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FUTURES MARKETS: THEIR USEFULNESS AND LIMITATIONS FOR
LATIN AMERICAN COMMODITY TRADE */

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I. INTRODUCTION

Most developing countries rely strongly on primary commodity exports as a major source of national income and many depend on the exports of a limited number of commodities for a substantial share of their foreign exchange earnings. Due to this, the level and stability of commodity prices and revenues have been a matter of major concern to these countries. Being no exception, the countries in Latin America and the Caribbean are heavily reliant on these exports (see Table 1). Given the high degree of price volatility experienced during the last two decades, improved commodity price management at the macro and micro level should substantially reduce their balance of payments uncertainties.^{1/}

The use of futures markets by developing country exporters has been suggested as a means to stabilize or increase export earnings. As is well known, futures markets constitute not only valuable sources of price and stock information but also indispensable instruments for price-risk transfer. These markets also give exporters greater flexibility in pricing and marketing decisions, and facilitate intra- and inter-temporal marketing (carrying stocks through and over marketing years). Furthermore, they can be used by exporters to support commodity prices, either directly through futures trading or indirectly via better management of inter-temporal price relationships and stock availability. Despite these potential benefits, however, many developing countries are inclined to sell their commodities only in cash or forward markets with little regard for the sometimes more advantageous futures market prices.

Similarly, on the import side failure to lock in a low price by buying futures contracts under advantageous market conditions often leads to higher import bills. While instability in world food prices has focused attention on security aspects, there is now an increasing awareness of issues related to market efficiency. To the extent that improvements in market or marketing efficiency increase price stability, the links between the two are clear. Given that even perfectly efficient markets do not eliminate price volatility, and to the extent that many developing countries continue to rely on world markets for food imports, understanding/utilizing futures markets becomes of

Table 1: Importance of Commodities in Trade and GDP

Country	Share commodities in total		Share of commodity exports in GDP		Share of comm. in total imports		Share of food products in total imports	
	merchandise trade	incl. fuels	excl. fuels	incl. fuels	excl. fuels	incl. fuels	excl. fuels	1987
	1987	1987	1986	1986	1987	1987	1987	
: Argentina	65.8	67.2	2.0	23.5	13.1	4.2		
: Bolivia	38.5	93.5	5.5	13.9	10.6	9.7		
: Brazil	52.1	54.8	4.0	4.2	16.9	8.9		
: Colombia	51.9	87.1	10.7	12.6	15.1	8.8		
: Costa Rica	93.3	93.3	18.2	18.2	7.0	2.1		
: Cuba	86.0 a)	96.4 b)	-	-	16.5	11.6		
: Chile	66.6	66.6	22.3	22.3	8.8	4.2		
: Ecuador	58.4	90.9	10.8	18.9	7.4	4.6		
: El Salvador	70.8	70.8	14.3	14.3	15.4	12.6		
: Guatemala	80.9 a)	83.7 a)	12.4	12.7	24.7	19.6		
: Haiti	42.6	42.6	3.9	3.9	40.7	39.4		
: Honduras	84.3	84.3	19.7	19.7	11.8	10.3		
: Mexico	17.4	59.4	3.0	7.8	20.3	11.8		
: Nicaragua	65.9	65.9	8.4	8.4	9.3	9.3		
: Panama	85.5	88.9	5.3	5.5	12.5	11.0		
: Paraguay	78.7	78.7	4.9	4.9	9.9	8.8		
: Peru	61.1	71.8	6.0	6.9	26.2	22.0		
: Dominican Rep.	69.4	69.4	10.9	10.9	14.8	12.6		
: Uruguay	49.7	49.7	9.8	9.9	11.2	6.3		
: Venezuela	7.2 a)	80.8 a)	2.0	16.1	19.2	11.7		

Notes: a) 1985 b) 1980

Primary commodities defined as SITC section 0, section 2 (less groups 233, 266, 267), section 4 division 68 and item 522.56

Source: UNCTAD Commodity Yearbook, 1989

strategic importance in domestic food security management.^{2/} Despite the potential benefits of futures markets, as in the case of commodity exports, countries that can least afford losses are doing little to manage their price risks.

The low participation of developing country agencies in the commodity exchanges can in part be attributed to a lack of familiarity with the operations of the markets. However, it also rejects a different perspective to that of the developed countries regarding the benefits and costs that futures markets entail, and the neutrality of the functioning of the exchanges. In principle, these institutions operate as "free", (but not necessarily "efficient"),^{3/} markets where prices are determined by continuous auctioning. On the other hand, developing countries often maintain that in practice, various constraints and distortions (e.g. inadequate financial requirements, foreign exchange risks, imperfect match in risk transfer between the markets in the North and South, national legislation, the trading practices of the leading multinational firms) tend to make the exchanges inaccessible on equal terms and not as beneficial as theoretically possible. This paper addresses these questions and discusses considerations pertinent to the efficiency of futures market use by developing country exporters and importers.

Over the years, a large part of intergovernmental activities on primary commodities has originated from the negotiations related to the Integrated Programme for Commodities (IPC), negotiated under the auspices of UNCTAD. In spite of arduous efforts made in this regard, not only have the results been discouraging but also there is a tendency among developed and developing countries to roll back and even to question these mandates. Today, commodity negotiations put more emphasis on "market" solutions rather than those based on state "intervention".^{4/} In this regard, trading in futures, may be viewed as an effective alternative to the conventional mechanisms for stabilizing or enhancing export revenues, such as international commodity agreements, assuming these markets function neutrally and efficiently from the point of view of developing countries.

II. RECENT DEVELOPMENTS IN COMMODITY EXCHANGES

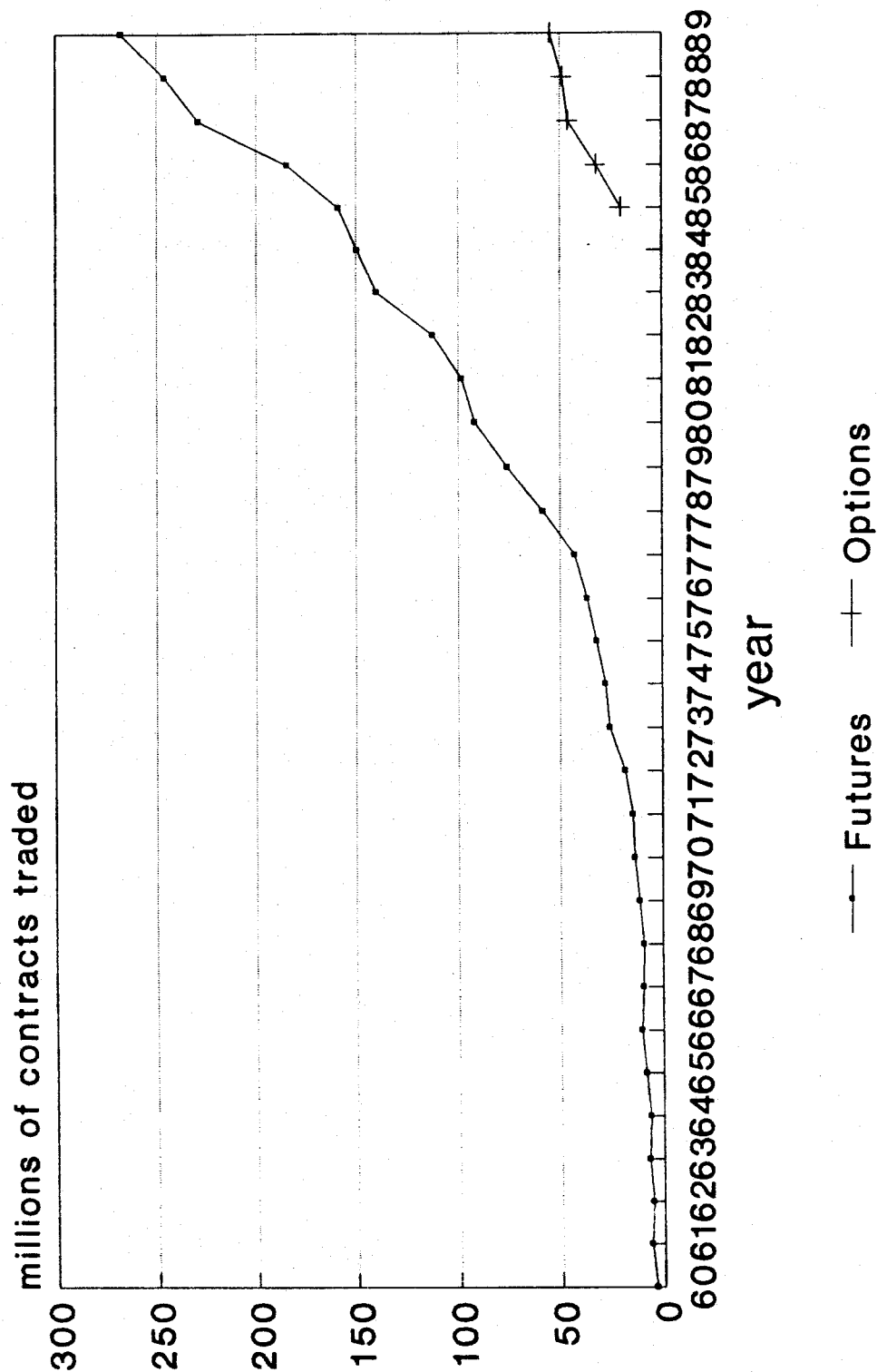
1. Increase in futures and options trade

The last two decades have witnessed a spectacular growth in trading, as both most conventional futures and a variety of financial instruments. The expansion of these activities has involved the successful launching of new markets away from the traditional commercial centers in the US and the UK, including some that are located in the developing areas. The rapid expansion in futures trading is shown by the fact that total contracts traded on all US futures markets rose from 3.9 million in 1960 to 43 million in 1977 and to 267 million in 1989 (see Figure 1), the last being equivalent to US \$ 28.3 trillion in value. To be sure, most of the growth in the past few years has occurred in the financial and options areas (mainly currencies, financial futures and stock indexes). The most recent data (1985-89) on US futures contracts by commodity group indicate that financial futures (interest rate, equity indexes, foreign currency/index) account for an increasing and share of the total, and that by 1989 these categories were responsible for more than 60% of all futures contracts traded in the US (see Figure 2). There has been, however, a substantial expansion in the primary commodity area as well. While in the second half of the 1980s, agricultural commodities maintained a relative share close to 20%, energy products emerged as one of the principal commodity groups traded. Non-precious metals, on the other hand, did not fare well with a standstill in the absolute number of contracts traded.^{5/}

A similar observation can be made on options contracts traded in the US. The number of contracts increased from little over 20 million in 1985 to over 55 million in 1989. By commodity group, in the late 1980s close to two-thirds of traded contracts corresponded to financial instruments, with the interest-rate related transactions being by far the most important (see Figure 3). As in the case of futures, agricultural commodities constitute an important part, while energy products have increased their participation rapidly.

