997).

Choice of Derivatives Products to Be Traded

To a large extent, the success of a derivatives exchange will depend on the choice of products to be traded. The main categories of products are commodities, interest rates, currencies, individual stocks, and stock indexes. The usual type of derivatives for these products are futures and options, although swap contracts are starting to appear in some exchanges. The products to be traded need to have the following characteristics: a sufficiently high level of price volatility to attract hedgers or speculators; a significant amount of money at risk; a significant number of domestic market participants—and possibly buyers and sellers from abroad; a large number of producers, processors, and banks interested in using derivatives contracts (that is, enough speculators to provide additional liquidity); and a weak correlation between the price of the underlying asset and the price of the already-traded derivatives contract(s) in other exchanges (basis risk). In the case of commodities, there also needs to be homogeneity in product specification, quality, and grade. The creation of a single derivatives contract is conducive to increasing the contract's liquidity and hence its appeal to hedgers and speculators. Note that financial products (that is, interest rates, currencies, and stocks) are almost by definition homogeneous products.

Results from an International Survey

This examination of derivatives exchanges is based on data from a survey that was distributed to 75 derivatives exchanges in 29 countries—almost all the exchanges that were in operation in 1996. Forty-two major exchanges in industrial and emerging markets answered the survey. Detailed results can be found in Tsetsekos and Varangis (1998), particularly in tables 1 through 11. Our analysis relied on the stage of development of the country's capital market to separate the respondents into emerging-market and industrial-country derivatives exchanges based on the International Finance Corporation's *Emerging Stock Market Factbook* (1988–95). Under this classification, 8 of the 42 respondents are considered to be emerging derivatives exchanges.

Chronology of Contract Introduction

The first derivatives contract was an agricultural contract introduced at the Chicago Board of Trade (CBOT) in 1859. That agricultural contracts were the first derivatives reflects that sector's importance in economic development during that period. Trading in derivatives of nonprecious metals began in 1878 at the London Metal Exchange. Globalization of transactions and exchange rate volatility led to the development of currency contracts in the late 1960s. Increasing capital mobility and the development of capital markets in emerging economies promoted the development of interest rate contracts and contracts based on stocks and stock indexes. The Chicago Mercantile Exchange (CME) introduced currency derivatives in 1968 and interest rate derivatives in 1971. Shortly thereafter, the Chicago Board of Options Exchange offered equity-based derivatives. Energy indexes were introduced in 1974, stock indexes in 1978, and swaps in 1989.

Although exchanges had typically introduced derivative instruments for agricultural commodities first and more recently added interest rate, index-based, and equity derivatives products, emerging markets have typically introduced index-based and interest rate derivatives first. Index-based contracts are derivatives contracts whose underlying price is the value of an index of stocks. The U.S. indexes are the Dow Jones Industrial Average, the S&P 500, and the Nasdaq 100. Other major indexes include the Nikkei 225 index in Japan, the FTSE 100 in the United Kingdom, the DAX in Germany, and the CAC 40 in France. In terms both of total number of products traded globally in derivatives exchanges and of volumes traded, the most popular products are based on stock indexes, followed by interest-rate-based products, currencies, and, finally, agricultural commodities.

FINANCIAL DERIVATIVES PREFERRED TO COMMODITY DERIVATIVES. In view of the globalization of commodities markets and the liberalization of agricultural markets

in emerging economies, these countries' interest in establishing commodity derivatives may seem less justifiable. Several reasons, however, explain this apparent anomaly. First, the liberalization of commodities markets has increased the pass-through of international commodity prices to domestic commodities, making the use of derivatives contracts traded abroad feasible for domestic hedgers. In other words, the basis risk for using existing derivatives contracts has been declining. For example, Mexican wheat producers may now find that using the CBOT wheat futures contract is feasible for hedging Mexican wheat price risk. Thus, the need to develop a Mexican wheat contract may be reduced.

