

FUTURES TRADING: ITS APPLICATION IN THE PHILIPPINES

by

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CHAPTER I

INTRODUCTION

One of the most critical problems confronting the Philippines is its continuously deteriorating foreign exchange situation. In order to minimize the outflow of its foreign exchange reserves, substantial amount of funds are currently being channelled into government programs intended to accelerate local production. Research has also been geared toward developing technology for the production of import substitutes. Various types of restrictions have likewise been imposed on imports, which unfortunately have done little in alleviating the situation, due primarily to the inelasticity of the country's demand for most of its import items.

The expansion of both traditional and non-traditional exports, particularly of agricultural products, is at present being heavily pushed. Alongside this strategy are measures adopted to expand the international market for the country's export products, and measures to enable the Philippines to remain competitive in the world market. In this connection, more attractive incentives are now offered to promote foreign investments in the Philippines as a means of diversifying trade sources. To further expand the scope of its international trade, the Philippines has entered into several bilateral and multilateral trade arrangements with other countries.

Due to the unpredictable behavior of international

commodity prices however, only a marginal improvement in the country's foreign exchange situation, if at all, may be expected, unless measures are taken to contend with adverse price movements in the international market. Hedging in futures markets will therefore be discussed in this paper as a possible means of locking in acceptable prices when importing selected agricultural commodities. The ability to fix import prices will enable the Philippine government to determine in advance, the approximate amount of foreign exchange needed in importing these commodities for any given year. In addition, to minimize the cost of delivering the imported commodities to the Philippines, basis trading will be proposed in lieu of the current practice of contracting for imports through flat price trading.

Importance of the Study

Since the balance of payments is, to a high degree, sensitive to price fluctuations in the international market, strategies must be explored to minimize the disruptive effects of unpredictable international commodity prices on the Philippines' dollar reserves. Hedging and basis trading are schemes which have never been considered in the past by the Philippine government, as possible means of minimizing the drain of foreign exchange from the country. Trading in futures markets, in the manner that will be discussed in this paper, has been proven to be an effective tool for riding out adverse commodity price movements by other importing countries such as Mexico, Brazil, and Iran.

Scope of the Study

Hedging and basis trading procedures, which the Philippine government could use to lock in and minimize the cost of its imports, will be discussed in this study. Initially, the application of the proposal will be limited to using futures markets when importing selected agricultural commodities-- particularly wheat, cotton, yellow corn, soybeans, and sorghum.

While futures trading is applicable to any commodity imported by the Philippines that is also traded in the futures market, the above-mentioned commodities were chosen (although they comprise only about 5 per cent of the country's total import bill) for two basic reasons: (1) the technology for growing lowland, heat-resistant wheat varieties has not been successfully developed and no substitutes have yet been found to completely replace the local demand for wheat. Furthermore, no significant breakthroughs have been attained to augment current shortfalls in cotton, yellow corn, soybean, and sorghum domestic production. Until such time, importations will have to be made in order to meet the highly inelastic demand for these commodities. (2) In order to facilitate the implementation of the proposal, particularly in the initial stages, these commodities were chosen because of the existence of government control, in varying degrees, over their importation.

Objectives

This study is primarily aimed at presenting a proposal to

the Philippine government to consider the potential of trading in futures market as a strategy to reduce the outflow of foreign exchange from the country and as a means of widening the country's involvement in, and knowledge of international trading. In light of existing uncertainties with regard to fluctuations of commodity prices, futures trading has been found to be an effective tool for locking in the prices of commodities traded in the market. Specific objectives are as follows:

1. To analyze the present method of importing selected agricultural products into the Philippines;
2. To discuss the operation of futures markets and the application of hedging and basis trading in the Philippines;
3. To illustrate how foreign exchange savings and other advantages may be gained from the selective adoption of the proposal, in lieu of the current method of importing;
4. To formulate criteria on which to base hedging and basis trading strategies; and
5. To identify problems that may be encountered by the Philippine government by trading in futures.

Limitation of the Study

Due to the unavailability of historical data on the value, volume, and transaction dates of imports on a per contract basis, empirical analysis will not be presented in this study. The more detailed analysis will be undertaken as soon as the necessary information become available to the writer.

Hypothetical illustrations will be made merely to show the mechanics of hedging, and to present the possible outcomes which may be expected given the occurrence of the situations cited.

CHAPTER II

PHILIPPINE ECONOMIC TRENDS: AN OVERVIEW

During the sixties, economic development policies in the Philippines were geared to urbanization and to the development of the urban sector. Foreign exchange earnings, mostly generated by agricultural exports, such as of sugar, coconut products, and wood products, were heavily drawn from to finance the growing import bill of the urban sector.

Agricultural Development Strategies

The advent of the seventies saw the reassessment of priorities, and consequently the reallocation of government funds to agriculture and the rural sector. The Philippines, like most of the developing nations, is predominantly an agricultural economy. Seventy per cent of the population is engaged in agriculture. Thirty-five per cent of the GNP, and approximately 60 per cent of the country's dollar earnings are generated by agriculture (Table 2.1). The consumer price index is based on the assumption that about 57 per cent of per capita income goes to food expenditures alone.

The shift in priorities came as a result of the government's realization of the deficiencies of previous development policies, which virtually did nothing to restore balance to the gross inequities in the distribution of income in the country. Clearly, it was an effort to widen the base of the population's participation in the developmental process. The

Table 2.1. Export Earnings in Current and Constant Values and Price Indices, 1960-1985.*

Item	Actual				Projected		
	1960	1965	1970	1975	1980	1985	
Current Value (US \$ million):							
Copra	139	170	80	161	238	188	
Coconut oil	16	68	96	217	530	1,157	
Sugar	133	132	188	697	895	1,506	
Wood products ^{1/}	102	195	295	226	793	1,423	
Copper concentrate and copper	30	47	185	196	900	2,414	
Other mineral products ^{2/}	31	30	39	134	304	621	
Other agricultural products ^{3/}	96	104	107	288	668	1,275	
Manufacturing and miscellaneous ^{4/}	13	22	93	392	1,384	4,291	
TOTAL	560	768	1,083	2,311	5,712	12,875	

Table 2.1. (Continued)

Item	Actual					Projected		
	1960	1965	1970	1975	1980	1985		
Price Indices (1967-1969 = 100)								
Copra	98.1	109.3	64.0	115.7	207.7	357.9		
Coconut oil	98.2	106.0	104.3	132.9	227.7	383.6		
Sugar	81.9	87.1	102.8	262.8	251.2	352.4		
Wood products ^{1/}	97.9	87.6	99.4	112.9	239.5	368.5		
Copper concentrate and copper	56.7	70.9	123.2	121.3	259.8	416.5		
Other mineral products ^{2/}	150.3	111.9	162.1	242.9	390.9	596.0		
Other agricultural products ^{3/}	145.0	109.2	138.6	187.4	267.4	375.1		
Manufacturing and miscellaneous ^{4/}	30.8	40.0	189.8	378.3	549.1	770.1		
TOTAL	92.3	92.8	108.6	186.1	291.3	468.5		

Table 2.1. (Continued)

Item	Actual					Projected	
	1960	1965	1970	1975	1980	1985	
Constant Value (US \$ million):							
Copra	142	156	125	139	114	53	
Coconut oil	16	64	92	163	233	302	
Sugar	163	152	183	265	356	427	
Wood products ^{1/}	104	223	291	200	331	386	
Copper concentrate and copper	53	66	150	162	346	580	
Other mineral products ^{2/}	21	27	24	55	78	104	
Other agricultural products ^{3/}	66	86	77	154	250	340	
Manufacturing and miscellaneous ^{4/}	42	55	49	104	252	557	
TOTAL	607	828	998	1,242	1,961	2,748	

^{1/}Includes plywood, veneer, lumber, pulp and paper

^{2/}Includes nickel ore, gold, chromium, iron ore, and other minerals.

^{3/}Includes desiccated coconut, oil cakes, molasses, bananas, pineapples and other fruits, marine products, abaca, and tobacco.

Table 2.1. (Continued)

4/ Includes re-exports, artifacts, jewelry, and other minor products.

*Sources: Data for 1960, 1965, 1970 and 1975 are from the Central Bank of the Philippines; those for 1980 and 1985 are World Bank projections.

worldwide food crisis in 1973, however, was the immediate and most critical factor which necessitated the mobilization of resources and the unification of national efforts toward the attainment of the three major agricultural thrusts, namely: (1) the achievement of food self-sufficiency; (2) the expansion of traditional and non-traditional exports (e.g., sugar, coconut products, and abaca, for the former; mangoes, marine products, tropical flowers, and spices, for the latter); and (3) the development of import substitutes.