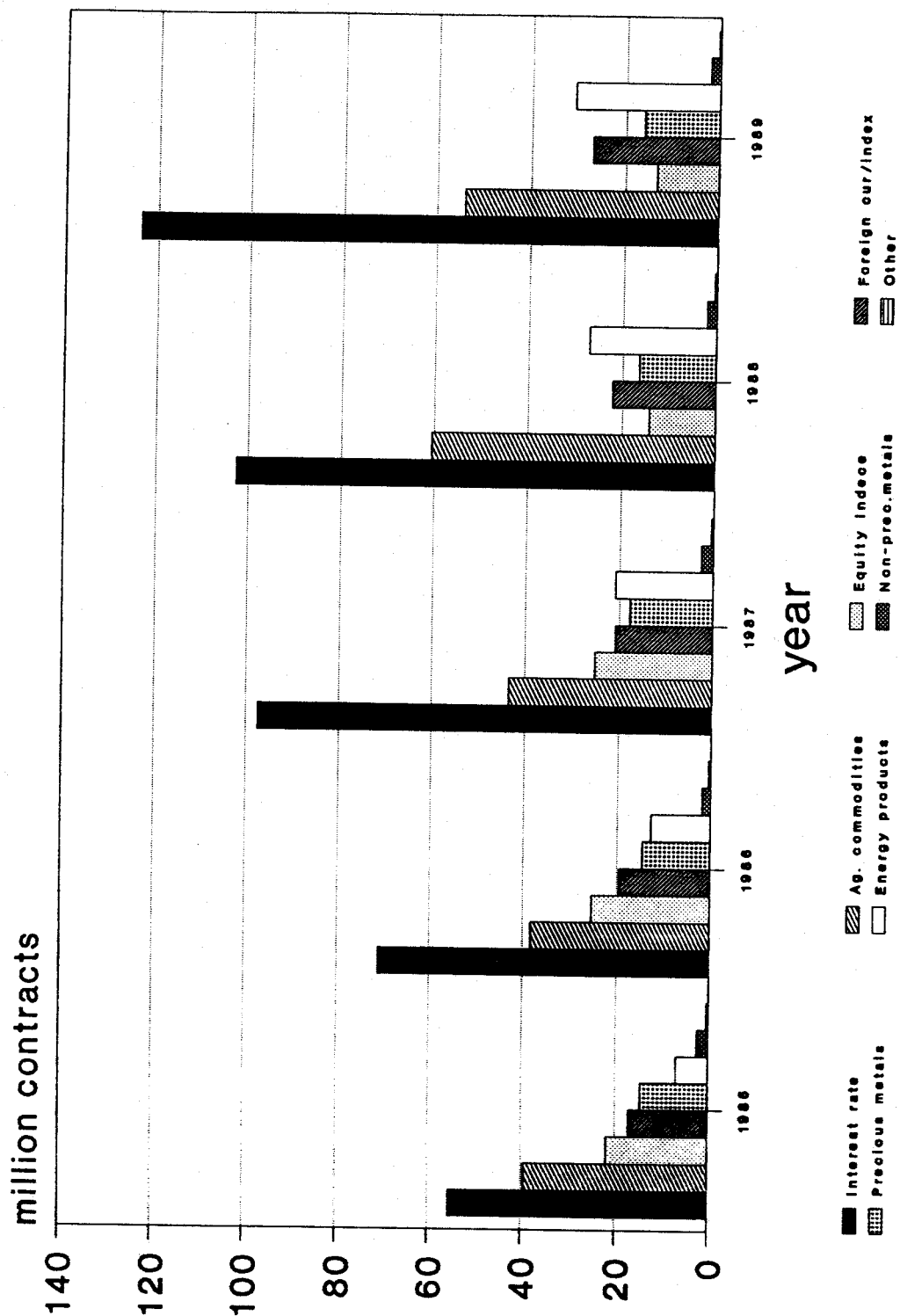
The rise in futures trading in oil has been spectacular. In effect, the most relevant price of oil in much of the world is no longer the OPEC price but the New York Mercantile Exchange (NYMEX) price —a market which did not

Figure 1: Volume of Futures and Options
Traded in the US 1960-89



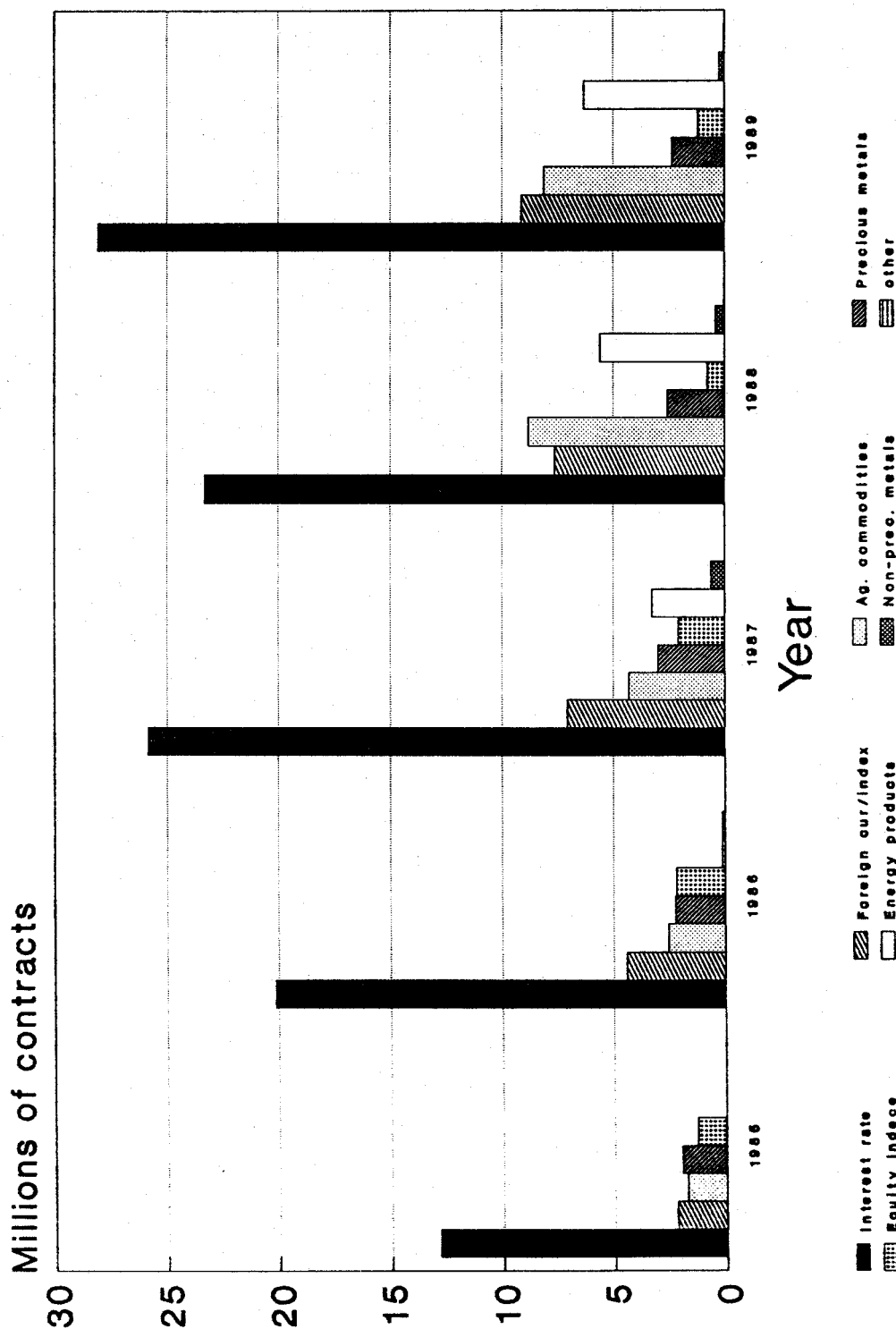
Source: Futures Industry Association

Figure 2: Futures Contracts Traded
by Commodity Group, in the US 1985-89



Source: Futures Industry Association

Figure 3: options contracts traded
by Commodity Group, in the US 1985-89



Source: Futures Industry Association

even exist before March 1983. Increased price volatility, high interest rates and storage costs in the late 1970s and early 1980s, and the emergence of surplus crude afterwards called for short-term trading arrangements and hedging instruments, in contrast to the earlier years when long-term contractual relationships between producers, principally those of OPEC, and major oil companies dictated the market price. By the end of 1985, virtually all crude moved at some sort of market-related pricing, and oil companies were acquiring anywhere 30 to 50% of their supplies on a spot, non-contract basis. In short, the rise of the futures market is both a cause and an effect of the erosion of OPEC market dominance.

The growth of futures activity in commodities since the 1970s has been in part a response to changed economic conditions. The 1973-75 boom and bust in many commodity prices coincided with high domestic inflation and the move to floating exchange rates. Much greater price volatility for commodities stimulated interest on the part of producers, consumers, processors and traders in the use of futures trading in order to moderate this exposure to price fluctuations. At the same time, price volatility gave an important boost to futures speculation, which enhanced the liquidity of leading markets and made them all the more acceptable to speculators. Another important consequence of the great price swings was that it became increasingly difficult for producers to maintain long-established systems of administered producer prices on world markets, not only in the case of petroleum but also for aluminum, nickel, and copper. The movement away from producer pricing led to a corresponding increase in the importance of prices determined on commodity exchanges.

During the 1970s, therefore, reflecting such changes as the end of dollar-gold convertibility, the shift from a fixed exchange rate system to a floating one, and the change in petroleum from being a cartel commodity to a market-sensitive one, the prices of gold and petroleum and currency exchange rates began to fluctuate. In the process of searching anchor levels for their prices, price volatility, including that of primary commodities, intensified. Also, since the latter half of the 1970s, with a high liquidity in major advanced countries and increased role of the services industry, portfolio investment by institutional investors, such as investment banks and insurance

firms, has expanded. Accordingly, primary commodities are increasingly viewed as financial assets and as part of a portfolio with other liquid assets (such as stocks, bonds, foreign currencies), and at least in the short-run, their prices are influenced not only by market demand and supply conditions (market fundamentals), but also by unpredictable new information on macroeconomic variables, which affect the terms on which traders are prepared to hold title to commodity futures contracts.^{6/} The more integrated commodity markets have become in overall financial operations, the greater has been the volatility in their prices (for a summary of various studies on these issues, see Ghura, 1990; Kuchiki, 1989).^{7/}

2. Characteristics of products traded on futures markets

Futures markets exist for many of the commodities exported by developing countries: these markets exist for 7 out of 10 UNCTAD's "core" products covered by the Integrated Programme for Commodities (cocoa, coffee, cotton and cotton yarn, rubber, sugar, copper and tin), the exceptions being hard fibers, jute and tea. The most active futures markets are located in the United States and the United Kingdom although less liquid futures markets can be found around the world. Since World War II, new futures contracts which have been introduced successfully in the US include aluminum, live cattle and hogs, frozen pork bellies, fresh eggs, frozen concentrated orange juice, plywood and lumber. Contracts for molasses, dressed beef and frozen shrimps were also introduced but failed.^{8/} With developing country government involvement, it is theoretically possible for other commodities of interest to developing countries to be introduced as futures.

However, not all products are tradeable or appropriate for a futures market. Manufactured products, particularly those for direct consumption, are not likely to be traded at the exchange, thanks to their higher degree of price stability and a certain flexibility to absorb price variability through mark-ups. Among commodities, most suitable are those products which can satisfy some minimum conditions such as: i) large supply and demand; ii) homogeneity and fungibility; and iii) storability. Supply and demand should be large enough to assure the free interplay of market forces with little

intervention and extensive enough to attract and sustain a large body of traders so that the liquidity of the market and continuity of trading can be maintained. The commodity also has to have a certain degree of homogeneity so as to permit interchangeability between production sources, with a possible system of premiums and discounts to compensate for the differences over or under the agreed specification. Additionally, futures contracts may call for delivery of many months into the future. Consequently the commodity must be capable of being stored for considerable periods as its contract provides for a market of last resort when the product is delivered or sold. Perishable commodities such as bananas do not meet this requirement.

Futures seem to develop where there is a need for an insurance for protection against price fluctuation by those producing, handling, trading or processing raw materials. For the majority of commodities, the share of raw materials in the final product price is high and this produces a higher risk, thereby inducing a higher level of intermediation. On the other hand, when there is a protective umbrella against rising prices which allows a rise in raw material costs to be passed on to the final product price without too much difficulty, it is not always necessary to resort to such a risk reduction mechanism as a commodity exchange. For instance, the share of bauxite in the final price of aluminum is very low, so that a large increase in the price of bauxite will not affect too much the final price of aluminum. While it would be possible to have a futures market for bauxite, whether there will be a need for and sufficient use of that market remains to be seen.

For these reasons, the greatest use of futures for hedging is made by institutions whose earnings are highly sensitive to small variations in the underlying commodity prices. Thus, commodity traders are usually the most active hedgers of all, in their attempt to protect their small margins from being wiped out by small swings in commodity quotations. The next most important group of users of these markets are the processors and fabricators of raw materials. Often, as in the grinding of cocoa beans, the roasting of green coffee, or the milling of grains, the value added in the processing stage is small in relation to raw material costs, leaving processors vulnerable to price swings unless they take steps to hedge their raw material purchases.

3. Foreign participation on commodity exchanges in developed countries

Measures of the involvement of foreign traders on futures markets are difficult to come by. Available estimates usually consist of the identification of large traders for purposes of reporting required by the Commodity Futures Trading Commission (CFTC). Powers and Tosini (1977), examining traders from 63 different countries in the US markets, found that the total number of reporting foreign traders was small and that most of them were of Canadian, European and Australian origin. They found that very little of the foreign participation came from developing countries. Thompson and Bond (1985), using similar data series up to 1983 provided by the CFTC, showed that US futures remained dominated by domestic interests but that foreign traders were playing an active role, especially in grains, the soybean complex, and foreign foodstuffs (coffee, cocoa and sugar).

Any estimate of foreign participation should be read with caution for the simple reason that reporting of large positions, required by the CFTC, can be easily veiled. If the trading entity trades in its own name, it can be identified as domestic or foreign. If, by contrast, the buyer/seller trades through a broker or variety of brokers, agents and banks (foreign or domestic), the identification of the buyer/seller is not possible. Therefore, it is not possible for the individual exchanges or the regulatory authorities to determine whether the buyer/seller is foreign or domestic.

Perhaps the most accurate estimate comes not from official statistics, but from the impressions of exchange participants and authorities. Experts' opinions suggest that foreign participation overall is approximately 30%. Though there is a good deal of variation among product groups, the estimate for the exchanges trading grains and the soybean complex is on the order of 15%, while for the exchanges trading metals and minerals it could be as high as 60%.