Second, financial markets are more country specific, and the demand for derivative instruments stems mainly from domestic users. Equity derivatives are based on equities in the local stock market; currency derivatives refer to the local currency relative to a foreign currency; and interest rate derivatives are based on the local bond market. More recently, institutional investors have taken an interest in these products. For example, to take a position in the local stock market, an institutional investor could purchase (or sell) futures on the equity index. If an investor wants to purchase a domestic stock but hedge that purchase against a drop that would affect stocks across the board, he could purchase a "put" option on the domestic equity index. Thus the market (country) specificity of financial instruments (stocks, bonds, and currencies) usually makes derivatives based on these instruments appear in local markets. The introduction of derivative instruments usually follows the development of domestic capital markets, but in some cases derivative instruments based on one market are traded on another. For example, the Nikkei 225 stock average is traded on the CME, while Italian and German bonds trade on the London International Financial Futures Exchange (LIFFE), and the Brazilian real trades on the CME.

Third, experience has shown that financial derivatives attract relatively higher liquidity than commodity derivatives. The Budapest Commodity Exchange experienced a dramatic increase in volume when it introduced financial derivatives contracts. In Brazil the São Paulo Commodities and Futures Exchange (BM&F) reported that the turnover of all agricultural contracts traded was about \$3.5 billion for 1996, less than 1 percent of the total value of the \$4.2 trillion contracts traded. At the CBOT and the CME, agricultural trades were less than 30 and 5 percent, respectively, of the total trading volumes of the exchanges.

TIMING OF SUCCESSIVE CONTRACT INTRODUCTION. According to survey respondents, about 36 months elapsed between the introduction of the first and second contracts, 18 months between the second and third, and 48 months between the third and fourth. The survey finds that introducing a derivatives contract takes relatively longer in emerging than in industrial markets. A noticeable difference is that emerging-market exchanges introduce (stock) index products relatively more quickly than do industrial markets.

The survey shows that agricultural derivatives products were the first to be delisted by an exchange, followed by index products. The data do not cover exchange-traded products that are inactive (that is, still listed but not traded, or traded but illiquid).

Exchange Structure

Most exchanges use an open outcry system, but electronic trading systems are increasingly used. Twelve exchanges (of the 39 reporting) rely exclusively on electronic trading, and 8 others employ some form of electronic trading system. Recently established exchanges are more likely to use electronic-based systems for trading, anticipating lower trading costs, which will be more attractive to businesses and investors. An exchange using an electronic system could also draw business from traders around the world, significantly expanding the potential market. And advocates of electronic trading say that it could be safer. For example, at the Beijing Commodity Exchange each trade is checked for adequate margins before the computer accepts it. And the BM&F in São Paulo performs back-office trade clearing and processing, a task performed by member firms in most developed markets.

CLEARING ARRANGEMENTS. Most of the exchanges in the survey require initial margin deposits and margin calls (variation margins), with the exchange guaranteeing the contracts through its own clearinghouse. There is some uniformity in margin requirements across the exchanges surveyed, and most require initial and variation margins with daily settlements. There are, however, disparities in the ways that margin deposits are collected (whether gross or net) and in the collateral the clearinghouse accepts—cash, securities, or letters of credit. Two-thirds of the exchanges surveyed own their own in-house clearing facilities; the remaining third cited ownership by banks, other financial institutions, or other exchanges.

In recent years exchanges have begun to explore a system of common clearing to improve efficiency. In 1997 discussions picked up with an initiative by the Futures Industry Association to develop a proposal that meets the needs of all parties involved. In Canada the Winnipeg Commodity Exchange is negotiating with the Canadian Derivatives Clearing Corp. (CDCC) to enter into a clearing services agreement. CDCC clears for the Toronto and Montreal exchanges.