Sufficient publicity has already been given to the on-going and proposed production programs and development strategies in agriculture. A considerable number of studies evaluating the possible outcomes and the effects of these programs on the political and economic framework of the Philippines are also available. This writer therefore, does not intend to delve further into that topic, but rather go directly to the discussion of the possibility of further improving the country's foreign exchange situation through futures trading.

The Balance of Payments

During the period 1970-72, the external accounts of the Philippines were roughly in balance, the trade account deficit in 1970, amounting to a relatively minimal US\$ 7 million. In 1973, due primarily to increased private and public investments and domestic output, and also because of the international price boom, the external terms of the Philippines improved by 28 per

cent.^{1/} Increases in real terms of 10 per cent and 14 per cent, respectively, were achieved over 1972's GNP and gross domestic income. This favorable situation quickly deteriorated however, starting from the second half of 1974. By 1975, the balance of payments showed a trade account deficit of US\$ 1.04 billion. The value of imports of goods and services increased by 10 per cent, accompanied by a 10-per cent reduction in the value of export earnings. The current account deficit during this year of US\$ 859 million was approximately 6 per cent of the GNP.

The World Bank estimates that even if the Philippines' current account deficit were to be reduced to about 4 per cent of GNP by 1980, and to 2 per cent by 1985, an average net inflow of foreign loans of approximately US\$ 1.0 billion annually would still be required.^{2/}

It is not advisable for the Philippine government to rely heavily on foreign borrowings to finance its deficits. The value of exports will have to be increased substantially in the future in order to expand the country's capacity to pay for its growing import bill. For the next ten years, imports are expected to increase by an average of 7-8 per cent annually.^{3/}

^{1/}Russell J. Cheetham and Edward K. Hawkins, The Philippine Priorities and Prospects for Development: The World Bank Country Economic Report (Washington, D.C.: IBRD, 1976), pp. 12-13.

^{2/}Ibid., p. 451.

^{3/}Ibid., p. 452.

At this rate, total import expenditures are projected to climb from US\$ 3.4 billion in 1975, to US\$ 13.4 billion in 1985 (Table 2.2).

It is primarily due to the Philippines' precarious balance of payments position, and for political reasons, to the need to reduce foreign leverage in the country, that programs geared toward the achievement of the three major agricultural thrusts mentioned earlier, are being very seriously pursued. For these reasons also, the Philippine government may wish to consider the proposal presented in this paper.

Table 2.2. Import Payments in Current and Constant Values and Price Indices, 1960-1985.*

Item	Actual					Projected	
	1960	1965	1970	1975	1980	1985	
Current Value (US \$ millions)							
Cereals	25	95	83	143	105	159	
Other consumer goods	75	90	98	357	502	718	
Crude petroleum	21	59	103	752	1,516	2,875	
Other raw materials	260	281	442	1,098	2,421	4,987	
Capital goods	223	283	414	1,000	2,327	4,626	
TOTAL	604	808	1,090	3,350	6,871	13,364	
Price Indices (1967-69 = 100)							
Cereals	62.5	68.2	72.0	214.2	245.5	354.1	
Other consumer goods	100.7	112.1	91.6	244.0	354.2	496.8	
Crude petroleum	115.2	102.2	99.9	832.8	1,198.4	1,680.8	
Other raw materials	92.3	101.6	124.3	298.8	433.6	608.2	14
Capital goods	82.8	97.5	107.1	181.5	263.4	369.4	
TOTAL	89.4	95.8	108.8	274.1	392.0	549.5	

Table 2.2. (Continued)

Item	Actual					Projected	
	1960	1965	1970	1975	1980	1985	
Constant Value (US \$ millions)							
Cereals	40	139	46	67	43	45	
Other consumer goods	75	80	107	146	142	144	
Crude petroleum	52	75	119	90	127	171	
Other raw materials	239	258	344	368	558	820	
Capital goods	269	290	387	551	883	1,252	
TOTAL	675	843	1,002	1,222	1,753	2,432	

*Sources: Data for 1960, 1965, 1970 and 1975 are from the Central Bank of the Philippines; those for 1980 and 1985 are World Bank projections.

CHAPTER III

THE FUTURES MARKET

When decisions on resource allocation have to be made where time is a basic consideration, imperfect knowledge about possible outcomes will always pose a constraint. Imperfect knowledge arises from dynamism which is characterized by unpredictable and constant change. Three basic sources of change prevail in the economy which affect decision-making. These are^{4/}:

1. Variations in exogenous factors, such as changes in weather conditions, consumer preferences, and population growth;
 2. Changes inherent in the system but not dependent upon a particular legal, political, or economic framework, like capital accumulation and technological breakthroughs; and
 3. Changes inherent in the system and basically dependent upon a particular legal, political, or economic framework.
- Among these are fluctuations in the quantity of money, changes in tax collections, and changes in storage stocks in response to shifts in supply.

When the possibility of future outcomes cannot be determined in an empirical or quantitative manner, uncertainty arises. Producers of primary agricultural commodities for

^{4/} Earl O. Heady, Economics of Agricultural Production and Resource Use (2nd ed., Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1952), p. 455.

instance, are faced with uncertainties arising from changes in prices and variations in yields. Price uncertainty is due primarily to recurring commodity cycles, disturbances growing out of the vagaries of weather, and changes in income. Technical or yield uncertainty on the other hand, results from variations in the production coefficient from a given technique.

The risks associated with those types of events are not insurable in the ordinary sense because they affect total supplies simultaneously in the same manner. It must be noted that commercial insurance companies remain viable because they rely on the averaging effect of the law of large numbers, which under the circumstances described above, is not possible.

The gap caused by the absence of ordinary insurance against price and technical uncertainties confronting producers of primary agricultural commodities is one of the main reasons for the existence of present-day futures exchanges.^{5/} In 1968, it was estimated that about 60 per cent of all agricultural commodity production in the United States was represented by commodities having organized futures markets.^{6/} At present, non-agricultural commodities, such as treasury bills and precious metals are also traded in futures markets.

^{5/}Gerda Blau, "Some Aspects of the Theory of Futures Trading", Review of Economic Studies, Vol. 12 (1944-45), p. 1.

^{6/}Tetteh Kofi, "A Framework for Comparing the Efficiency of Futures Markets", American Journal of Agricultural Economics, Vol. 55 (1973), p. 584.

Development of Futures Markets

Prior to the establishment of organized futures markets, a type of forward cash contract, described as "to arrive" contract was used by owners and buyers of storable commodities. To be specific, "to arrive" contracts were used to ensure the future delivery of specified physical commodities at negotiated prices. Exact delivery dates, however, were not stipulated in the contracts because of the unreliability of transportation facilities then.

Soon however, certain limitations were found in the use of cash forward contracts. On the seller's side for instance, substantial opportunity losses were incurred when the price of the commodity increased in the market before physical delivery was actually completed. In addition, when the seller's stocks were destroyed or when the quality was reduced due to infestation, costly investments on replacement stocks had to be made to enable the seller to meet his obligations.

Similarly, a buyer incurred opportunity losses when the price of the commodity dropped in the market, relative to the contracted price. When that situation happened, it rendered a forward buyer less competitive in the consumer market because he had to sell his finished products at a price higher than those offered by processors who did not forward contract. Furthermore, during periods of reduced demand or oversupply in the consumer market, a forward contractor was obligated to accept delivery of the previously contracted commodity, even if it was economically unwise to do so (due to storage problems

resulting from unmoved inventories, for example).

Because of the limitations of forward cash trading in effectively protecting forward contractors' incomes from unforeseen fluctuations in demand and supply, secondary trading of "to arrive" contracts evolved. Thus, for instance, an elevator operator who was the original selling party in a "to arrive" contract sometimes sold his side of the contract to a third party. One reason for doing this was his subjective expectation of a possible increase in grain prices to a level higher than had been previously agreed upon in the forward contract. Selling the contract to a third party also provided the elevator operator with funds earlier than would have been possible if he had waited for the actual delivery to be completed. The third party on the other hand, probably expected prices to decrease before the delivery date and therefore, hoped to make a profit by purchasing the specified commodity when prices fell, and delivering to the forward buyer at the higher contract price.

Likewise, the original forward buyer would transfer his obligation to accept future delivery of a physical commodity when prevailing prices became more attractive, or when he expected demand to be reduced upon maturity of the contract.