The frequency of use of the exchanges by Latin American and Caribbean countries depends on several factors including: i) the type and size of the company and its ties with firms operating in the developed market economies; ii) the extent of risk exposure on the one hand and the degree of risk

reduction which futures markets are supposed to provide in relation to the company's its physical trade (basis risk) on the other; iii) the company's knowledge of and familiarity with exchange operations; iv) its capability to finance margins and other deposits required; and v) restrictions placed by national authorities on the transfer of foreign exchange to finance these operations abroad.

4. Some specific cases

As regards agricultural commodities, in the cases of cocoa and coffee, in general scattered producers sell through traders to a variety of processors. Nonetheless, due to the increasing concentration of processing and marketing in a small number of large firms, there is now a much higher percentage of trade taking place directly between producers and processors, thus bypassing the traders. Earlier, the traders negotiated the deals with the producers and then hedged their price exposure. The large processing firms are believed to hedge at most 10% of their forward purchases and inventories. The reduced role of traders has resulted in a decline in liquidity on the futures markets, especially in Paris and London. Undeniably, the exchange quotations still function as a price barometer and negotiation tool, while traders continue to provide an important market research role to some producers. For sugar, where the producers and users are widely dispersed, the traders are relatively small in number but well known and important to the functioning of the cash market as well as the futures. Though it is likely that most coffee, cocoa and sugar exported from Latin America and the Caribbean is sold on the commodity exchanges through operators, experts estimate that no more than 25% of these exports is traded directly by the producers on the exchanges (López Huebe, 1990).

In the case of grains, the major part of exports from Argentina and Brazil (the principal exporters in the region) is concentrated in the hands of private companies, which are subsidiaries of transnational firms or which have foreign representation in these countries. Again, though it is difficult to quantify the degree of participation of these countries, direct consultations with major exporters of grains and their products suggest that these companies

use (but not necessarily systematically) the futures markets to hedge, and that they seem to cross-hedge with other commodities as well as financial futures and exchange rate-related futures. In contrast, the official organizations specializing in grain exports in Latin America (e.g., the Junta Nacional de Granos of Argentina and other similar institutions) use the exchanges principally as sources of information and contract negotiation tools, but not for effectuating hedging or speculation.

In the US, it is not the farmer (except for some large ones) but the grain elevators that hedge. The exchanges are used actively by traders, but less by mills and other processors. In a survey of US farmers made at the end of the 1970s less than 7% said they had actually traded futures contracts. Their participation was constrained by the lack of familiarity with the operations of the futures markets, the small size of farming operations as indicated by yearly output much lower than the minimum contract size tradeable on the exchanges, the lack of capital and credit facilities to meet commission fees, and by the initial and variation margin requirements. Nonetheless, the Chicago Board of Trade (CBT) estimates that about 50% of its wheat-related futures business is hedging while the corresponding figure for soybeans is in the range of 40-45%, and that for corn, 55-60%.

Futures markets exist for frozen concentrated orange juice (FCOJ), the major exchange for this product of increasing regional interest being the New York Cotton Exchange (NYCE). Though Brazilian companies, a major producer, are prohibited by their own laws from participating as members in the NYCE, their use of hedging on a significant scale is acknowledged. Brazilians also use it as a basis for market information, speculation and, most importantly, for paying their growers: the processors pay the growers the NYCE price less all other costs (processing, transport, tariffs, etc.), leaving most of price risk to the growers.

Historically, the participation of the metal industries as members of the exchanges has been low. In recent years, however, this has increased not only through the incorporation of the companies as members but through a higher level of influence exercised by them over the decisions which affect the industry. Nonetheless, only in the case of the copper industry do Latin American producers participate actively in the exchanges, especially in the

industrial segments which are most exposed to price risks (such as semi-finished fabricators). In copper, there is the prevalence of forward quantity contracts with deliveries scheduled regularly over the year but with prices directly linked to London Metal Exchange (LME) prices. There are a relatively small number of major suppliers and a fairly dispersed group of fabricators and copper users, with traders active in smoothing out supply and demand for material not covered by the contracts. In recent years, the major public and private companies of Chile, Peru, Mexico and Brazil have used the LME and Commodity Exchange (COMEX) regularly for hedging purposes.

Futures trading in aluminum is relatively new, having commenced in the late 1970s. One of the main features of the aluminum industry in recent years has been the falling share of production accounted for by the six major producing companies at all stages of production (i.e., bauxite, alumina and aluminum). At the same time, the number and importance of independent, non-integrated producers, including state owned companies in developing countries, has increased. Price instability has meanwhile increased at the aluminum stage, partly as a result of the introduction of this metal on commodity exchanges and partly because of loss of market control by the major companies. Bauxite and alumina prices have generally remained more stable, but the increasing practice of linking alumina contract prices to prices for aluminum has had the effect of transferring price instability to alumina. In Brazil and Venezuela, the major producers in the region, the companies base their contracts on the LME price. Many of these companies are joint-ventures between the state, the majors and/or Japanese interests, and part of their production is committed under long-term contracts or is marketed by the majors' subsidiaries. The rest is sold independently and probably a portion of this is covered by the exchanges.

As for copper, tin has a long history with respect to the commodity exchanges. Given a dispersed industrial structure at the consumption end, the LME was used principally for hedging by traders. The tin industry, on the other hand, operated on the LME for a long period of time in order to sustain prices under the International Tin Agreement. In South East Asia, the Kuala Lumpur Tin Market (KLTM) and the recently established Kuala Lumpur Commodity Exchange (KLCE) tin futures market in Malaysia enhance trading and price

setting opportunities for this region's producers, although volumes traded are still relatively small. The reintroduction of tin futures on the LME in 1989 also provides opportunities for hedging and speculative activities. The principal Brazilian producer, Paranapanema, is a private company and is believed to have participated through its trading arm at the LME. In the case of Bolivia, direct participation at the LME is negligible, given that a large part of Bolivian production is marketed through traders who incorporate price fixing options in the contracts.

III. THE ECONOMIC OPPORTUNITIES PROVIDED BY FUTURES AND OPTIONS MARKETS TO DEVELOPING COUNTRY EXPORTERS

The main focus of this chapter lies in illustrating the economic opportunities provided by, and the constraints in utilizing, futures markets from the point of view of the developing country exporter. Before going into illustrative cases, however, some general comments are in order.

There are four main roles that commodity exchanges perform for users: hedging, speculation, price fixing and arbitrage. The exhaustive literature on these functions means that it is unnecessary to provide here a detailed description of their mechanics and possible benefits to users. The advantages of commodity exchanges for producers, traders, and consumers under a market economy system are also well known, and can be summarized as follows: i) a reduction of the price risks inherent in commodity ownership; ii) easier and cheaper finance; iii) improved knowledge of market conditions; and iv) guaranteed fulfillment of futures contracts.

Futures markets benefit those market participants not directly involved in futures trading since futures prices provide useful forecasts of actuals ahead of delivery dates. This means that in assessing the overall benefits of futures trading for each commodity, account should be taken of gains to people other than those directly involved in trading. The gain in market transparency can be considerable, in comparison with what happens in many private deals.

In general the only means by which those who take ownership of commodities from the original producers can minimize their risk and absorb the market fluctuations for the period of time they hold the goods is to force the producer to sell his goods at a discount. Futures exchanges enable those with inventories of internationally trade commodities to transfer risks via hedging to the futures market, thus possibly allowing a higher price to the original producer.

There are other "spill-over" benefits accruing from futures markets to developing countries which are neither immediate nor direct but rather important in the medium and long term. They include an increased integration of developing countries' pricing systems into world markets, a broadening of

competition and reduction of monopsonistic power, and a dissipation of the domestic risk load to the broader world economy (Power and Tosini, 1977). Also, as suggested by Hirshleifer (1988), in the absence of futures markets, there will be greater incentives for growers/producers to vertically integrate to offset the negatively correlated payoffs which exist between them. This could be achieved by combining assets under single ownership or by forward contracting between the producer and the processor. Establishing/participating in a futures market provides an alternative means by which these groups can transfer risks individually. Organized futures trading therefore can act as a substitute for vertical integration or share contracting as a means of diversification, while at the same time encouraging a greater degree of product specialization.^{10/}

1. Futures

The attraction of futures trading over the spot transaction from the view of developing countries rests on futures markets' capability to promote: i) anticipatory hedging (forward pricing); ii) inventory hedging; iii) flexibility in pricing; and iv) support of commodity prices. Added to these, of course, is the frequently mentioned market information function: commodity exchanges provide information with regard to price behavior in light of existing and expected market supply/demand conditions for purposes of making production and marketing decisions.

a) Anticipatory hedging

The outcome of a hedging operation depends on a combination of hedging strategies and circumstances. What is less questioned today is the desirability of some form of hedging in the first place —at some point in the production, processing, merchandising and end-user chain.

Anticipatory hedging is the buying or selling of futures contracts in anticipation of a commodity purchase or sale. It is basically a price-fixing decision: prices look "good" today for the commodity that must be eventually bought or sold. Most producer hedging, some processor hedging, and most potential importer hedging fall under this category. Farmers, for instance, can at anytime during the year sell their intended output which will be

available only at harvest. Futures markets provide a continuous pricing and sales opportunity for an otherwise discontinuous production operation. In the case of a processor, he will typically have relatively small on-site storage capacity, and thus be unable to buy his annual input requirements in the cash market in a single operation. But if the processor judged that prices were low, he could secure today his entire annual requirements by buying futures.

As can be seen above, when futures markets are used for forward pricing, they serve essentially the same function as cash forward markets. The differences between them ^{11/} include the ease of entry and exit, and the practice of "marking-to-the-market" in futures, and the ability to easily "roll-over" sales in futures from one delivery period to a later maturity. Forward pricing effectuated in this manner removes uncertainty regarding export price levels. These are coupled with futures markets' higher liquidity commensurate with trading volume, while in forward markets there is almost no fungibility. Futures markets are supposed to provide a higher level of contract integrity guaranteed by the exchange's clearing house operations.

The opportunities arising from forward pricing in a liquid futures market may be of special interest to the developing country exporter whose timing of export sales is vital to foreign exchange management. By this method, the exporter can sell fractions of intended export sales in futures over intervals denominated by contract months. Benefits can be substantial for those organizations and export firms, like the Junta Nacional de Granos of Argentina, cooperatives, and state trading companies that systematically obtain the product from the local market and later export it. A close follow-up by these institutions on the market allows them to decide on appropriate moments to hedge well in advance of actual sales or harvest, or without the presence of habitual consumers. The Australian Wheat Board is said to use this modality of risk reduction systematically.

By nature, anticipatory hedging is speculative: the participant selects determined moments to buy or sell, based on his judgement about the prevailing futures market prices. The operation involves a decision to lock in a price considered "good", on the basis of a market analysis or certain criteria regarding his commercial operations (this decision is similar to the one taken

by the speculator in the exchange), or on the basis of the relative prices of inputs used in production.

In addition to this speculative character, anticipatory hedging, like other types of hedging, does not totally eliminate uncertainty in the net price eventually received by the exporter. Some uncertainty still remains in the difference, known as the "local basis", between the cash price at the delivery location and the price of the cash market export sale. As discussed later, this difference may vary widely depending on the distance between the futures market delivery point and the location of the actual export sale. There is also "quality" basis risk, arising from the differences in the grade or type of commodity offered for the export sale and that specified in the futures contract.

There is also a "quantity" risk. Futures trading does not guarantee that quantities hedged before harvest will equal the quantity available for sale later on the cash market. Prior to harvest, producers can only form expectations of what their yields will be. Therefore, it is unlikely that producers would be able to hedge the exact amount of their harvests. Unless large storage facilities are maintained to regulate the flow of stocks onto the market, producers face sizeable risks in forward pricing. It is perfectly possible for exporters to profit as well on changes in the local, quality and cash basis, but for a risk-averse hedger, as the exporter of a developing country is likely to be, this basis variability can be seen as something very undesirable. The actual margin of the exporter will depend on how well the relevant cash basis was anticipated. This, in turn, calls for sophisticated knowledge of basis relationships.

An exporter who uses futures markets to forward price exports may do so either to stabilize export revenue or to plan export marketing. However, whether forward pricing of exports, by anticipatory hedging, would stabilize export revenue is not certain. Export revenues will be stabilized if the variance of prices received through forward pricing in futures markets for any given quantity of exports is less than the variance of prices received through only cash market transactions. Considering that futures prices usually move in line with cash market prices across marketing years, forward pricing in futures markets should not effectively reduce year-to-year variance in

export earnings. However, should there exist a relationship between the mean and variance of returns such that lower variability only comes at the expense of lower expected returns, the benefits of hedging are reduced. Still, risk adverse exporters may be willing to trade some returns for lower variance. More importantly, futures trading, by itself, will not moderate or remove variance in export earnings attributable to production variability.