EXCHANGE OWNERSHIP AND MEMBERSHIP. Most exchanges operate as nonprofit self-governing entities owned by their members; a few operate as subsidiaries of other exchanges or as limited liability companies. Exchange membership distinguishes between full (or regular) and associate (or limited) members. Only full members are entitled to voting privileges pertaining to self-regulation of the exchange. Associate members have the same trading rights as full members, but often their activities do not cover clearing transactions. Among the exchanges in the survey, the median

percentage of full or regular members is 80 percent, of which 76 percent have clearing rights. Only 16 percent of associate members have clearing rights.

Survey respondents indicated that the prevailing regulatory structure was exercised through a parliamentary law, under the authority of the government.

Economic and Capital Market Conditions

Using data from the International Monetary Fund's *International Financial Statistics* for various years, we examined the extent to which differences in economic and capital market conditions explain differences in the derivatives exchanges in industrial and emerging economies. As economic proxies, we used changes in consumer prices, prime interest rates, government bond yields, industrial production, growth in real gross national product (GNP), the level of GNP, and the share of investments in GNP. As proxies for capital market conditions, we used stock market turnover and capitalization, the variance in stock market capitalization, the value of stocks traded, the volatility in value traded, and the number of listed companies in the stock exchange, as reported by the International Finance Corporation in its *Emerging Stock Market Factbook*.

We found no statistically significant differences between emerging and industrial derivatives markets with respect to the economic proxies. We did find some differences in capital market conditions, but these may be explained by the size and maturity of industrial capital markets. We concluded that our tests give no conclusive indicators for the degree of market readiness for developing a derivatives exchange. In this respect, additional research is needed to establish whether such indicators exist and, if they do, to quantify them.

Launching New Derivatives Exchanges and Products

In considering the establishment of new derivatives exchanges, policymakers should begin with a feasibility analysis. Such an analysis should investigate the degree to which the preconditions discussed earlier are met, identify key areas of weakness, and formulate plans to address these areas. There is no point in proceeding with the design of the exchange and the products to be traded until this analysis is conducted. The next step involves selecting the products to be traded and deciding on the elements of the exchange's microstructure. The research presented here, and experiences from various countries, point to some important lessons.

First, the chances of success are higher if index-based and interest-rate-based derivatives products are introduced first. Because our survey indicated that it takes more time to introduce derivatives contracts in emerging than in industrial markets, with the notable exception of derivatives based on an index of equities, emerging markets are likely to have more success in introducing financial derivatives related to equities.

Recent experience indicates that derivative instruments on agricultural products are more difficult to introduce because liberalization of agricultural markets tends to lag behind financial markets. Furthermore, financial markets tend to create much more liquidity than agricultural markets. For instance, in 1996 the Budapest Commodity Exchange increased its liquidity by 400 percent when it introduced financial contracts (mainly currency) to its product line. And because of the globalization of commodity markets, the potential for using existing contracts in established exchanges reduces the need to develop local agricultural contracts. As a general rule, emerging-market economies that have relatively successful commodity exchanges have sizable local commodity markets (for example, Argentina, Brazil, China, and Malaysia).

Second, appropriate regulations and a conducive legal environment are crucial for the development of derivatives exchanges. The literature attributes problems in the legal-regulatory infrastructure as major impediments in the drive to develop derivatives exchanges in emerging markets. The most important of these problems are:

- Antagonism between market sectors (banking, derivatives, and securities) over which entity should regulate and supervise the exchange—and under what rules
- A lack of confidence as a result of scandals, corruption, and market failures
- Uncertainty about the equitable application of laws and regulations, the enforceability of obligations, and the lack of market-oriented insolvency laws.

Third, partnerships and joint ventures between new and existing exchanges can be mutually beneficial. The CBOT is considering such ventures with exchanges in Argentina, Poland, and Turkey. Established exchanges can offer technology and know-how, and their members in turn can gain access to a potentially high-growth market. In fact, rather than setting up their own derivatives exchanges, several emerging economies could do better by using other well-established exchanges and listing their products with them. Regional exchanges such as the Stockholm-based Options Market offer another way to improve market liquidity, but they may be harder to develop and coordinate.