Secondary trading involved the participation of speculators who were willing to put up capital in the hope of making profits from price changes in the cash market. However, because "to arrive" contracts were highly specialized (inasmuch as these contracts were originally made for particular producers and buyers), and since speculators were neither grain processors

nor grain users, and therefore were not interested in actually making or accepting delivery, secondary trading of "to arrive" contracts was minimal. The heterogeneity of the contracts made it extremely difficult for secondary traders to bring buyers and sellers of a specified physical commodity together at mutually agreeable prices. Thus, in time, "to arrive" contracts evolved into the present day futures contracts. Prices, grades, quantities, delivery dates, and location became standardized for specific commodities. Futures commodity exchanges were organized to facilitate futures trading. Rules for open competitive bidding and contract specification were formulated. Clearing houses were soon established to assume the role of opposite party to all transactions negotiated in the exchanges.

Operations of Futures Markets

Futures trading in commodities is defined as "trading conducted under special regulations and conventions, more restricted than those applied to any other class of commodity transactions, which serve primarily to facilitate hedging and speculation by promoting exceptional convenience and economy of the transactions".^{7/} Conflicting opinions have arisen regarding the comparative importance of hedging versus speculation in sustaining futures markets. Many are of the opinion that

^{7/} Holbrook Working, "Futures Trading and Hedging", Selected Writings of Holbrook Working, Compiled by Anne E. Peck (Chicago, Illinois: Chicago Board of Trade, 1977), p. 140.

futures trading rests primarily on people's desire to speculate. Statistics however, show that the volume of futures contracts correspond very close with the volume of stocks in commercial channels which are hedged. Furthermore, the degree of speculation seems to be highest after the harvest season when most of the commodities have already been hedged.

A. Hedging. To hedge in futures means to enter into a contract to buy or sell on standard terms as a temporary substitute for an intended later contract to buy or sell in other terms in the cash market.^{8/} The standard terms are established and enforced by commodity futures exchanges. When a second contract involving the cash market is entered into at a later time, however, the hedge must be lifted to liquidate the first contract (futures contract). While actual delivery is made according to the terms of the second contract, the effective price is generally determined by the first contract. Adjustments on prices are consequently made to reflect any differences which may arise between the terms of the two contracts with respect to the quality of the commodity and the place of delivery. This explains how prices may be fixed in advance by hedging in the futures market.

Hedges are classified according to a trader's position in the futures market. A short hedge entails the sale of futures contracts to neutralize risks arising from a possible decline

^{8/} Holbrook Working, "Hedging Reconsidered", Selected Writings of Holbrook Working, Compiled by Anne E. Peck, (Chicago: Illinois: Chicago Board of Trade, 1977), p. 137.

in the price of the physical commodity while still in storage or in the process of production. A long hedge on the other hand, is the purchase of futures contracts as protection against a possible increase in the price of a physical commodity which will be purchased at a later time.

The two most important functions of hedging are:

1. It neutralizes the price risk involved in holding commodities, or in making forward commitments for possession of stocks at a later time. This is made possible through the assumption of opposite positions in the cash and futures markets, so that gains in one market may be used to offset losses in the other market. For hedging to effectively perform this function, the cash and futures prices of a specific standard of commodity must move toward the same general direction over a period of time. Furthermore, the cash and futures prices of a commodity must reasonably converge upon maturity of the futures contract, differing only by the amount of delivery costs necessary in transferring ownership of the commodity. Deviations from the first-mentioned cash-futures price relationship often occur and could in fact enhance profits and the effectiveness of hedging, as long as the inequalities in the movements of cash and futures prices are reasonably predictable, and hedging strategies are formulated with these deviations in mind.

2. Hedging provides a guide for the efficient inventory control because it promotes stockpiling during periods of surplus and prompts the release of stocks during periods of

artificial short supply in the market. During periods of scarcity, cash prices tend to be higher than futures prices. The negative or inverse carrying charge associated with the commodity serves as a disincentive to carry stocks beyond the current period. On the other hand, when there is a glut in the market, futures prices exceed cash prices by an amount equal to, or greater than carrying costs. Commodity holders are therefore induced to carry stocks beyond the current period, sell futures contracts, and therefore prevent cash prices from falling further. Thus, through hedging, inventories tend to be managed more efficiently, and price fluctuations in the cash market are mitigated.

B. Speculation. At this point, it must be noted that even in highly organized risk-shifting futures markets, there will always be a "risk surplus" for which no opposite hedges can be found. A "risk surplus" is characterized by a situation where, at any point in time, the demand for hedges against selling risks are in excess of the demand for hedges against buying risks, or vice-versa.^{2/} Thus, there is an excess demand or excess supply which, as stated earlier, is not insurable. Logically, it can only be transferred to traders who are willing to put up risk capital-- the speculators. Speculators rely on their foresight of future price movements in the market in making their risk-bearing profitable.

Many writings on futures markets seem to exaggerate the

^{2/}Blau, p. 2.

extent by which speculators dominate futures markets and cause prices to fluctuate extensively away from their true equilibrium level. Economist Roger Gray believes however, that while this may happen occasionally, especially in thin or lopsided markets, the pressure created by speculators on prices never lasts long. Every futures contract has a maturity date, at which time, its value approximates the actual price in the cash market which is determined by supply and demand factors.^{10/} Furthermore, any speculator who contributes to the upward pressure on prices by accumulating a substantial long position in a commodity eventually has to offset his position and thus, cause prices to move back downward. An even more important point to consider is the fact that the very nature of developed futures markets prevents price manipulations. Since information on market developments are immediately transmitted to the trading floor of futures markets where thousands of traders are pitted against each other daily, price formation is almost completely efficient. Many economists believe that futures markets are the closest approximation of a perfectly competitive market where no single individual can significantly manipulate prices. This is guaranteed by the Commodity Exchange Act which limits the number of futures contracts an individual can own for a particular commodity.

^{10/} "Stability in a Swinging Market", Business Week, August 8, 1977, pp. 70-71.

In May of 1977 for instance, the Commodity Futures Trading Commission chairman filed a case against the heirs of a Dallas, Texas oil billionaire, H.L. Hunt, for having purchased 22 million bushels of soybean futures contracts (approximately 33 per cent of the entire existing U.S. soybean supply for the period). The Commodity Exchange Act restricts ownership of soybean futures to 3 million bushels per trader. Members of the Hunt family countered that they were acting separately from each other, and therefore were entitled to the number of contracts which they have purchased. The price of soybean futures at that time began to increase, by as much as 20 cents per day, the maximum daily limit. After a series of court hearings, the Circuit Court of Appeals finally decided, on September 29, 1977, that the members of the Hunt family were to be collectively considered as one trader, and therefore were required to liquidate their soybean futures contracts in excess of the maximum 3 million bushel limit.

Statistical tests devised to determine the randomness of price movements of commodities traded in the futures markets suggest that, not only do speculators not distort and manipulate prices, in many instances, they actually facilitate the stabilization of price movements. Speculators risk their capital in the hope of making profits from their careful appraisal of market demand and supply information. When speculators trade, their responses to the market information,

which affect not only the current, but also future price movements, are immediately transmitted to the trading floor. Since a critical function of prices is to ration supplies over time, the sooner it takes the traders to recognize a coming shift in demand or supply, the more stable are the prices.

Functions of Futures Markets

Optimal inventory allocation and efficient forward price forecasting are the two most important functions of the futures markets. Several variables affect the degree by which these functions are effectively carried out.^{11/}

(1) The nature of the commodity, the degree of uncertainty associated with the commodity's production variations, supply and demand elasticities, and the nature of inventory and cost functions;

(2) The quality of past and forthcoming information regarding economic conditions, and the ease of adequately predicting these; and

(3) The nature and degree by which free market price determination is artificially manipulated.

The role of futures markets in guiding inventory management has already been discussed in connection with hedging and speculation. This section will therefore concentrate on price relationships for seasonally produced commodities with

^{11/}Kofi, p. 588.

continuous inventories, and the effects of price behavior and price expectations on storage stocks, and vice-versa.

A. Forward Price Estimation. As previously indicated, the constellation of futures prices for a commodity at a point in time is determined on the basis of available supply and demand information and on hedgers' and speculators' assessment of present and future market conditions. For most storable commodities, there is a close positive correlation between futures prices estimated during the planting season and the subsequent harvest time cash prices. The simple linear regression presented below is used to estimate cash prices at harvest time^{12/}:

$$P_C = \alpha + \beta P_f + e_H$$

where: P_C = cash price at harvest time

P_f = previous futures price quotations for harvest time contracts

e_H = error term

Given the above function, the correlation coefficient, r^2 may be used to test the relationship between futures prices and harvest time cash prices. A large r^2 implies a close correlation between the prices and presumably, a reliable forecast.