The foregoing suggests that while futures markets can provide some protection against adverse cash price movements, they may do little to protect revenues for the naive producer/exporter. The level of optimal anticipatory hedging can be substantially less than expected output when price and production uncertainties are high. It might turn out that the quantity to be hedged is a decisive decision variable, instead of always assuming completely hedged positions. Particularly in the case of agricultural commodities, as said earlier, a producer has to face not only a price but also a quantity risk and deviations from completely hedged positions are thought to be rational and depend on the type of relationship between output and price variability. It is possible that the level of optimal hedging for a risk averse producer might be much less than the expected output when both price and production are uncertain.

The level of hedging can also be different for large and small producers/exporters. Futures trading, at a horizon for which the futures prices are supposed to provide an unbiased estimate of the long-run equilibrium price of the commodity (a highly debatable subject), should allow consumers and those small producers whose production has a negligible effect on the commodity price to eliminate the effects of price variability completely. On the other hand, large producers, whose production levels will affect the commodity price, will not be able to eliminate uncertainty from their revenues completely, though they may be able, to some extent, to adopt futures positions which will make fluctuations in revenues independent of variations in the commodity price. In sum, for consumers and small producers, futures trading could be, in terms of risk reduction, an effective price stabilization mechanism. Large producers, whose main interest is revenue stabilization, also can adopt a forward position that is optimal for their own circumstances, but the task of finding such a level is more complicated.

b) Inventory hedging

Futures markets constitute a valuable source of market information and careful monitoring of prices leads to efficient export pricing and marketing. In particular, the relationship between futures prices for different maturities provides the market-determined price of commodity storage.

The difference in price between futures contracts for different maturities, the so-called "basis", is a signal of the availability of stocks to the markets: large price spreads indicate an abundance of stocks and an incentive to store whereas small or negative price spreads points to a tightness in stocks and an incentive to release them to the market. Returns to storage, known as "carrying charges", are normally greatest between contract months immediately following harvest and smallest between those immediately preceding it. That is to say, when stocks available to the market are plentiful, positive carrying charges will exist between distinct contract months. By contrast, small or negative carrying charges will result when stocks are low. The exporter who understands the significance of futures price spreads can use this information to his benefit in the timing of export sales even without engaging in futures contract trading. The examination of these price relationships enables the exporter to be aware of current market conditions as well as implicit future market expectations (these points on the "basis" will be taken up again in Chapter III).

Futures price spreads, therefore, will signal to the exporter when to store and when to sell. With this information, the exporter might store the product by hedging stocks in futures markets against possible adverse price changes. When a carrying charge is positive, the exporter can earn a return to storage by simultaneously purchasing the cash commodity and selling futures. Upon the expiration of the near futures, the exporter can continue to earn a return to storage by rolling over his futures position into the next future, as long as a positive carrying charge is maintained. The exporter can redo the process until price spreads become negative, and then close out his futures position and releases his stocks on the cash market.

The degree of success in inventory hedging by exporters, depends, as in the case of anticipatory hedging, on basis risk. The return to storage may be reduced or increased by changes in the exporter's local or quality basis. It

will be also affected by changes in the cash basis if stocks are released from storage before expiration of the futures contract. Benefits accruing from inventory hedging also depend on the stockholding behavior of principal cash market participants: the availability of stocks to the market relative to current demand largely determines carrying charges, and the stockholding behavior of a major producer or a group of producers, and the location of the futures market, has an important bearing on them. It is known, for example, that carrying charges in grain, soybean and cotton futures are determined by stockholding behavior in the United States where the major futures markets for these products are located.

Mechanisms employed in inventory hedging should encourage not only intra- (within a harvest year) but inter-temporal (year-to-year) price stability, promoting stock releases in times of shortage and stock accumulation in times of abundance. However, these gains could be substantially reduced by the application of price stabilization schemes which tend to regulate stock availability contrary to futures market signals.

Regarding inter-temporal price stability, there is another dimension to consider in the mineral sector. In effect, the owner of the mine has most of his inventory in the form of reserves. As such, his assets are exposed to the risk of price variability, depending on the price at which the reserves are to be extracted. In consequence, the producer is exposed to risk with respect not only to the refined metal inventory, or production during the period in question, but also to the stock of raw material for a much longer-term production horizon (Bande and Mardones, 1990).

c) Flexibility in pricing

Another important modality of hedging which could be of great utility for developing country exporters is the mechanism of the so-called "basis priced contract". The parties to this contract agree to two separate components in pricing the export sale: i) the choice of the futures contract which later determines the absolute price of the export sale; and ii) the basis, or the amount above or below the relevant futures' price the exporter will earn for making the sale. The basis is composed of transportation costs between the futures market and the delivery location and of premiums or discounts for quality differences with respect to the commodity specified in the futures

contract. This practice is known to be common in the worldwide grain industry including the major Latin American exporters of grain. Basis priced contracts allow the exporter, as in the case of the importer, to fix one dimension (the basis) of an export sale in advance, but at the same time maintain flexibility in the other dimension (price). By definition, forward contracts fix both dimensions, while cash market sales fix neither.

In a typical basis priced contract, the exporter and the importer agree on a sale/purchase of the commodity after having specified the basis. The futures contract used for this purpose by both the exporter and importer is the one whose expiration is the closest to the time of delivery agreed in the export contract. The price at which the exporter sells and importer buys futures does not have to be the same. Both exporter and importer, according to their judgement, speculate on price levels by waiting to take a futures position. Once a trader establishes a price by taking a futures position, if he so wishes, he can establish a new price by rolling-over. Thus, the risks in a basis priced contract lies in the very flexibility in determining a price level and the risk that the agreed-on basis will not cover exporting costs.

A mechanism often adhered to by the countries in the region, but strictly speaking outside futures operations, is called Executable Orders (E.O.). It is a variation of an Against Actuals contract (the barter of physical for futures) and is usually arranged with a member of the exchange. The major objective is to establish a price-fixing formula which permits a partial or total execution of a sale between the date of the physicals sale and the date of shipment. After agreeing on the quantity of lots, the positions and the premium/discount in relation to the futures price, the seller fixes the price of the physicals by giving orders to the broker who executes them on the exchange for his own account. The advantage for the seller is that he can fix the price of the physicals when he so desires during the stipulated period. The seller operates on the exchange the same way as if he were making a hedge without assuming any direct commitment at the exchange.

Benefits accruing from E.O. contracts should be assessed by their provision of price-fixing alternatives: i) should a fixed-price sale be preferred, the objective is achieved by giving an order to sell the total of the lots involved in the contract; ii) if the objective were to obtain the

average (for instance for a one month period), orders could be given for a sale of an equal number of lots each day, so that at the end of the period, a price similar to the monthly average would be obtained; and iii) according to one's best judgement, E.O. contracts may be used in such a manner as to obtain a higher price than in cases like i) and ii).

d) Support of commodity prices

From the point of view of developing countries, there is an additional issue to be addressed: futures trading initiated by the private sector or official intervention in futures markets as a substitute for participation in commodity price stabilization schemes, which up to now have been mainly practiced under the international commodity agreements. Instead of using futures markets on an individual basis for conventional pricing and stock-carrying purposes, exporters may attempt to affect/support cash market prices by trading futures collectively. The basic strategy would involve the purchasing of futures contracts while holding a sufficient amount of the cash commodity to exert upward pressure on futures and cash market prices. In this manner, taking long positions in futures markets could be a substitute for taking long cash market positions, which is basically the aim of under buffer-stock holdings. An immediate appeal for this type of action is based on the market leverage provided in futures trading. Neither do exporters need immediately to restrict exports, nor do they have to store stocks in their own countries. What is required, however, is the necessary margin capital to take and hold onto the futures positions.

The explicit objective of buffer-stock programs is to decrease price variability and possibly income variability. There seems to be also an implicit goal of these operations to stabilize prices at levels, on average, higher than those of long-term equilibrium. The use of buffer-stocks to achieve price levels higher than those which would have been established by market forces alone, as has been observed in the case of the tin crisis, tends to encourage over-production and to leave the buffer-stock authority as buyer of the last resort, with an ever growing stockpile of the commodity. In order to sustain futures prices above their long-run equilibrium level, the authority would normally be holding net long positions and taking losses on

these contracts as they near maturity. Further, such price-supporting activities would necessitate taking delivery on futures contracts.

In addition to being considered as "manipulative" and running the risk of regulatory action on the part of the exchange itself or the governmental regulatory agency,^{12/} this type of market operation to support cash prices entails high risks. The participants will eventually face the problem of what to do with stocks acquired by standing for delivery on their long positions. As said earlier, unless the overhanging stocks are effectively removed from the market, any temporary increases will be short-lived. On the other hand, in order for the price-support activity to be effective, the mechanism which is to transmit price changes from the futures to the spot markets must be strong enough so that intervention in one market can be considered as a good substitute in the other. The futures market in question, therefore, must possess the depth, breath and resiliency to withstand official intervention and to transmit predictably price changes to the spot market.

An alternative to collective action by producers, either through the international agreements or joint futures market operations, of course would be for each of them individually to adhere to futures markets. In this context, Newbery (1983) suggests that in general futures markets are likely to offer better insurance to producers than price stabilization schemes, as long as, and to the extent that, futures markets are kept highly competitive. And this condition, somewhat contrary to the widespread belief on the part of developing country exporters, requires adequate speculation. The comparative advantage that futures trading has over price stabilization schemes arises basically from: i) the discretion it gives to the potential hedger, allowing him to take into account a possible quantity risk; ii) the potential distortion of production incentives under price stabilization schemes; and iii) the encouragement given by futures markets to the development of storage facilities and the carrying of inventories by the private sector.

The choice between private futures markets or official intervention in the cash or futures markets with the aim of stabilizing prices is a philosophical as well as empirical one. The promotion of futures trading to shift risk and encourage the private holding of inventories is an approach which emphasizes "market" solutions by the private sector. The publicly held

buffer-stock approaches involve, of necessity, a significant degree of official management of major commodity markets. The ramifications of official intervention in futures markets may be quite large and possibly unfavorable.

2. Options

An option gives the purchaser the right, but not the obligation, to buy (call) or sell (put) a commodity at a given price (called the strike price) during a given period of time. In contrast, a futures contract is an agreement to purchase or sell a commodity at a given price during a given period of time. A futures contract obliges both parties to the contract to fulfill the contract, while a purchaser of an option can walk away from the contract if this is deemed to be convenient. It should be recalled that the purchaser of a call option is not the opposite party to a purchaser of a put: the opposite party to a purchaser of a call is the grantor or writer of the call. Similarly, the opposite party to a purchaser of a put is the grantor of a put. Options are not free: their price is called the premium and is determined in the market place. When options are traded on an exchange, their premiums and the price of futures move together through arbitrage. In fact, most people who write options, hedge them with futures so that there is a net addition to futures liquidity. In this sense, an option must have an underlying liquid futures market in order to be successful. The rapid increase in cocoa, coffee and sugar options in the United States can therefore be attributed to a large extent to their underlying futures markets.

Producer/exporter uses of options are diverse but can be divided into four categories: i) price protection; ii) quantity risk management; iii) risk management in bids; and iv) income generation.

a) Price protection

Like futures, options can be used to shift the risk of price change. By way of illustration, we can see how the price risk is shifted for the case of grain farmers using futures and options. Usually the farmer has an alternative between selling the grain immediately or storing it in anticipation of higher prices later in the season. The second option is often attractive because grain prices tend to be at their seasonal low right after harvest. However, it

is also highly risky since grain prices may fall rather than rise, due to unforeseen circumstances. As seen earlier, an anticipatory hedging in futures markets allows such a producer to shift the risk of adverse movements in his inventory.

Instead of entering into a selling (short) position in futures, the farmer could purchase a put with a strike price near today's futures price. If the price subsequently rises, the farmer can leave the option or if it still has some value, offset it and sell his grain in the cash market. If, however, prices subsequently fall, the farmer can exercise the option, receive a short futures position which can be offset for a gain or settled by delivery. It is clear that the put option acts as a price floor, allowing the producer to profit from price increases, while the futures hedge allows him to lock-in a price.