Fourth, policymakers in emerging economies should look at whether access provided to market participants in their countries allows them to trade in derivatives exchanges abroad. Even where there are local exchanges, removing the barriers to overseas trading could increase the liquidity of the local exchange by providing opportunities for arbitrage between local and foreign exchanges.

Fifth, electronic trading appears to be the choice among new exchanges. Lower transaction costs for users are often cited as the key benefit of electronic trading.

To some extent, derivatives markets complement developments in the stock markets. By the end of 1996, more than 78 developing countries had stock markets; during the 1990s their capitalization increased more than 10 times, and the number of domestic companies listed more than doubled. Derivatives exchanges have played a major role in these developments. They have contributed to more balanced alloca-

tion of resources and have enabled the transfer of risk within a country and even across countries. Although there are concerns about the explosive growth of derivatives and the risks that they may create, business at these exchanges is increasing, and the exchanges continue to grow and to introduce new products.

Appendix. Types of Derivative Instruments

Forward Contracts

A forward contract is an agreement to purchase or sell a given asset at a future date at a fixed (predetermined) price. In a forward contract the buyer and the seller assume each other's performance risk. The terms and conditions of the forward contract are usually specific to each transaction, although some forward contracts are standardized.

Futures Contracts

A futures contract is similar to a forward contract: the buyer (seller) of a futures contract agrees to purchase (sell) a specified amount of an asset at a specified price on a specified date. But futures contracts differ significantly from forward contracts in several ways. First, contract terms (amounts, grades, delivery dates, and so forth) are generally standardized. Second, transactions are handled only by organized exchanges through a clearinghouse system. Third, profits and losses in trades are settled daily (marked to market). Fourth, futures contracts require depositing a certain amount of margin money in the exchange as collateral. Fifth, while forward contracts involve delivery (exchange) at maturity, futures contracts are usually closed before that. Thus, futures contracts separate the purchase and sale of assets from hedging. Through these arrangements, futures contracts significantly reduce the credit and default risk entailed in forward transactions. Contract standardization also improves liquidity (that is, the contract volumes traded).

Options Contracts

An option on a futures contract is the right—but not the obligation—to purchase or sell a specified quantity of the underlying futures contract at a predetermined (strike) price on or before a given date. Exchange-traded options, like futures contracts, are standardized. There are also over-the-counter options offered by banks and brokers, which can be customized. The purchase of an option is equivalent to price insurance; therefore, there is a price to be paid (just like an insurance premium). Some important definitions regarding options are:

Call. A call option gives the buyer the right, but not the obligation, to buy the underlying futures contract at a predetermined price during a given period of time. Call options are usually purchased as insurance against price increases.

Put. A put option gives the buyer the right, but not the obligation, to sell the underlying futures contract at a predetermined price during a given period of time. Put options are usually purchased as insurance against price declines.

Strike or exercise price. The price at which the futures contract underlying an option can be purchased (if a call) or sold (if a put).

Premium. The price paid for the options contract.

Exercise. To exercise a call (or put) is to buy (or sell) the underlying futures contract at the strike price.

Time to expiration. An option is good only for the length of time specified in the contract. The last day that an option can be exercised is called the expiration date.

Swap Contracts

A swap contract is an agreement to exchange, or swap, a floating price or rate for a fixed price or rate (or vice versa) for an asset at specific time intervals. A swap is like a series of forward contracts lined up on a schedule, but it does not involve physical exchange of assets. Swaps solve problems relating to the need for longer-term price fixation, but they tend to be credit-intensive and carry the risk of nonperformance.

Notes

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1. According to the Bank for International Settlements (BIS), at the end of 1996 the notional principal outstanding of financial derivatives approached \$35 trillion, of which approximately \$10 trillion was in exchange-traded instruments; the rest was traded over the counter.

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