^{12/}William G. Tomek and Roger W. Gray, "Temporal Relationships Among Prices in Commodity Futures Markets: Their Allocative and Stabilizing Roles", Selected Writings on Futures Markets, ed. A.E. Peck (Chicago, Illinois: Chicago Board of Trade, 1977), p. 141.

Studies by Tomek and Gray over the period 1953-1969 indicate that wheat, a commodity with continuous inventory market, has a higher r^2 than potatoes, a commodity with discontinuous inventory market. It was concluded that future prices are more reliable estimates of spot prices at maturity, for commodities with continuous inventories, such as wheat, than for commodities with discontinuous inventories, such as potatoes.

The effects of the other variables earlier mentioned on the price-determining mechanism of futures markets can also be measured by the r^2 performance test.

B. Relation Between Spot and Futures Prices. The normal relationship between spot and futures prices for seasonally produced storable commodities are as follows:^{13/}

$$F_1 - C_1 = S$$

and

$$F_2 - C_2 = D$$

where: C_1 = cash price at the beginning of storage period

F_1 = futures price at the beginning of storage period

S = storage cost

C_2 = cash price at the end of storage period

F_2 = futures price at the end of the storage period

^{13/} Robert V. Price, "The Effects of Traditional and Managed Hedging Strategies for Cattle Feeders", Unpublished M.S. Thesis, Kansas State University, 1976, pp. 30-32.

D = delivery cost

According to Nicholas Kaldor, in a properly functioning futures exchange, arbitrage will always prevent forward prices from exceeding spot prices during the storage period by more than the amount of carrying costs.^{14/} Given a situation where $F_1 > C_1$ by more than storage costs, it will be more profitable for arbitrageurs to sell futures, buy spot, and carry the commodity to the forward date. In a relative case of scarcity, increased demand for the physical commodity alone will cause C_1 to rise, while increased sales of futures contracts will reduce F_1 , until $F_1 - C_1 = S$.

While arbitrage may be relied upon to set an upper limit to the contango (i.e., the excess of F_1 over C_1), it is not equally effective in preventing the cantango from decreasing by more than the amount of storage cost. Neither can it set a lower limit on the extent of backwardation (i.e., the excess of C_1 over F_1).^{15/} The reason for this is that, while in the first case, anyone with sufficient credit can step in and influence prices by selling forward and buying spot (or, in the lack of physical commodity, by merely creating a demand for it), only holders of stocks may sell spot and buy futures under the second case.

^{14/}Blau, p. 18.

^{15/}Contango and backwardation are British terms used by J.M. Keynes in his Treatise on Money (New York, 1930), to refer to premium and discount situations, respectively.

On the other hand, if on the expiration of the futures contract, F_2 were to exceed C_2 by more than D , equilibrium will be restored when traders simultaneously buy the physical commodity for immediate delivery against futures contracts. Conversely, if C_2 were to exceed F_2 , it becomes more profitable for traders to buy futures contracts, force delivery, and immediately sell in the cash market.^{16/}

Financial Stability of Futures Markets

The financial integrity of commodity exchanges is unparalleled in the business community. Customer protection is guaranteed through several measures adopted by commodity exchanges. Among these are the following:

A. Margin Deposits. All futures traders must put up margin deposits amounting to 5-15 per cent of the value of the commodity traded. These deposits are used to cover daily price fluctuations of futures contracts, and must not be mistaken as downpayment on the value of the contracts.

B. Daily Settlement Procedure. Traders' futures positions are settled at the end of each trading day. All open contracts are evaluated at the day's settlement price. If a gain is made during the day, a trader may ask to receive the profits immediately even without liquidating his position, if he wishes to invest these funds elsewhere.

Should a loss be incurred during the settlement procedure,

^{16/}Price, pp. 31-32.

such that the margin deposit falls below a set minimum, additional deposit will have to be made to maintain margin equity. A broker has the option of liquidating a trader's contracts if the additional funds are not made readily available.

C. Price Limits. Limits on maximum price fluctuations per day are generally set to negate the effects of developments which could artificially distort normal price movements.

D. Additional Guarantees. For every contract made in the futures market, the transacting parties are, the clearing house of the futures exchange and a brokerage firm which is a member of the clearing house. A futures trader is obligated to a brokerage firm, which in turn is obligated to the clearing house. The clearing house will always guarantee the payment of gains and/or the delivery of physical commodity even if the opposite transacting party defaults. The guarantee is backed up by: (1) funds deposited by clearing house members; (2) surplus reserves of the clearing house; and (3) security deposits from futures traders and clearing house members.

In May of 1976, short sellers of Maine potato contracts who did not liquidate their position in the futures market prior to the maturity of their contracts, failed to meet the deadline for delivery of nearly 50 million pounds of potatoes. This has been the most massive default ever in the history of U.S. futures trading. The President of the New York Mercantile Exchange where Maine potatoes are traded, therefore assumed authority to purchase potatoes in the Maine cash market for delivery to the buyers. The brokerage houses which represented

the defaulting short sellers were held liable for differences which arose between the price of potatoes bought by the Exchange in the cash market, and the price at which the traders sold the contracts short. In addition, the brokerage houses were fined for the default. The brokers, in turn, imposed the same charges on their defaulting clients.

CHAPTER IV

THE TRADITIONAL METHOD OF IMPORTING IN THE PHILIPPINES

This paper proposes the selective adoption of futures trading in the Philippines. Initially, participation in the futures market will be limited to the importation of agricultural commodities such as wheat, cotton, yellow corn, soybeans, and sorghum. These are among the more basic requirements in the Philippines and are all traded in the futures markets. Furthermore, their importations are, to varying degrees, controlled by the government.

The National Grains Authority

The National Grains Authority (NGA) was created immediately after martial law was proclaimed in the Philippines (September, 1972). Among its functions are the procurement of locally produced grains and the importation of rice, yellow corn, and sorghum. When wheat prices escalated in the international market about three years ago because of a world-wide shortage, the responsibility of importing wheat was transferred to the NGA. Until the technology for growing lowland heat-resistant wheat varieties and suitable wheat substitutes are developed, the NGA will continue to import all of the nation's wheat requirement.

Soybean importations are currently handled by individual industrial processors, although there have been plans of

coursing these through the NGA. The biggest impediment to the plan however, has been the widely fluctuating world prices of soybeans. Since a ceiling price is set on soybean meal in the local market to protect the country's livestock industry, the repercussion of the highly volatile soybean prices on the government's subsidy budget has prevented immediate action on the plan. Futures trading may be a solution to this obstacle, as will be illustrated later.

The Philippine Cotton Corporation

Inasmuch as cotton imports drain the country's dollar reserves by as much as US \$50 million annually, a commercial-scale cotton-growing project was initiated in the northern part of the Philippines in July 1974. Local cotton production however, is still minimal compared to the national requirement. The Philippine Cotton Corporation, a partnership of government and the nation's 22 textile millers which oversees the cotton project, could be utilized in initiating participation in the futures market as a means of fixing the import prices of cotton and in reducing import costs.

Table 4.1 shows the import volume and value of the above-mentioned agricultural commodities in 1976.

Quotation of Prices: The Flat Price System

For the purpose of determining import requirements, estimates of demand and supply for yellow corn and sorghum are made annually, at least three months prior to the traditionally lean periods of supply (February, March and April). The

Table 4.1. Volume and Value of Selected Imports, 1976.*

Commodity	Quantity (net kilograms)	CIF Value (US \$ millions)
Wheat	703,617,959	125.0
Cotton	30,577,182	40.8
Yellow corn	96,381,418	13.0
Soybeans	11,152,621	2.4
Sorghum	NA	NA
TOTAL		\$181.2

*Source: 1976 Foreign Trade Statistics of the Philippines.

three-month lead time is intended to give the NGA enough time to make purchases before local supplies bottom out and prices escalate. In addition, it also provides sufficient time for the contracting and timely delivery of the grains to the country. In the case of wheat, all of the country's flour millers submit reports on their requirements to the NGA, after having made individual estimates of demand and supply for the year.

As soon as import requirements (volume and time required) are finalized, the NGA opens a tender for price quotations from exporters. On the basis of quality, quantities available,

and prices offered, the NGA chooses the lowest bidder with whom it negotiates a forward contract to deliver the grains to the Philippines at a specified time.