Another suggested use of options in this category is as insurance against catastrophic price movements, not an uncommon problem faced by developing country producers/exporters. A producer may be willing to assume a certain degree of risk under normal periods, but may desire to protect himself from major price shifts. Under these circumstances, he might purchase an out-of-the-money put option in which the strike price is substantially less than the current market price of the underlying futures contract. In view of the smaller probability that such a put will be profitable compared to one with a strike price equal to the current price, its premium will be low. In this way, out-of-the-money puts could provide relatively cheap mechanisms to insure against catastrophic price changes.

b) Managing with quantity risk

A second category of use of options by producers is to deal with quantity risk. An illustrative case is a producer who tries to hedge "expected" production at planting time. In this case, the producer faces not only price risk but also quantity risk because the exact yield is not yet known. Using futures, a prudent producer could hedge less than expected production, making sure that he is not overhedged. In contrast, a put option allows a producer to hedge expected production fully because this option does not have to be exercised.

c) Options and bids

Options make it possible to reduce risks in transactions where the bidding system is used. A processor who desires to cover the price risk involved in a bid, whose bidding rules will be announced afterwards, can buy a call option for the quantity necessary to meet the order. In this way, he fixes the price, avoiding the risk if the price of the commodity increases meantime. If the bid is lost, and in addition the price moves against him, he only loses the option premium. If the price moves in his favor, he makes a profit, whether or not he wins or loses the bid. A futures contract is not useful in this case since it obliges the bidder to accept delivery even if the bid is lost. The opposite case in which the buyer obtains the product in a bid using an option can also be envisaged.

d) Income generation

Another possible use of options by producers is to earn income. As obvious as it might seem, for every purchase of an option at a particular time and price, there is also the sale of an option at the same time and same price—the point being that just as there are investors who find it advantageous to buy options, there are others who find it advantageous to write options. Indeed, there may well be occasions and situations in which investment objectives can best be served by strategies that involve writing rather than buying options on futures contracts.

Typical cases are writing of call and put options to earn premiums, without having any position in the underlying futures contract (known as writing uncovered or naked calls or puts). These strategies can provide cash flows from premium incomes during periods of "flat" or slightly bearish markets.

Uncovered option writing, however, should be considered only by those investors who fully understand the risks involved and who are financially willing and able to assume them. The potential loss is unlimited, whereas potential profit is limited to the premium received. Considering the financial and expertise restraints faced by producers/exporters of developing countries, it can be said that these strategies cannot serve their immediate interests.

The preceding shows that as a flexible risk management tool, options provide several advantages to both futures hedgers and unhedged positions:

i) options buyers enjoy limited risk with unlimited profit potential (they can never lose more than the premium paid); ii) contracts can be closed out prior to expiration; iii) users and producers can fix their prices at various levels, in effect using options as price insurance; iv) option buyers are not subject to margin calls so that no open ended credit line is needed; and v) options make significant new pricing strategies available. On the other hand, certain disadvantages may make the use of options less appropriate in certain circumstances. They include: i) options values diminish over time —holders may therefore suffer a daily erosion in their time value; ii) options premiums must be paid in full at time of purchase; iii) sellers must meet margin requirements at all times; and iv) options strategies and premium determinations are complicated. Evaluating each advantage and disadvantage can only be done on an individual basis, depending on the degree of exposure, capital and willingness to accept risks.

From the point of view of developing country producers/exporters, however, options may be more relevant tools than futures. Participation in options markets can take place either through producers/exporters directly buying put options or through traders offering producers/exporters the equivalent forward option (a cash market option), then covering themselves by buying options. Buying options can be promoted as a long-term insurance policy, while futures are more suited for short-term price fixing for forward contracts. The idea is that through such a tool a producer can guarantee a minimum price for his product sold forward, but at the same time be able to take advantage of price increases. The cash market option functions similarly —a trader offers a guaranteed minimum price of so many points off the current price, but if prices increase before delivery, then the producer receives same number of points under the new price. This approach caters to a producers' usual price optimism in that he sees prices going up.

IV. CONSTRAINING ELEMENTS ON THE USEFULNESS OF FUTURES MARKETS FOR DEVELOPING COUNTRY COMMODITY EXPORTS

1. The basis

Hedging tends to reduce the cost of exposure to price uncertainty if there is less uncertainty about the basis, or the difference between spot and forward prices, than about the level of the spot price. The expected benefits of hedging therefore depend on the degree to which the basis is more predictable than the level of the spot price.^{13/}

Given the recognized importance of the basis in the risk transfer process, it is useful to analyze it in some detail. In an approximate way, the future price parity can be defined as the following:

$$F^m_t = S_t + c + u$$

$$c = C - Y$$

where F^m_t denotes the futures price at time t for a given contract maturing at time T and m , the delivery month (F^{12}_t , for example, futures price for delivery in December). F^m_0 is the futures price at present (let us say January) for delivery at m . F^m_T is the futures price at the maturity date. S_t is the spot price at time t , while C is "gross carrying charges" including interest, insurance, storage, embarkation fees, etc. which are necessary to store the inventory. Y is the "convenience yield", being defined as the return that inventories yield their owner aside from an expectation of rising prices. For instance, in the case of a raw material for manufacturing, there are benefits accruing from holding inventories in terms of production adjustment, rather than purchasing it on a spot basis. This concept helps to explain why traders and manufacturers may hold stocks even when they expect prices to fall, and why they hold and hedge stocks even when the basis is negative. And lastly, u is a disturbance term consisting of transaction costs (commission fees etc.) as well as all other market factors which influence the price.

Using the terms above, the basis is defined as:

$$\text{Basis} = |S_t - F^m_t|$$

When $|S_0 - F^m_0| < |S_1 - F^m_1| < |S_2 - F^m_2| \dots$, the basis is getting "strong", while when the opposite is true ($|S_0 - F^m_0| > |S_1 - F^m_1| > |S_2 -$

$F^m_2|)$, it is getting "weak". At time T , i.e., the maturity date, $|S_T - F^m_T| = 0$. Also, when $F^m_t - S_t > 0$, it is called "normal market" (contango), while $F^m_t - S_t < 0$, "inverted market" (backwardation). The reason why the basis is important is that the fundamental of hedging is to transform the spot price risk to change in the basis (basis risk). Whether the market will be normal or inverted depends on c and u , but since u is defined as an error term, the market trend depends to a great extent on the net carrying charges ($c = C - Y$).

In general, the relationship between C and Y is distinct among commodities: allowing for possible exceptions, the contango characterizes the markets for gold and silver and other precious metals. For these products, Y is negligible, and the circulation in spot markets is abundant. Furthermore, there are large reserves under possession of governments or other agents, and there are few transport problems which might lead to a "squeeze" situation. Therefore, F^m_t reflects principally interest charges as a major component of C , establishing the relationship $F^m_t > S_t$. The further away the maturity date, the greater is F^m_t in relation to S_t , presenting a typical contango situation. Under these situations, the trader sells hedges (short) and makes a profit when the basis gets "weaker".

On the other hand, "backwardation" is often observed for agricultural products such as wheat, barley, soybean, sugar, cocoa, and for metals like copper and aluminum. When these products are in contango, there exists a certain basis movement pattern in accordance with the seasonal harvest (production) cycle. For instance, in the Northern Hemisphere, spring futures would tend to be contango in relation to the autumn spot price. In the case of backwardation, the tighter the spot market, the greater the value of Y and it theoretically can be assumed that $- < c = C - Y < 0$. For instance, a long hedge S_0 by a short of F^m_0 , under backwardation, will lead to $(S_0 - F^m_0) < (S_t > 0 - F^m_t > 0) < 0$, and can produce a big loss. A selling hedge to cover a forward sale of physicals is considered advantageous in a "normal" market, and this would be an argument in favor of hedging. Conversely, if the market is "inverted", this is an unfavorable factor in a hedging decision.

Hedging operations entail "basis" risks if cash market transactions are separated by space, time, and form from futures market transactions. As seen

earlier, whether basis risk is high or low depends on several factors. If there is quality risk (instability in the price spread between the exporter's grade and that called for in the futures contract), these two markets are not likely to be well integrated. Also, if transport costs such as freight rates vary, the spot price at the futures market delivery points will also vary relative to the spot price at the exporter's location. The exporter will hedge his inventories if he anticipates a low basis risk. If the basis narrows, the hedge is profitable, whereas if it widens, the hedge might result in a loss.

The experienced trader may thus profit if hedges are lifted after the basis moves in his favor. The following may be concluded with regard to the outcome of a hedging operation and the market situation (positive sign means a profit while negative sign, a loss):

<u>market</u>	<u>hedge type</u>	<u>basis</u>	<u>basis</u>
normal	selling hedge	+	-
normal	buying hedge	-	+
inverted	selling hedge	-	+
inverted	buying hedge	+	-

Since variability could result in a loss, the risk adverse hedgers might refrain from trading. It should be stated that analyzing the basis is especially important in the case of products having a low unit value in order to evaluate when and in which markets hedging should be taken. Moreover, basis risk is likely to be more significant to the foreign hedger than to a trader hedging in the domestic market, due to: i) limited transportation availability; ii) foreign exchange risk; and iii) possible government market intervention at either the foreign or domestic end.

One might speculate that if the change in the variance of the basis is caused by completely unpredictable events, it is likely that futures market participation would decline. However, if the increase in variance can be attributed to events about which there is market information, those traders who believe they have such insights will be attracted to the situation, and therefore, futures volume can increase. For the uninformed trader, there is simply an increase in the variance of the return function but for the knowledgeable trader, there is an increase in the expected mean that more than compensates for the higher variance and leads to increased trading activity.

The importance of information capacity and technical expertise in trading can be understood in this framework.

The preceding simple illustration shows that the pursuit of profit as well as the shifting of risk should be the governing motive of hedging. The recognition of the profit motive in hedging introduces the information aspect of futures trading. Given the standardization of contracts and the organized, highly competitive trading, an informational advantage could serve as a second potential source of systematic returns, besides the scarcity rent possibly obtainable by risk-bearers.

2. Financial considerations

a) Burden of margin calls

In general, futures markets can be said to establish easier and cheaper financing. This is because the solvency of the borrower is not impaired by a drastic fall in market price if the value of the merchandise has been protected through the hedging operation. When a raw material is given as a collateral, the bank will run a high risk if the commodity is not adequately hedged. Therefore, futures can be used as part of a strategy to facilitate the financing of new production projects.

A great advantage of futures markets is the high leverage potential, enabling voluminous transactions with relatively small margins. In turn, margin deposits are most often cited as the major barrier to the use of futures markets by developing countries. The practice of daily account crediting and debiting, the so-called "marking-to-the-market", often results in large interim unexpected profits or losses for the trader holding a futures position. The uncertainty about the size of margin deposits during the life of a contract, therefore, calls for extremely liquid financial resources. These reserves must be highly liquid since a trader must be ready to meet margin calls immediately.

Furthermore, commodity credit to cover margin calls is only available for relatively short periods, typically no more than six to twelve months, reflecting the fact that beyond this time horizon, the producer is unable to offer the commodity as secured collateral. However, governments of developing

countries are anxious to stabilize their foreign exchange revenues over considerably longer horizons than this.^{14/} In fact, futures trading will become a more adequate substitute for price stabilization if credit can be made available, perhaps by an international or regional organization, to finance market or related hedging operations over a longer period and more widely than at present.

Foreign agents usually have greater difficulty than domestic traders in maintaining a futures position. Futures contracts are usually transacted in the currency of the country where the exchange is located and margins are also called in the domestic currencies or interest bearing government securities, certain kinds of equity stocks, letters of credit and bank guarantees and in some cases warehouse warrants. This presents a great constraint for potential participants from countries where foreign exchange availability is constrained by lengthy bureaucratic procedures.^{15/} In this sense, government sponsored trading agencies may have more success in establishing foreign exchange access than individual private firms.

It is essential that traders authorized to operate in futures markets have the full confidence of the government, the Central Bank, and the public in order to be able to operate freely and expeditiously with skills and discretion, but without being subject to unwarranted criticism. Let us remember that losses resulting from not using futures markets are "opportunity costs". The losses that actually occur through the use of the exchanges are, however, "real" and they appear in the trader's accounts and are often subject to strong criticisms especially if due to speculative operations. What might be necessary is a readiness of the parties concerned to accept short-run cash losses in view of more long-term gains and opportunities. In countries where it is necessary to defend each and every transaction, or where access to foreign exchange is not immediate, the success of futures trading may be quite reduced.

It seems that members of the exchanges enjoy more maneuvering room with respect to margin calls and that trading through principal traders most of whom are members of the exchanges, via a principal-to-principal basis, would give the developing country trader more flexibility in meeting margin obligations (Bande and Mardones, 1990). The burden of margin deposits might be

further eased, as in the case of the US exchanges, when lower margins are paid for the non-speculative use of futures markets by primary commodity producers. Another way would be to allow the producers/exporters intending to hedge to obtain credit from banks or other institutions against deliveries to be made into warehouses in producing areas.

Another idea regarding margins is creation of a financial-cum-insurance market. For a fixed fee, related to factors such as the past price volatility of the commodity in question, the duration of the contract that is to be insured and the interest rate, insurance companies could offer to meet all the margin payments associated with hedging and price fixing. This kind of an insurance policy would be of substantial use for highly risk-averse producers, diversifying their marketing options from the traditional method of forward sales.

b) Exchange rate risk

In terms of risk management in commodities, the importance of exchange rate volatility has grown dramatically since the breakdown of the previous fixed exchange rate regime in the early 1970s. Now the exchange rate risk is an important element for the decision maker because currency values can change widely between the time a futures contract is entered and the hedge is lifted. For the offshore hedger who seeks to stabilize export revenues in domestic currency terms, exchange rate movements constitute a crucial factor in the overall effectiveness of a commodity hedging strategy. Additionally, the outcome of futures operations becomes further complicated when the net exchange rate is taken into account, which incorporates effects from export drawbacks and export duties. A high degree of interaction between prices and the exchange rate implies that the offshore trader might view price risks differently than a domestic trader, and this in turn will affect the desire to participate in hedging operations.

For an efficient operation of local futures markets, a stable unit of value is required for the determination of price. For instance, the Bahia Mercantile Exchange (BMB), in cooperation with the Bolsa de Mercadorias de Sao Paulo (BMSP) developed a futures contract for cocoa beans which enjoyed initial success, as long as the "Plan Cruzado" was effective. When this stabilization plan collapsed and the stable unit for the determination of

price disappeared with the resurgence of inflation, holders of short positions were unable to keep up with the surge in the value of cocoa and were forced to cover at severe losses. Thus, as long as inflation was the primary motive for the establishment of long positions, there would be no sellers, and hence no opportunity for a futures market to function. Realizing this situation, the BMB/BMSP introduced an adjustable cocoa contract, but the complicated method of daily adjustments of the value of the open position relative to the change in the official dollar/cruzado exchange rate made futures trading cumbersome, and the adjusted cocoa contract remained dormant.

Theoretically, and at times in practice as shown by the Australian Wheat Board, some reduction in exchange risk exposure can be achieved in two ways. One is to borrow offshore in the same currency as applies to overseas sales (in the case of the AWB, wheat sales in US dollars). This creates a natural hedge in the sense that exchange rate movements which imply a loss on export receipts simultaneously imply a gain on loan repayment commitments. The main difficulty in pursuing this policy lies in matching the volume and maturity of loan commitments to the exact timing of export receipts.

An alternative means is, of course, to use the market for forward exchange cover. However, the efficiency in exchange risk reduction depends on the degree of interdependence between commodity price risks and exchange rate shifts. As generally occur, changes in the value of the main currency (e.g., US dollar) are transmitted directly into spot commodity prices—for example, a US dollar devaluation implies a rise in dollar-denominated commodity prices. It is also possible to envisage the effect through the impact of changing world commodity prices on the exchange rate of a small open economy. Changing commodity prices alter a country's terms of trade which, via current account earnings, leads to changes in the exchange rate. Also, monetary shocks which affect interest rates may alter both commodity prices and exchange rates. A short-term rise in interest rates may have the dual effect of pushing down commodity prices (via inventory stockholding effects) and strengthening the currency (via induced capital flow). These commodity price-exchange rate interactions can create a divergence in the perceived risks of commodity stockholding on the one hand and futures contracts on the other. They also

should lead to divergences in perceived basis variance between offshore hedgers and the domestic counterparts.^{16/}

In any case, the desire of the foreign trader to reduce his exchange risk by concurrently hedging in foreign exchange markets generally requires added liquidity. Moreover, that direct hedging in futures markets is sufficiently complicated in a developing country environment implies that more sophisticated strategies for currency cover would entail expertise and possibly high costs and risks.

3. Representativeness of prices generated at the exchanges

The basic role of speculators as participants at the exchanges is well known—providing required liquidity to the market and assuming risks which hedgers are trying to reduce. A common criticism of the commodity exchanges relates to the argument that speculation distorts prices and increases price volatility. The nature of the market commitment is that hedging is normally net short and speculation is net long. The extent to which long speculation exceeds short hedging can be considered as excess speculation and reflect a degree of market imbalance.

Exchange quotations are basically a short-term indicator in which accurate market signals of medium- and long-term considerations on production and consumption are not necessarily well incorporated. In addition, the fact that a relatively small number of physical transactions set the reference price for all of the output of a given commodity tends to distort prices. In the short-run, the price elasticities of commodities are known to be low, and adjustments on both supply and demand side are slow. Because of lagged reactions of commodity demand and supply fundamentals, new market disturbances occurring in the interim could cause commodity prices to deviate from a long-term equilibrium trend.

The practice of many speculators of relying heavily on technical analyses (based on information on prices, trading volumes, open-interest positions, and other indicators), and the extrapolation of trends might magnify the movement of the market in one direction and possibly destabilize it. Criticism as to the unrepresentative nature of exchange prices is clearly related to the

speculators' heavy reliance on technical factors, which often promote price movements which run counter to the trends of the fundamentals. Industry often claims that the prices quoted on commodity exchanges are far removed from long-term equilibrium prices and that their interests are not sufficiently echoed at the exchanges.

Most of the trading which takes place is speculative and the presence of such a large number of speculators in these markets calls for in-depth analysis of their behavior. At present, it is not clear whether prices are more volatile or distorted because increasing uncertainty about production, stocks, consumption or other events cause speculators' expectations to change frequently, or whether it is their very participation that generates price swings.

One of the major obstacles existing for a greater participation of the countries in the region is the lack of parallelism in the evolution of prices between the exchanges in the developed market economies and the local markets. First of all, futures market performance for commodities exported by developing countries such as cocoa and coffee may differ from the performance of futures markets for commodities such as cotton and sugar whose export trade is shared by both developed and developing countries and whose international trade is only a fraction of world production. For instance, the most salient feature of the No.2 cotton futures contract is its specification that only US-grown cotton may be delivered. As such, foreign cotton traders are somewhat limited in their use of the New York cotton market because they cannot deliver foreign-grown cotton. However, the N.Y. cotton futures may still be used effectively for hedging by foreign traders as long as cotton prices in New York are highly correlated with cotton prices at terminal locations outside the US. Thompson (1983) argues that cotton futures price spreads are indicative of US cotton stock availability rather than world stock availability. In the case of cocoa futures, however, price spreads appear to represent world stock availability and this is probably due to the fact that most cocoa stocks are held in importing developed countries where stockholders are likely to hedge on futures markets or at least pay attention to futures price signals.

In the case of grains, as Regúnaga (1990 a) shows, the prices in Chicago and Kansas do not always evolve systematically with the corresponding FOB or FAS prices in Argentina and Brazil. The divergent price movements are related to changes in premiums to define the FOB price, changes in margins, transport costs and the exchange rate.

With respect to premiums, it is possible that the "fundamentals" affecting demand and supply in the producing (exporting) countries differ from those corresponding to the consuming countries where the exchanges usually exist. In grains, for instance, the US and some Latin American countries are competitors. This can produce a situation where a US sale implies a substantial reduction in demand for Argentina and Brazil, while an increase in these Latin American countries' production has little impact at the international level —especially in the case of wheat, and to a lesser extent in feed grains and soybeans.

It is known that a temporal disequilibrium in grains demand and supply in the major producing countries can result in a competition between local consumption and exports, which will be reflected in the local FOB prices in a more accentuated manner than at the CBT. Also related to this, is the cross seasonability in production between the Northern and Southern Hemisphere, which produces unpredictable variations in premiums.

The lack of parallelism in price evolution is more accentuated when comparison is made of internal prices in Latin American countries with quotations in Chicago or Kansas. Frequent changes in the costs and margins involved in the embarking process can be induced by local government policies or by local market conditions, and the availability of financing. In the case of Argentina, the prefinancing system has been said to have substantially modified the internal purchasing power of some operators who have easy access to international capital. Those with ample funds have been enabled to obtain more favorable FAS-FOB margins. Regarding the local supply and demand balance, it is interesting to note that a production reduction experienced in Argentina in recent years resulted in oversupply of shipping and processing capacities, generating strong competition among grain elevators and processing plants. This was reflected in lower shipping costs and higher internal grain prices, altering the normal FAS-FOB price relationship.

The representativeness of the prices generated at the exchanges might be further narrowed for the products with a low degree of processing, like minerals. Price formation of non-processed minerals takes place in relation to the exchange quotations (IME, COMEX) of the corresponding metals, but as often pointed out (Sánchez Albavera 1984), the sellers of these products are not always able to benefit from higher metal prices, due to the arbitrary criteria of adjustment in toll charges, impurity discounts and smelting and refining reductions which do not move proportionally to the increase or fall in the exchange quotation.

4. Contract specification

The representativeness of price quotations at the exchanges has to do with contract specification, specificity of which will influence greatly the degree to which the contract will be successful. Well designed contracts should attract trade by a wide spectrum of hedgers and speculators, while poorly designed contracts attract insufficient trade volume resulting in a "thinness" in a large number of the futures markets. Thin markets with a small number of buyers and sellers and a small volume of transactions might be more prone to price bias and price volatility. Well designed contracts promote more producer and industry activity as well. Attracting a sufficient number of speculators to the futures market can mean a certain relaxation in contract specification sought by industry, in compensation for the liquidity required for the exchange to provide its premodial role as a risk transferor. To ensure liquidity, there is a tendency towards a situation where the futures quotations reflect the state of demand for the "lowest common denominator" quality of the commodity, and do not necessarily provide a full reflection of the value of the bulk of production entering world trade.

The major features of a futures contract which determine its effectiveness are delivery grades and locations. With respect to delivery grades, there will be a "quality risk" if the physical product is not equivalent to the quality specified in the contract traded in the exchange. For instance, in 1987 the IME decided to upgrade its aluminum contract, because according to IME officials, there was little physical material behind

the standard contract deals, which often left the market with wide price fluctuations. The copper contracts on the LME and COMEX were upgraded for the same reasons. The same applies to zinc, where a new special high grade contract was introduced to bring the LME more in line with the physical market. The prices on the LME for nickel and aluminum shot up in early 1988, but both markets were rather thin in terms of number of buyers and sellers and most of the physical trade transactions were outside the associated cash markets.

As mentioned earlier, while standard premiums and discounts are usually allowed for alternate grades, such compensations may understate premiums and overstates discounts actually paid on the cash market. In the case of copper, for instance, there is a practice to charge a premium for higher-quality cathodes than those specified by the LME. But it is not always possible to determine the value of the premium in advance. In the annual contract signed between the producer and consumer, this premium is contemplated, but it is not the case for sales not covered by an annual contract. The seller is, therefore, subject to a variation in premium levels, which moves in accordance with the demand and supply of high-quality cathodes (Bande and Mardones, 1990).

Interestingly however, this premium is lost when the high-quality cathode is delivered to the warehouses authorized by the exchange. A buyer who wants to take delivery from the exchange, on the other hand, has to pay a premium. Something similar happens with the geographical location of an authorized warehouse of the exchange. The seller can take advantage of having the material in a convenient spot, saving at the same time transport costs. On the other hand, the buyer, who wishes to receive delivery from a particular warehouse, must usually pay a premium. There is no mechanism to fix in advance the amount of this premium.

5. Futures markets as last resort

Futures markets may be used as a vehicle for direct commodity marketing. If they wish, exporters can sell futures contracts with the intention to deliver the commodity to an official delivery point upon contract expiration. For some

exporters this option may be attractive because it solves the problem of finding and contracting with buyers. By this option, the exporter is assured of a market, with an established price. However, in practice, the delivery points are usually in consuming regions so that the exporter would have to arrange transportation of the commodity to an authorized delivery point. Furthermore, heavy use of this delivery mechanism is likely to depress the price of a futures contract, thereby making the contract less attractive to prospective traders. An over-use of this practice might also lead to an even lower supply elasticity, by reducing the urgency to regulate production in accordance with demand changes. Under these circumstances, futures prices may reflect market conditions only at consumer-oriented delivery points; prices in producing regions need not move with futures prices. Thus, futures prices are used more often by traders who face little basis risk, that is, those that transact in cash markets which are well integrated with futures market delivery points.

6. Government policies and futures market use

Government policies have a far reaching impact on the use of futures markets and, as mentioned earlier foreign exchange management is a very important case in point. It is conceivable, on the one hand, that some policies reduce both futures market use and price variability, while on the other, others may promote its use and increase price variability. Other cases characterized by decreased use but increased price variability are also possible.

Under the not always convincing assumption that stabilized cash market prices are a good predictor of futures prices, commodity price stabilization schemes under buffer-stock or quota arrangements should lead to a reduction in cash market price variability as well as in futures price variability. Traders who face little adverse price movement have little incentive to hedge, while speculators are less attracted to assume futures positions. Some of the experiences with price stabilization programs (e.g., sugar, coffee, cocoa, tin) show, however, a distinct behavior with respect to cash market and futures market variability.

Meanwhile, unpredictable, transitory or erratic government interventions such as trade embargoes, price support or subsidies and exchange rate changes may increase price variability and the use of futures markets could be increased to deal with these market shocks.^{17/} Similarly, speculators may be more apt to take futures positions. Trade restrictions such as quotas or tariffs could also increase the supply inelasticity of the commodity, making cash markets thinner and cash prices more variable. Futures markets whose trade is highly regulated may even be characterized by a higher price variability than the cash market when speculative activity is unproportionally high relative to hedging activity. Though hedging may be justified by high cash price variability, even greater variability of futures prices may discourage hedging.