A similar type of transaction is entered into by the industrial feed processors when importing soybeans, and by the local textile millers when importing cotton.

When import requirements are purchased in this manner, the majority of exporters^{17/} quote flat prices which include, not only an acceptable margin for the storage, handling, and delivery of the commodity to the Philippines, but also a risk premium.

As indicated earlier, a short hedger sells futures contracts against his inventory to avoid the risk of reduction in the value of his stocks prior to delivery. However, when asked to quote a flat rate, he has to do either one of the following:

(1) Lift his hedge prior to quoting a price in the open tender by buying back a certain number of futures contracts corresponding to the volume of stocks he intends to offer. He then becomes a speculator by the amount that his physical stocks exceed the amount hedged in the futures market. For this, he expects to receive, not only a normal return on his investment, but also a remuneration for the speculative risk he is made to assume. Should his offer not be accepted in the open tender, he resells the same number of contracts in the futures markets as a hedge. Since prices fluctuate in the

^{17/}Refers to exporters who short hedge in the futures market.

futures market, if by the time he resells prices have become lower, then the value of a portion of his inventory is reduced.

(2) Quote a flat price and then lift his hedge on the necessary number of futures contracts only after the contract to deliver to the Philippines has been awarded to him. If, when he liquidates his position in the futures market, prices have increased, he will have to shoulder losses in the sale of his stocks to the NGA.

Thus, under both circumstances, an exporter, when asked to quote a flat price, charges a premium for the possibility of economic loss due to unpredictable price fluctuations - a remuneration for the risk he is made to shoulder. Generally, the greater the difficulty involved in forecasting price movements over a given time period, the higher is the risk premium charged.

CHAPTER V

PHILIPPINE PARTICIPATION IN FUTURES MARKET

Having discussed the fundamental concepts underlying the operations of futures markets, this section will now illustrate how hedging can reduce the outflow of Philippine foreign exchange when importing. The primary goal therefore is cost minimization, although hedging can also enhance profits.

Hedging and Basis Trading

In the previous discussion on price formation in the futures market, it was concluded that a close linkage exists between the cash and futures prices of a specific commodity. It was also concluded that while the prices are correlated, a difference exists between the two prices. This difference is collectively referred to as the basis. The basis is a function of the following variables:

1. Supply and demand for the commodity;
2. Supply and demand, and prices of substitute commodities;
3. Storage availability and cost structure;
4. Availability and cost of transport facilities; and
5. Quality factors.

Generally, traders find it more convenient to trade in terms of the basis because its movements are less extensive and more predictable than the fluctuations of absolute cash and futures prices.

Disregarding price adjustments to account for delivery costs and quality differentials, the basis can always be expected to eventually narrow down to zero upon maturity of a futures contract. As earlier explained, the simultaneous reaction of traders to inequalities between cash and futures prices for the same standard and quality of a commodity upon the expiration of the futures contract ascertains the fulfillment of such condition. This is critical because, in essence, this condition is what makes fixing of prices in advance possible in the futures market.

A. Delivery on Contract Maturity Date. Assume that the NGA decides on period T_1 to import 5,000 bushels of wheat. The current cash price quotation is \$3.70 per bushel. After considering the costs it normally incurs in importing wheat, the price at which it has agreed to sell the imported wheat to the local flour millers, and the approximate time it wants the wheat delivery to be made to the Philippines, that NGA decides that the T_2 wheat futures, priced at \$3.60 per bushel is an acceptable price. The following hypothetical illustrations will show how the NGA can lock in its desired price by hedging in the futures market:

Table 5.1. Delivery on Contract Maturity Date: $F_2 = C_2 > F_1$

CASH MARKET		FUTURES MARKET	
T_1 :	Spot Price: \$3.70 per bushel	T_1 :	Buy 5,000 bushels of T_2 wheat at \$3.60 per bushel
T_2 :	Buy 5,000 bushels of wheat at \$3.75 per bushel	T_2 :	Sell 5,000 bushels of T_2 wheat at \$3.75 per bushel
Gain/(Loss) (\$0.05 per bushel)		\$0.15 per bushel	
Effective Buying Price: \$3.60 per bushel			

Table 5.2. Delivery on Contract Maturity Date: $F_2 = C_2 < F_1$

CASH MARKET		FUTURES MARKET	
T_1 :	Spot Price: \$3.70 per bushel	T_1 :	Buy 5,000 bushels of T_2 wheat at \$3.60 per bushel
T_2 :	Buy 5,000 bushels of wheat at \$3.45 per bushel	T_2 :	Sell 5,000 bushels of T_2 wheat at \$3.45 per bushel
Gain/(Loss) \$0.25 per bushel		(\$0.15 per bushel)	
Effective Buying Price: \$3.60 per bushel			

In the first example (Table 5.1), the basis narrowed down from \$0.10 per bushel on T_1 to 0 on T_2 . The NGA, by liquidating its long position in the futures market on T_2 , the expiration date of its futures contract, gained \$0.15 per bushel from the price increase in the market. By postponing the purchase of wheat in the cash market from T_1 to T_2 however, it incurred a \$0.05 opportunity loss because of the increase in the cash price from \$3.70 per bushel to \$3.75. Using the gains in the futures market to offset the opportunity loss in the cash market, the effective buying price was however, still locked in at \$3.60 per bushel ($\$3.75 - \$0.15$), the price which was originally determined to be acceptable.

Similarly, in the second example (Table 5.2), the basis moved from \$0.10 per bushel on T_1 to 0 on T_2 . The NGA lost \$0.15 per bushel in the futures market because of the price decline from \$3.60 to \$3.45 per bushel, but saved \$0.25 per bushel in the cash market by buying wheat on T_2 when the wheat price of \$3.45 had been reduced from the T_1 level of \$3.70 per bushel. Again, when gains were used to offset losses, the effective buying price was fixed at \$3.60 per bushel ($\$3.45 + \$0.15$).

B. Delivery Prior to Contract Maturity Date. Should the delivery of the physical commodity be required prior to the expiration of the futures contract, the basis would not be expected to disappear completely as in the preceeding examples. Due to the possibility of divergences occurring between the

cash and futures prices of a given commodity over a time period, hedging must be managed and done selectively in order to avoid situations where both cash and futures prices move against the hedger. This requires an ability to recognize and estimate the direction of price movements in both markets.

Tables 5.3 and 5.4 illustrate the consequent effective buying prices under premium and discount situations, where hedges are lifted and the delivery of the physical commodity are made prior to the maturity of the futures contracts.

A premium situation occurs when futures prices are above cash prices, while a discount situation is defined as a situation where cash prices are above futures prices. In a true premium situation, the distant futures would also be above the near futures, and vice-versa for a true discount situation.^{18/}

From the foregoing examples, it will be noted that prior to the expiration of the futures contracts, the basis cannot be expected to converge to zero. In spite of this however, the effective buying prices in the examples shown, relatively approximated the acceptable prices of \$3.60 in the first case, and \$3.45 in the second case. It will also be noted that in the second case where $F_1 < C_1$, the effective buying prices were \$0.05 higher than the desired price, but lower than the price \$3.60 per bushel which would have been the price paid if the hedger had decided not to hedge, but instead bought the

^{18/} Price, p. 36.

Table 5.3 Hypothetical Illustration of a Buying Hedge: $F_1 > C_1$

Time Period	C ₁ Constant		C ₁ Increases		F ₁ and C ₁ Decrease		F ₁ and C ₁ Increase	
	F ₁ Decreases		F ₁ Constant		FUTURES MARKET		FUTURES MARKET	
	CASH	FUTURES	CASH	FUTURES	CASH	FUTURES	CASH	FUTURES
	MARKET	MARKET	MARKET	MARKET	MARKET	MARKET	MARKET	MARKET
T ₁	\$3.45	\$3.60	\$3.45	\$3.60	\$3.45	\$3.60	\$3.45	\$3.60
T ₂	3.45	3.50	3.55	3.60	3.25	3.50	3.70	3.80
Gain/(Loss)	0	(0.10)	(0.10)	0	0.20	(0.10)	(0.25)	0.20
Effective Buying Price	\$3.55		\$3.55		\$3.35		\$3.50	

Table 5.4. Hypothetical Illustration of a Buying Hedge: $F_1 < C_1$

Time Period	C ₁ Constant				C ₁ Decreases				F ₁ and C ₁ Decrease				F ₁ and C ₁ Increase			
	F ₁ Increases				F ₁ Constant				CASH MARKET				FUTURES MARKET			
	CASH	FUTURES	MARKET		CASH	FUTURES	MARKET		CASH	FUTURES	MARKET		CASH	FUTURES	MARKET	
T ₁	\$3.60	\$3.45			\$3.60	\$3.45			\$3.60	\$3.45			\$3.60	\$3.45		
T ₂	3.60	3.55			3.50	3.45			3.20	3.15			3.70	3.65		
Gain/(Loss)	0	0.10	0.10	0	0.10	0			0.40	(0.30)			(0.10)	0.20		
Effective Buying Price	\$3.50				\$3.50				\$3.50				\$3.50			

physical commodity at the current cash price during period T_1 . Thus, by hedging and postponing the purchase of the physical commodity, the hedger made an additional gain by not paying for the commodity's storage costs up to period T_2 .