V. FUTURES MARKETS FOR COMMODITY IMPORTING

1. General considerations

Today the majority of developing countries are net importers of cereals (wheat and wheat flour, rice, barley, maize). The importance of these imports is clearly seen in that in recent years around 40-50% of developing country export earnings from the 18 commodities covered by UNCTAD's Integrated Programme for Commodities have been directed towards the financing of cereal imports. For the countries in Latin America and the Caribbean, the share of food products in total imports is often high, amounting to close to 40% for Haiti or and 20% for countries such as Peru and Guatemala (see again Table 1). In view of the need to ensure food security and the large amounts of foreign exchange spent on food imports, special efforts are called for by developing countries to buy their food requirements on competitive terms.

Many governments and private buyers purchase their commodity imports in the simplest form, that is, at the cost and freight (C&F) price delivered to the buyer's port. This is often the most expensive way to purchase, and it entails the buyer considerable logistical constraints for the buyer. Buyers are unable to speed up or delay shipment because they do not control the shipping. By purchasing C&F, the buyer is forfeiting all logistical flexibility to the seller, whose primary objective after concluding the sale is to conform to the contract at the cheapest cost and to cash the buyer's letter of credit as soon as possible. By contrast, with their own initiative, decision making and proper expertise, buyers can regain much better control and flexibility of imports, both in price and logistics. For this reason, most of the largest purchasers and importers, like the governments of the U.S.S.R. and China and the major commodity houses, purchase on an FOB basis and handle shipping themselves separately (Pinniger 1987).

Although the above argument is widely recognized, there is some concern that developing countries often pay unduly high prices for their grain and for their transport. A comparison of the CIF unit value of the cereals imported by developing and developed countries in 1981 (a peak year of grain imports) shows that for the first group of countries it was US \$ 232 per ton whereas

for the latter, US \$ 196. For the years 1979 to 1981 the import unit values for developing countries were 15 to 18% higher than the corresponding figures for developed countries (UNCTAD 1983). Though part of this difference is attributed to the developing countries' relatively high transport costs, there seems to be an important potential in aggregate savings through improvement in import management. As in any commodity, efficiency in grain market purchasing requires in-depth knowledge of the market and speedy access to up-to-date information and the capacity to process it. In recent years, grain market analysis and trading has become more complex since the more traditional sources of instability in grain markets such as weather and diseases have been coupled with other sources such as the exchange rate, inflation, and disruptions related to changes in the foreign relations and in the farm programs of major exporting countries.

In developing countries the import of cereals is largely carried out by government authorities, either through ministries or governmental buying agencies, who often lack the flexibility in management that characterizes private traders. Public officials are less experienced in adjusting to the speculative nature of the commodity markets, which calls for quick decisions, appropriate timing, and a certain ability to face risks. All this tends to place governmental agencies at a certain disadvantage. Efficient procurement by a buying agency may be further limited when it has no financial autonomy but depends on other departments such as the Ministry of Finance or Central Bank for the financing of food imports.

When governments import foodstuffs, they normally do so through tenders. The main reason for this is accountability and the belief that bias and favoritism can be better constrained. Nonetheless, by its very nature, tendering is a time-consuming operation and the built-in delays in tendering are pronounced in developing countries. Even when producers are accustomed to ensuring that the interval between the announcement of the tender and the contracting of the purchase is kept to a minimum, the time-consuming nature of tenders does not always make them the most appropriate strategy for food purchases, particularly in the case of large purchases or emergency situations.

2. Possible uses of futures markets and their benefits and costs

As in commodity exports, several types of hedging operations provide importers with an instrument to secure a price which they consider favorable. In contrast to forward or cash contracts where contracting and pricing decisions are taken simultaneously, futures contracts allow these decisions to be separated. And if so desired, as in exports, futures markets can be used to spread pricing decisions over time for a sizeable import contract.

One possible way for importers to use futures markets is to lock in the price, for a portion or all of their anticipated requirements, before actual import contracts are negotiated. Even though exact quantities to be imported are yet unknown, based on the experience of previous years, the importers could hedge long covering the minimum anticipated requirement, if current prices are considered by them to be advantageous. Later when exact quantities are known and the actual imports are contracted, the futures contracts would be sold. The price "locked in" in this case would be approximate from the point of view of the importer, since the actual price paid for delivery in the importing country will depend on transport and exchange rates at the time specified by the contract.

As a second alternative, futures contracts could be used to spread out the time of pricing, for instance, by buying fixed percentages of the total anticipated transaction each month. When import contracts are large, forward contracting with fixed prices is risky because the entire contract is priced on the same day. Unless the importing agency is specially adept at contracting at or near market lows, the costs entailed in this pricing method could be high in any particular year. By buying futures over a period of months (either in anticipation of the actual fixed price contract or after a basis-priced contract has been negotiated), the importer is likely to purchase at the average market price. Again, the average price level fixed by this method will only be approximate as the actual import price will depend on transport costs and exchange rates.

Another way is, if such opportunities exist, to use futures markets to establish the import price by entering into a "basis-priced" contract. The basis may include transportation costs and quality differentials if the

quality to be contracted is different from the standard contract grade. The two components combined give the price level in the importing country location. In this way, the timing of the decision to import specific amounts at specific times can be separated from the timing of the decision on price. And, since the basis is known, futures serve to assure a location-specific price to the importer.

As indicated, the use of futures permits anticipated requirements of a substantial scale to be priced almost instantaneously or be priced over a period of months, even though they are to be shipped at one time. This type of flexibility can be an important asset for the importers of developing countries, but the degree of its contribution depends upon their view of whether current price levels are right or not, given projections of supply and demand over the period of the requirement. Here again, though futures markets provide an alternative way to implement a decision, they do not necessarily help in evaluating the fundamental purchase decision. In this sense, the information capacity of the trading agent is crucial and not to be overlooked.

Obviously, a benefit of futures trading is information improvement. Greater ability of trading agents to monitor markets applies not only to those who participate directly but also those who trade through one or more brokerage firms. Futures markets should also provide for reliable estimates of the costs of foreign exchange, of internal price support mechanisms if any, or of any other import-related programs well in advance of their implementation. In this sense, concentrated purchasing power in organizations of a public character allows not only for requirements and scheduled demands to be known in advance, but also for forward planning of an internal marketing strategy, taking advantage of market tendencies in accordance with existing levels of stocks and the demand of local users.

However, while reduction in the short-term price risks through futures is achievable, price risk is not totally eliminated, due to the risks entailed in changes in transport costs and exchange rates. How important this short-term reduction in price risks is varies from country to country. Furthermore, though with futures trading only relatively short-term price risks (less than a year) are reduced, the variability of import prices from year-to-year may

not be significantly reduced, since futures prices for grains are as variable from year-to-year as are spot prices.

As in the case of exports, the direct costs of futures trading are more quantifiable than benefits. They include executions fees, which cover both the purchase and subsequent sale of a futures contract, and margins. Margin calls, as pointed out earlier, are real in the accounting sense (not like opportunity costs in a fixed-price commitment) and highly visible. This visibility of margin losses on falling markets may be a great disadvantage in itself, especially from the point of view of the country with little foreign exchange.

3. Holding grain reserves in futures contracts

Possible benefits accruing from the use of futures in commodity importation can of course extend over the period usually referred to --annual import requirements. Futures positions can be extended over time to price anticipated requirements for more distant periods than the available futures positions. The placement of actual hedges does not have to coincide with the expected timing of imports since the futures positions could be rolled forward. These facilities could promote trade opportunities under long-term bilateral agreements and maintenance of reserves of foodstuffs in excess of those required for emergency and operational purposes by holding futures positions rather than holding a physical stock.

In principle, long-term positions are more cheaply priced in futures markets than in the spot market, since purchases in the spot market for future requirements would involve storage costs. Price spreads between futures contracts should be less than the full costs of storage, sometimes by a substantial margin. Therefore, the futures position should be generally cheaper to maintain, by rolling over the contracts, than the equivalent size of physical stock.

In the real world, however, the above proposition has to be qualified in several ways. As in the case of exports, the cost of the product in question held in futures positions for long-term requirements depends on the "basis" at the time when the product is actually required. This basis is likely to differ

from the one prevailing at the time when the futures were initially purchased. Furthermore, when the storage costs or interest rates are lower in the importing country than in the country where the futures market is located (e.g., the United States), the cost assessment should be altered. Also, in this calculation, changes in freight rates between initiation of the reserve and its actual use are important. Since high commodity prices are usually accompanied by high freight rates, the balance could swing in favor of the importing country-based reserve. Moreover, currency conditions are important. If, for instance, the importing country expects a significant currency devaluation over the period the reserve might be held, the cost comparisons might turn in favor of local reserve maintenance.

VI. CONCLUSIONS AND RECOMMENDATIONS

Over the years a great deal of intergovernmental negotiations in the commodity sector have been directed towards price stabilization. Such "non-market" schemes as buffer stocks and export quotas, practiced under international commodity agreements or other similar arrangements, however, have met limited success, due mainly to insufficient participation (producing and consuming countries alike), inadequate funding to support them and their inherent inability to correct supply-side disequilibria. Given the recent trend towards the search for solutions based on "markets" and taking into consideration the high price volatility of recent decades, the use of commodity futures markets by developing countries could be thought of as a viable alternative as a price-risk management tool, if their market mechanisms are better understood and more appropriately exploited.

In addition to the main focus on price stabilization, international cooperation in commodities has given increasing emphasis to greater participation of developing countries in the marketing and distribution by their products together with an improvement in market transparency and access. In light of this, futures markets could induce integration of developing countries' pricing systems into world markets, as well as a broadening of competition and lessening of worldwide vertical integration, a feature which has characterized many commodity markets. In order for these countries to be active participants in these markets, however, they require technical assistance for developing and improving their capacity to evaluate international marketing systems so as to better formulate export marketing strategies. In this sense, international organizations such as UNCTAD could play an important role, by preparing technical papers and handbooks on the functioning of commodity exchanges and their impact on export marketing and risk management, with the interests of developing countries in mind.

In the last two decades commodity futures markets have shown a spectacular growth, and this has been in part as response to changed world economic environment. Much greater price volatility, coupled with high inflation and exchange rate uncertainties, induced interest on the part of producers, consumers, processors and traders to adhere to futures markets in

order to moderate price risks. At the same time, price volatility gave a necessary boost to futures speculation, which enhanced the liquidity of these markets, making themselves more attractive and acceptable to speculators. Meanwhile, the long-established systems of administered producers' prices on world markets have given way to the price-determination mechanisms based on commodity exchanges, as in the case of petroleum, copper, aluminum and nickel.

Another significant change regarding futures transactions at commodity exchanges has been a large increase in futures trading, especially in the US in financial instruments (futures contracts on treasury bonds, stock and price indexes and options on these contracts). This has meant that commodity futures are more and more being seen as an element of futures trading generally, rather than as a pure commodity trading instrument. Commodity futures are gaining characteristics of investment markets, and are not just commercial markets or business transactions. Taking into account the intensified interdependence between the markets for factors, products and other assets, any analysis or prognosis of futures commodity markets should include the consideration of a variety of macroeconomic elements, in addition to the pertinent considerations on the fundamentals of demand and supply of the product in question.

Options on many commodity futures contracts have been introduced in recent years and are gaining importance in futures trade. Considering the important benefits which they might provide for the countries of the Latin American region, the ideas underlying this instrument must be widely diffused among potential users. Given the certain complexities of options strategies and premium determinations, however, training courses should be organized in conjunction with the exchanges themselves and other organizations competent in this area.

There is now consensus that regardless of whether the exporter of a developing country participates directly in futures, exchange quotations provide essential information on the current state and future expectations of the commodity. Even if the private sector, marketing board or government agency does not intend to hedge on these markets, prices generated there provide information to local producers and trading agents which is helpful in evaluating their production and trading decisions. In-depth and day-to-day

examination of these price signals and the positions held by traders allows the exporter(importer) to know if it is reasonable to expect a premium over the spot price for forward sales, or whether he should be prepared to accept a discount. In this regard, a wider diffusion of and easier access to the information pertaining to the commodity exchanges is indispensable. The acquisition by developing countries of improved communication systems and their links with pertinent information sources outside the region is crucial. Efforts on the part of the exchange authorities to diffuse information on their operations should be strongly encouraged.