From the illustrations presented above, it can be concluded that if it is to be ascertained that an acceptable import price is effectively locked in, a long hedge must be liquidated upon maturity of the contract. As a general rule, a contract must be purchased if the price is expected to increase. If delivery of the commodity is required prior to the contract's expiration date, liquidation must be made before the price starts to fall particularly below the original buying price. In this connection, by managing a hedge, purchasing at an excessively high cost can be avoided; in many instances, profits may even be enhanced. It must be recognized however, that gains are not always guaranteed in situations where contracts are liquidated prior to their maturity, even with a managed hedge. A certain amount of risk is involved because of deviations between futures and cash prices, which could result in losses, particularly in cases where hedging strategies are formulated on the basis of misinterpreted information about future price developments.

Two of the more commonly used methods in managing both selling and buying hedges are the following:

1. Use of orders. Two types of orders will be discussed: stop-loss and limit orders. A stop-loss or stop order is an

order from a trader to his broker to close out or reduce an unfavorable long or short position in the futures market, in order to limit a trader's risk. For instance, a long hedger may give a stop-loss order to sell at \$3.50 if he thinks that the market may soon start to slump. When prices in the futures market begin to fall, the hedger's transaction will be closed as soon as the price reaches \$3.50. If overnight news causes futures to open at \$3.45, the transaction will automatically be closed at \$3.45. A limit order on the other hand, is usually used to acquire or to add to a marker position, either long or short. In a short hedge for instance, if the acceptable futures price is \$4.00, a limit order will instruct the broker to sell when the price reaches or goes above \$4.00. In a long hedge however, the order implies the desire of the client to purchase futures contracts when the price reaches or goes below \$4.00. If no time limit is given, the order is assumed to be good only for the day the order was made.

These types of orders will be particularly useful in the Philippines because futures trading hours in the United States do not coincide with office hours in the Philippines.

2. Use of moving averages.^{19/} Decision-making involving hedging strategies utilize two general types of analyses: fundamental and technical. Through fundamental analysis, a careful appraisal of demand and supply situations can be made. Long-term price movements can be determined, and from this,

^{19/} Ibid., pp. 54-58.

long-range actions can be planned. The behavior of prices however, is not affected by supply and demand factors alone. Traders' responses to currently available market information and their anticipations with respect to future events also affect price movements. This type of information which cannot be obtained from fundamental analysis alone, is critical in the proper timing of hedging activities, and can be determined through technical analysis.

Technical analysis, as referred to here, is the appraisal of daily changes in prices, volume of transactions, and open interest. Plotting of moving averages is one of the most commonly used tools in technical analysis.^{20/} In plotting moving averages, short-term price trends are superimposed on long-term price trends to obtain indications on when hedges must be placed, and when these should be lifted. During periods of rising prices, short-term averages tend to exceed long-term averages. When prices are declining, short-term averages dip below long-term averages. In a long hedge, futures contracts must be purchased when the two lines intersect, that is, immediately before they take on a positive slope. At this point, prices are low and are beginning to rise. Conversely, the hedge must be lifted when the two lines intersect and begin to take on a negative slope. Thus, gains are made by selling the futures contracts when prices have reached their maximum for the time period. The opposite is true in a selling hedge

^{20/} Most commonly used are the 10-and-3 and the 10-and-5 day averages of daily settlement prices.

(Fig. 5.1).

Analysis of moving averages show present and past price behavior. To the extent that subsequent price trends may be deduced from the past and present price movements, the analysis may be considered predictive. The major shortcoming of the technique is that it sometimes produces false cross-over signals. Precaution must therefore be taken before major hedging decisions are made. For instance, cross-over tolerances may be arbitrarily set and/or, cross-over signals may be tested against the outcome of the present-day settlement price.

The formula used in computing the averages is:

$$MAVE_t = \left(\sum_{i=t-n}^t S_i \right) / n$$

where: $MAVE_t$ = moving average price at the close of trading on day t

S_i = settlement price on day i

n = number of days in moving average

The Basis Tender

For the physical commodity negotiated through the futures market to be delivered to the Philippines, an open tender, similar to those conducted under the present method of importing, will have to be conducted. This time however, it will only be for the purpose of negotiating the basis (in contrast with negotiating a flat price) which is more predictable over time than absolute prices are. Basis offers will indicate the participating exporters' appraisal of adjustments needed to be

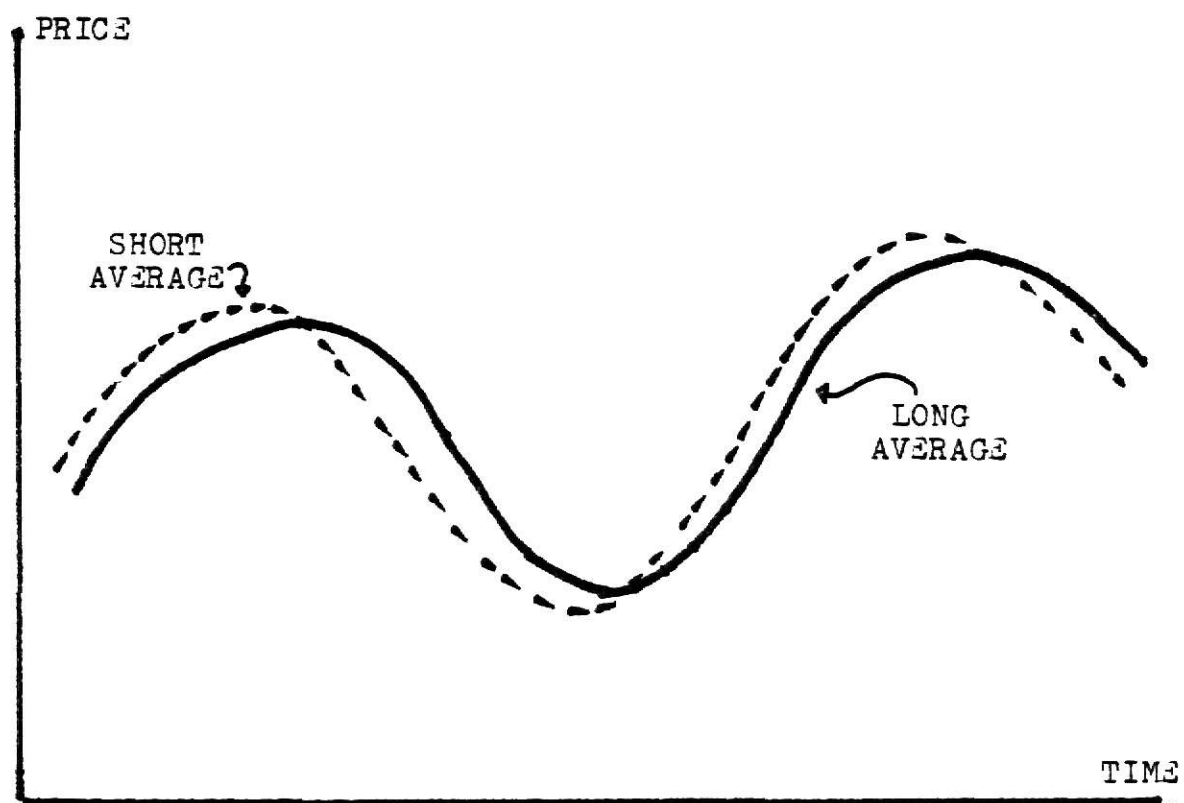


Fig. 5.1. Hypothetical Movement of Moving Averages.

made on the commodity's hedged price in order to account for quality differentials and delivery costs to the Philippines.

Basis biddings may be conducted anytime prior to, or after the futures contracts are purchased. To obtain indications on the most appropriate period during which to conduct a tender for a particular commodity, and to get an estimate of the range of basis variation during the period, an analysis of basis movements over time must be made.