The most obvious benefit that accrues from futures and options is hedging, so that local producers and consumers can be provided with relatively riskless guaranteed prices for a period of time in the future. In contrast to the frequent cases where the sellers (buyers) are obliged to sell (buy) their products at unstable prices at irregular intervals, they can be assured of obtaining the average price over a period of time, by adopting a simple hedging strategy to offset the imbalances experienced in the actual physicals schedule of sale (purchase). Futures hedging mechanisms also provide instruments to improve the cash/inventory management of the commodity trading entity. Seasonal imbalances can be smoothed out by offsetting futures sales and purchases. Also, surplus inventories can be cheaply financed by taking advantage of the "contango" on the futures to help to cover the cost of financing these inventories. Similarly, the high leverage obtainable via the use of futures markets enables a foreign exchange-starved nation to economize on its working capital and secure control over resources with a nominal value much greater (a factor of 5 to 10) than the foreign exchange tied up in margin calls.

There are also some indirect, yet important effects for developing countries. Futures and options trading should enhance increased integration of their pricing systems into world markets and a broadening of competition and an easing of vertical integration which still characterizes many industries.

Against these potential benefits, several qualifications should be made when these are assessed in a real world situation. Especially from the Latin American and Caribbean perspective, these reservations relate to the type and the size of the firm and the closeness of its links with companies operating

in developed countries, the personnel's knowledge about the advantages and limitations of trading at the exchange, the effectiveness of futures trading to cover the price and risks associated with its merchandize trade, the financial capability to finance the margins and other deposits, government regulations concerning the transfer of foreign exchange, and the lack of operational experience and technical expertise.

It may be concluded that futures markets can be of varying value for individual commodities as a tool for price discovery and insurance purposes, either because some of the markets are better suited to forecast prices than others or because they represent more national conditions than those worldwide. As observed in a number of products, the usefulness of exchanges as part of their commercial strategies is reduced by the lack of parallelism between the prices on the different markets. For some products and countries, the basis risk is greater than the price risk as a result of market interference from the trade policies of certain exporting countries, or because the factors influencing supply and demand in each competing country differ. There always exists a problem relating to the "quality" risk. Instability of exchange rates are another cause of discrepancies between local and international prices. The recognition of the importance of the basis risk has opened the way for another trading alternative, known as "hedging the basis". Though there are numerous analyses of this alternative regarding the developed economies, this is not the case for Latin America and the Caribbean. It follows that there is a great need for studies on the behavior of local markets and their relationship to the ones existing in the developed economies. Especially important will be the quantification of basis risk and the identification of the determinants of basis from a perspective of a developing country exporter. Needless to say, these analytical efforts have to be accompanied by increases in trading experience and technical know-how on the part of firms in the region so as to apply them in practice.

It is not always the case that forward pricing by hedging would stabilize export revenues. They will be stabilized if the futures price variance for any given quantity is less than the variance for cash market transactions. On the other hand, if there exists a relationship between the mean and variance of returns such that lower variability is brought about at the expense of lower

expected returns, the benefits from hedging might be reduced. To the extent that futures trading might not moderate variance in export earnings attributable to production variability, the level of optimal hedging can be substantially less than expected output when price, exchange rate and production uncertainties are eminent. Especially for large producers, whose production disturbances will affect the commodity price itself, it will be more difficult to eliminate uncertainty from their revenues completely than small producers. It follows that the net effectiveness of these markets should be examined product by product at a national level, taking into consideration the importance of the country in world production, the size of the internal market, and exchange rate effects.

Margin requirements are often cited as one of the major constraints for developing country agents' participation at the exchange, due to the unpredictability of amounts, frequency and timing. Governments have to understand that the provision of foreign exchange backing for margin calls is not a case of wasting scarce foreign exchange for speculative purposes. Even though the size and timing of margin calls are inherently unpredictable, the worst case of all would be for support for margin calls to be withdrawn half way through a hedging operation. Serious consideration should be given to the idea that international agencies, such as the World Bank, Interamerican Development Bank or the International Monetary Fund, obtain the capacity to provide the necessary guarantees that would enable producers and traders in the region to hedge their positions independently on the existing organized exchanges. The general concept of creating a mechanism to relieve the problem of hard currency availability as a major impediment to developing country participation would be recommendable, and in particular the possibility of establishing third party custodial accounts guaranteed by an international agency might be examined.

It sometimes happens that the quality of commodities accepted for delivery against futures contracts and the locations in which delivery can be made are typically chosen in order to achieve the greatest potential trading interest ("liquidity") for the futures contracts, and may imply that futures relate, in practice, to material of significantly less commercial value than that supplied by an exporter. Any exporter/importer using futures must take

care not only to understand the complex system of premia and discounts, but also to see to that the best interests of industry be reflected in the contract specification, delivery rules, trading hours and other institutional matters of exchange operations. In this sense, an increase in the representation of industry at the Board and ad hoc committees of the exchanges would be recommendable.

It is sometimes argued that the exchanges should be located near the area of production, on the ground that this proximity would facilitate deliveries and yield greater benefits to the producers. The exchanges, however, mainly deal in "paper" transactions, not in physical commodities, and for them there would be little advantage in being near the production site. Furthermore, most of the countries in the region do not fulfill the prerequisites for the proper functioning of an exchange, which include: a fast and efficient communication network; foreign currency convertibility at reasonably low cost and risk and a financial system capable of supporting capital transfer, short-term credits and special types of debt instruments; well-established transport and storage systems; moderate taxation of profits; a legal system which recognizes and enforces the rights and duties embodied in contracts, etc. Also, the net foreign exchange and employment gains from the establishment of local futures markets are smaller than is commonly imagined. Some developing countries, such as Malaysia and Singapore, who fulfill many of these conditions, have set up their own exchanges. However, for the majority of the developing countries, the opening of new exchanges cannot be regarded as viable, unless strong and efficient physical exchange markets exist, another important prerequisite for sustainable futures markets. Otherwise, there is always the risk that business will be spread too thin to allow any one market to do well. In this regard, commodity market development must begin with the markets themselves.

A reason why so few producers of developed and developing countries hedge their futures sales has to do in part with the fact that the usual size of the futures contract unit is more than the entire output of most individual producers. Any significant reduction in the size of that unit would probably make the costs of trading in futures too high. This is surely the case of the agricultural sector but is not totally unapplicable to the mineral sector where some small- and medium-size firms refrain from futures trading due to

these costs. On the other hand, the average costs of these operations are known to decline quite steeply with the volume of transactions. These features taken together suggest that to enable their individual producers to reduce risk via hedging, governments should take advantage of schemes of cooperative hedging or encourage the private sector to hedge on their behalf. Large companies, with worldwide creditworthiness, for instance, should take full advantage of the flexibilities offered by a variety of brokers whom they deal with. The likelihood of their obtaining more credit lines at lower rates through diversified brokers could be passed on to smaller companies.

Where futures markets exist, there is usually plentiful market information available to participants. It is generally agreed, however, that following the information generated in these markets alone is not enough; there must be a group of experts who critically compare and judge the local (public or private) performance with that of the international market continually. It is important to remember that there is a certain interchangeability of information among a series of products; price signals for wheat could indicate possible future price movements of other grains. Considering that in general the search for information has the characteristic of increasing returns, it might be recommendable for those agencies responsible for commodity merchandizing to be diversified in terms of product lines, not specializing in a limited number of products. Full advantage should be taken of economies of sale in information collection/processing. In this sense, it should be a matter of common interest to have more market transparency through improved quality and frequency of statistical information furnished by the exchanges and other competent institutions.

There might also arise a need to employ qualified and experienced audit personnel who are independent from the marketing entities, to analyze the market intelligence and to objectively judge the performance of government or private traders. This should take place without too much day-to-day intervention, because it is necessary to create an environment which allows those responsible for commodity merchandizing (public or private) to act quickly. Though it is of obvious importance to protect the national interest, it is not wise to interfere with the technical intricacies of complex trading. In many cases, additional terms or conditions imposed by the government add to

the final cost of export/import transactions. It may be also desirable to allow private firms to compete along with quasi-government institutions, and whichever entity furnishes a better mix of prices, credit and other terms should handle the transaction.

Notes

1/ An important feature of the world economy in the 1970s and 1980s has been the large volatility of primary commodity prices. For instance, from 1971 to 1974 prices of food products (in SDRs) rose by more than 100%, but fell by 25% from 1974 to 1977. More recently, during 1983-1986 mineral and metal prices fell by 23% while they increased by 54% for 1986-88.

2/ With the possible exception of rice, the dominant food and feed grain markets of the world are commodity futures markets, and virtually all trade in these products is priced in relation to these markets.

3/ On the concept of efficiency of commodity futures markets, see Kaminsky and Kumar (1989).

4/ Schemes such as buffer stocks and export quotas are aimed at reducing price variability. Those "non-market" strategies have met with limited success because of insufficient participation of exporting and importing countries, inadequate financial reserves of participating exporters, and because those strategies often inadequately manage the production variety component of the revenue variability equation.

5/ Data on the value of futures contracts traded in London by commodity group suggest that in the UK, the group of non-precious metals accounts for more than half of the total traded (see FIA, International Report, 1989).

6/ A good example is commodity funds. These funds invest in commodities the way investment trust funds invest in stocks and bonds. The funds collect investment capital from individuals, corporations, and institutions and these investors must commit their funds for five to eight years. The fund managers then use this capital to buy and sell American commodity futures, and return the profits to the investors. Commodity funds have grown quickly in the US since the stock market crisis of Oct. 1987. Currently around \$ 5-7 billion is reported to be invested in such funds.

7/ Kuchiki argues that due to these changes, one can observe three important transformations in commodity price movements: i) the cyclical periods of commodity prices have become shorter, and the amplitudes of the cycles have intensified; ii) a linkage of primary commodity markets with the financial markets has formed, though the relationships have time differentials (leads and lags) — the price of crude oil leads other commodity markets,

including the financial markets; and iii) the prices of crude oil, gold, T-bills, and stocks provide the same periods of cycles.

8/ Despite the failure of the contract traded between 1979 and 1982, broiler chicken futures will be reintroduced and its options are to appear in the near future at the Chicago Mercantile Exchange (The Financial Times, July 17, 1990).

9/ "Hedging" is defined as taking a position in a futures market opposite to that held in the physical market to minimize the risk of financial loss from an adverse price change for which no commercial insurance is available.

10/ As examples, historically, farming cooperatives for wheat in the United States have owned a significant share of wheat elevators business. The rise of the oil futures markets occurred in the 1970's, when the rise of OPEC segregated the production stages of oil extraction from refining in what had been a highly vertically integrated industry. A similar observation can be made about the aluminum industry where the appearance of futures markets was correlated with the emergence of independent, non-integrated producers, including those from the developing countries.

11/ On the differences between cash forward and futures markets, see Nelson (1985).

12/ For instance, the large long futures positions assumed by Central American Coffee producers in the late 1970s, under the Pancafé Group, were alleged by the CFTC of the United States to be manipulative and this trading was suspended (see Menjivar 1983).

13/ Though the basis risk element is always a factor, whether this is the critical factor in deciding futures market participation depends on the product. For instance, coffee is delivered from warehouses in New York and New Orleans, and there are complicated quality discount and premium structures to accommodate the heterogeneity of the product. For the developing country exporter, these factors add up to considerable basis risk in terms of freight, quality and politically or naturally induced market disruptions. In contrast, the world sugar contract is FOB country of origin, seller's option, which eliminates freight-rate risk for most of the developing country delivery points. Sugar is quite homogenous in quality, reducing this element of basis risk as well.

14/ The IME, which dominates world non-ferrous metals, is considering dramatic changes to its contracts, which would be lengthened to three years compared to the present fifteen months. Also, in the light of greater demand for hedging on crude oil, the Board of the NYMEX voted in July of 1990 to extend the listing of futures in this product by a year and half from the present 18 months listings.

15/ In the case of Argentina and Brazil, though it is possible to transfer commissions fees and other funds abroad, in practice it is not easy. For a long period of time, in Argentina, transfers offshore have been restricted or delayed and traders have been obliged to use indirect methods. Until April of 1989, the companies had to buy BONEX and change them for dollars in Uruguay and then remit abroad (Regúnaga, 1990 a).

16/ As an example, Thompson and Bond (1987) show that the floating of the Australian dollar in 1983 presented the Australian Wheat Board with a different perspective on the optimal use of US futures markets than existed before that time, suggesting that significant changes in hedging behavior can occur as a result of exchange rate-commodity price interactions. They also show that for the Australian-based wheat trader, the extent of the perceived payoffs from hedging since December 1983 were larger because of the interaction effects of exchange rates and commodity prices. The average optimal hedge ratio for the Australian trader exposed to currency risk was over 30% whereas the ratio for the trader with covered currency risk was 19% of stocks.

17/ The practice of indirect and direct subsidies instrumented by the United States and other developed countries, most notably the US Export Enhancement Program, generally implies a price reduction in the Southern Hemisphere and an increase in the price quotations in the US exchanges. These subsidies are neither permanent, nor generalized for all countries, which do not affect the premium systematically, creating uncertainty for the trader. Other subsidies to production and trade, or barriers also generate distortions in export prices of other countries but are more easily reflected in premiums and thus less damaging (Regúnaga 1990 a).

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