For the previous years, when only historical data on flat prices are available, the "basis" can be estimated by getting the difference between the C&F prices paid for specific imports, and the settlement price of the commodity in the futures market on the day the flat price was quoted.

The Analysis of Basis Trends

Using the analysis of variance method (ANOVA), let:

$$Y_{ijk} = \mu + \alpha_i + \beta_j + \gamma_{ij} + \epsilon_{ijk}$$

where:

Y_{ijk} = k^{th} basis offer in quarter j of the i^{th} year

μ = average basis offer over the entire period ($\bar{Y}...$)

α_i = average effect of the i^{th} year ($\bar{Y}_{i..} - \bar{Y}...$)

β_j = average effect of the j^{th} quarter ($\bar{Y}_{.j.} - \bar{Y}...$)

γ_{ij} = interaction term between quarters and years
 $(\bar{Y}_{ij.} - \bar{Y}_{i..} - \bar{Y}_{.j.} + \bar{Y}...)$

ϵ_{ijk} = error term $\sim N(0, \sigma^2)$

i = years 1, 2, ..., I

j = quarters 1, 2, 3, 4

$k = \text{basis offer } 1, 2, \dots, n_1$

Analysis of Variance Table		
Source	d.f.	Sum of Squares (SS)
Quarter	3	$S_1 = \sum_{j=1}^4 \sum_{i=1}^I \sum_{k=1}^{n_{ij}} (\bar{Y}_{.j.} - \bar{Y} \dots)^2$
Year	(I-1)	$S_2 = \sum_{i=1}^I \sum_{j=1}^4 \sum_{r=1}^{n_{ij}} (\bar{Y}_{i..} - \bar{Y} \dots)^2$
Quarter*year	3(I-1)	$S_3 = \sum_{i=1}^I \sum_{j=1}^4 n_{ij} (\bar{Y}_{ij.} - \bar{Y}_{i..} - \bar{Y}_{.j.} + \bar{Y} \dots)^2$
Error	N-4I	$S_4 = S_5 - S_1 - S_2$
Total	N-I	$S_5 = \sum_{i=1}^I \sum_{j=1}^4 \sum_{k=1}^{n_{ij}} (Y_{ijk} - \bar{Y} \dots)^2$
Note: N= total number of observations = $\sum_{i=1}^I \sum_{j=1}^4 n_{ij}$		

Having constructed the ANOVA table, three hypotheses will be tested:

A. $H_0^{(1)}$: No interaction exists between quarters and years

$$\text{Test statistic: } F = \frac{S_3 / (3)(I-1)}{S_4 / (N-4I)}$$

with rejection region $F > \mathcal{F}_{(3)}(I-1, N-4I)$ for significance level α .

If $H_0^{(1)}$ is rejected, it is implied that an interaction exists between basis prices during quarters and the years when they were quoted. In this case, historical data on basis trends are not reliable indicators of future basis behavior. Normally however, the basis is repetitive and generally predictable. Thus it is likely that there will be insufficient evidence to reject $H_0^{(1)}$.

B. If $H_0^{(1)}$ is not rejected, a second hypothesis will be tested:

$$H_0^{(2)}: \alpha_1 = \alpha_2 \dots \alpha_I$$

$$\text{Test statistic: } F = \frac{S_2/(I-1)}{S_4/(N-4I)}$$

with the rejection region $F \geq \mathcal{F}_{(I-1), (N-4I)}$ for significance level α .

$H_0^{(2)}$ merely tests the effect of years on basis prices. Generally, this hypothesis may be expected to be rejected because of cost differences arising from year-to-year, due to the effect of inflation, and possibly the effect of the occurrence of abnormal events in any one year, on the behavior of the basis.

C. If $H_0^{(1)}$ is not rejected, a more critical hypothesis to test is:

$$H_0^{(3)}: \beta_1 = \beta_2 = \beta_3 = \beta_4$$

$$\text{Test statistic: } F = \frac{S_1/3}{S_4/(N-4I)}$$

with rejection region $F \geq F_{(3), (N-4I)}$ for significance level α .

If $H_0^{(3)}$ is not rejected, it is implied that negotiating the basis during any of the quarters of the year will create no significant effect on the basis price level.

If rejected, however, the most appropriate period during which to conduct a basis tender for a particular commodity can be determined (Fig. 5.2). Before assuming that the period with the lowest mean price ($\bar{Y}_{.j.}$) is the most appropriate period, the mean quarter prices must be compared with each other to determine if any significant differences exists between any two or three quarters.

There are several statistical methods available to test the significance of differences between any two or more means.^{21/} Outlined below is the Least Significant Difference (LSD) method which tests pairs of means:

1. Arrange the quarter means in an ascending order.
2. Compute the standard error of the difference between two means, using the formula:

$$s_p = \sqrt{MSE} \sqrt{\frac{1}{n.j.} + \frac{1}{n.j.}}, \text{ with } N-4I \text{ d.f.}$$

where: s_p = pooled standard error of the difference between two means

MSE = mean square error = $S_4/N-4I$

$n.j.$ = total number of basis offers in the j th quarter

^{21/}George W. Snedecor and William G. Cochran, Statistical Methods, (Ames, Iowa: The Iowa State University Press, 1967), pp. 271-278.

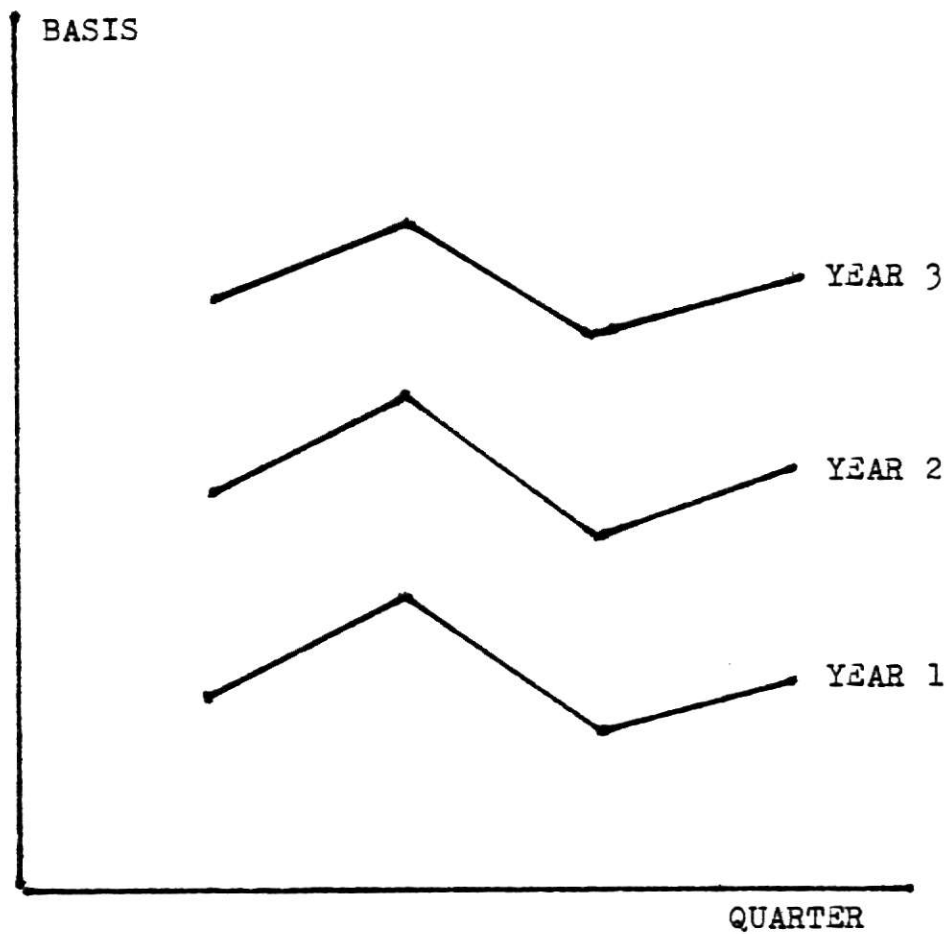


Fig. 5.2. Hypothetical Illustration of Basis Movements.

No interaction between quarters and years.

Existence of quarter effect. Existence of year effect.

3. Using $(s_p) (t_{\alpha/2, N-4I})$ as critical value, test the significance of the difference between two means, where the difference must be greater than or equal to the critical value to denote significance.

If no significant difference exists between any two quarters, the basis tender can be conducted anytime during those quarters with negligible effect on the basis. A $100(1-\alpha)\%$ confidence interval for the difference between the means of the two quarters can be obtained by adding $\pm$ LSD to the observed difference.

In addition, using the formula given below, a $100(1-\alpha)\%$ confidence interval can be constructed about a point estimate to get an indication of the possible range of basis prices which can be expected when the tender is conducted:

$$\bar{Y}_{.j} \pm t_{(\alpha/2, N-4I)} * s_{\bar{Y}_{.j}}$$

$$\text{where: } s_{\bar{Y}_{.j}} = \sqrt{MSE} / \sqrt{n_{.j}}$$

Initially, the reliability of the analysis presented here will be impaired to the extent that the amount of risk premium paid under the traditional method of importing cannot be estimated. While the actual basis paid during the past years cannot be exactly determined, the trends indicated may be used to obtain information on periods when the basis is usually low. The analysis will also provide an estimate of the range of basis variations during the appropriate period. The analysis of variance method may be expected to provide more

conclusive results after the adoption of the proposal because of the absence of risk premium. Knowledge of transportation cost structures and other relevant information on transport availability will also be useful in scheduling basis tenders and in estimating reasonable delivery costs to the Philippines.

Anytime after the basis bidding has been completed, the NGA may instruct its broker to transfer its futures contracts to the lowest basis bidder as a final procedure before the delivery of the commodity. Under ordinary circumstances, this must be done no later than five days prior to embarkation of the physical commodity.

Except for separate price negotiations (i.e., for the base and the basis components of the total price), adoption of the proposal will entail no other change from the current method of importing, with regard to the manner of payment and the terms of delivery.

CHAPTER VI

SUMMARY AND CONCLUSIONS

Since the Philippines is faced with a deteriorating balance of trade, and given the condition of imperfect knowledge about future price and market behavior, the potential of futures trading as a strategy to minimize the outflow of country's dollar reserves when importing, must be explored. It is the intention of this paper to solicit such attention.

As indicated earlier, for facility of implementation, futures trading as proposed here, will initially be limited to the importation of wheat, cotton, soybeans, yellow corn, and sorghum -- agricultural commodities over which some form of organized government control is in existence. If the implementation of the proposal is successful, the application may be expanded to include other imported agricultural commodities that are traded in the futures markets. However, even then, the strategy may still have to be done selectively to honor the Philippines' preferential trading commitment to the rest of the ASEAN countries which do not hedge in the futures market. In addition, the government may also consider the advantages which may be attained from hedging the country's major export products such as sugar, lumber, and copper, as a means of achieving a maximum competitive posture especially when dealing with large international corporations who import these goods.

In conclusion, due to factors inherent in the system of futures trading, dollar savings may be gained when importing in various ways:

1. Non-payment of risk premium. Most flat pricing is computed from futures prices. The main difference however, lies in the imputation of a risk premium in flat prices quoted by exporters when invited to bid in an open tender. The determination of the exact value of the premium is beyond the scope of this paper. It is obvious, however, that the amount must be sufficiently attractive to induce a hedger to expose his capital to the very same risk which made him hedge in the first place.

2. Efficient management of inventories. Effective hedging requires the use of fundamental and technical analytic tools in order to properly appraise local and international market and price trends. Thus, when practised systematically, hedging may provide a reliable guide for managing local inventories by facilitating the synchronization of Philippine importations with favorable international market developments.

3. Attainment of flexibility in price-fixing. By hedging and basis trading, sufficient flexibility is attained in determining the cheapest possible combination of the two components of a commodity's import price. As illustrated earlier, as long as the futures contracts is liquidated upon its maturity, an attractive futures (base) price may be locked in even in the event of adverse price fluctuations. This is not possible under the traditional method of importing where exporters

quote a flat rate.

4. Attainment of anonymity in the international market.

In the traditional method of conducting an open flat price tender, the Philippines pushes prices to move against itself on two counts: (a) by inviting exporters to participate in an open tender, it "announces" its short position in the international market. When substantial quantities are to be purchased, prices are pushed upwards. (b) By asking exporters to quote prices in the open tender, hedges are lifted simultaneously in the futures market, thus affecting the movement of cash and futures prices.

5. Creation of a more competitive situation among basis bidders. The number of participants in a flat price tender is generally limited to exporters who have sufficient capital to assume risks associated with unfavorable price changes. In a basis tender, no such type of risk is involved. Thus a bigger number of bidders are attracted to participate, resulting in a more competitive situation. This tends to reduce the basis offers.

There are two constraints in the adoption of futures trading in the Philippines. The first, as earlier mentioned, is the time difference between futures market trading hours in the United States and the office hours in the Philippines. This, however, can be resolved through the use of orders, and during critical periods, the assignment of an evening work group to monitor price movements in the futures market.

The immediate transfer of funds from the Philippines to

the futures exchange to meet margin requirements, perhaps poses an even more critical constraint. Should the Philippines decide to take advantage of the benefits of trading in the futures market, it must look into the possibility of making arrangements with the Central Bank to facilitate such transfer, and to make available sufficient cash (\$) overseas, necessary to maintain margin equity in the event of adverse price movements.

It is unfortunate that this study has been limited to merely citing the benefits which the Philippines could gain from futures trading. When a change such as this is proposed, quantified proofs are often sought. Otherwise, it is usually met with skepticism. With sufficient data however, the advantages mentioned here may be quantified and weighed against the costs involved in hedging, such as the 0.2% broker's commission per contract made, interest foregone on margin deposits, and overseas communications expenses.

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FUTURES TRADING: ITS APPLICATION IN THE PHILIPPINES

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AN ABSTRACT OF A MASTER'S REPORT

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During this decade, the Philippines' balance of trade began to deteriorate starting from the second half of 1974. It is expected to worsen unless measures are taken to expand the country's capacity to finance its increasing import bill, primarily by increasing its exports. Equally important is the need to offset the effect of unstable prices in the international commodity market on the country's balance of trade. In this connection, this study was undertaken to propose using the futures market when importing selected agricultural commodities, as a means of locking in import prices and minimizing import costs. The agricultural commodities selected are wheat, cotton, yellow corn, soybeans, and sorghum-- agricultural crops whose importations are regulated in varying degrees by the government. In the future, the application of the proposal may be expanded to include other commodities that are imported by the Philippines and are traded in the futures market. If the adoption of the proposal is successful, the government may also consider hedging the country's major export products in order to obtain a maximum competitive posture in the international market when dealing with large foreign importers.

Through hedging, a contract to buy or sell on standard terms in the futures market is entered into as a temporary substitute for an intended later contract to buy or sell in other terms in the cash market. As long as the position in the futures market is liquidated upon maturity of the futures contract, an import price may be fixed in advance by buying

long in the futures market. If the Philippines decides to hedge, it will not only be able to lock in an import price in advance, it will also be able to minimize the cost of its imports, through the non-payment of the risk premium which is usually charged by exporters under the traditional method of importing. The determination of the exact amount of the risk premium is beyond the scope of this study. However, it can be expected to be sufficiently attractive to induce exporters to expose their capital to the very same risk which made them hedge in the first place. Furthermore, by hedging, the Philippines will be able to maintain anonymity in the international market when contracting for its imports. This is necessary if the Philippines is to prevent prices from moving against it, especially when substantial quantities are to be purchased.

If delivery prior to the expiration of the futures contract is required, hedging must be managed in order to determine the appropriate period during which to open and close out positions in the futures market. Stop-loss and limit orders may be used for this purpose. Moving averages may also be plotted to ensure that the contract is purchased when the price is low but is expected to increase, and that the same contract is sold before the price starts to fall, particularly below the original buying price. It must be recognized however that as long as a futures contract is liquidated prior to its maturity date, there is no assurance that the price-fixing mechanism of hedging will always be guaranteed. A

certain amount of risk is involved because of the deviations which often develop between futures and cash prices during the life of the futures contract.

In order for the commodities contracted through the futures market to be delivered to the Philippines, a basis tender will have to be conducted. The basis is the difference between futures and cash prices, and is in general, more stable and predictable over time. A statistical test to determine when to conduct the basis tender and the range of basis offers which may be expected during the appropriate period is presented in the study.

Thus, through hedging and basis trading, the Philippines will be able to fix its import prices in advance and minimize its import costs, thereby reducing the outflow of its foreign exchange when importing. Familiarity with demand and supply situations necessary in effective hedging and basis trading will also provide a useful guide in the efficient management of inventories.