

Commonwealth Economic Papers: No.14

Recent Trends in Commodity Marketing



Commonwealth Secretariat

COMMONWEALTH ECONOMIC PAPERS: No. 14

RECENT TRENDS IN
COMMODITY MARKETING

A study prepared for the Commonwealth Secretariat
by the Commodities Research Unit Limited

Commonwealth Secretariat, Marlborough House
London SW1Y 5HX

November 1980

© Copyright 1980

Printed and published by
The Commonwealth Secretariat

May be purchased from
Commonwealth Secretariat Publications
Marlborough House
London SW1Y 5HX

ISBN 0 85092 192 9

PREFACE

In June 1979 the Commonwealth Secretariat arranged a Seminar for Commonwealth officials to promote understanding of the operations of the London Commodity Markets and the significance of their price-fixing role for commodities on the exports of which many Commonwealth countries depend. As a follow-up to that Seminar and taking into account heightened activities in commodity markets, arising from continuing high levels of inflation, exchange rate instability and increasing interest in investment in commodity markets, the Secretariat's Economic Affairs Division commissioned this Study from the Commodities Research Unit to examine more closely recent developments in commodity marketing.

The Study has as its purpose to examine in particular the extent and influence of hedging and speculative dealing in the commodity markets, and the effects of recent growth in other 'non-trade' dealing - portfolio investment, commodity funds, bank operations, and dealings motivated by the greater attractiveness of commodities as a store of wealth in the light of currency instability. It examines the extent to which it is possible to determine whether this more extensive 'non-trade' business has affected price volatility and long-term price levels, and whether it has been in the interest of commodity producers and consumers.

The analysis of these recent developments will, it is hoped, be helpful in adding to understanding of price determination in commodity markets, and its response to influences beyond production and consumption to which it has become increasingly exposed.

B. Persaud
Assistant Director

RECENT TRENDS IN COMMODITY MARKETING

<u>CONTENTS</u>	<u>Page</u>
<u>CHAPTER I : COMMODITY MARKETING</u>	7
1. INTRODUCTION	7
2. PRODUCER PRICING AND TERMINAL MARKET PRICING	9
2.1 <u>Two Systems</u>	10
2.2 <u>Producer Pricing</u>	11
2.3 <u>Terminal Market Pricing</u>	13
<u>CHAPTER II : THE GROWTH OF TERMINAL MARKETS</u>	19
1. INTRODUCTION	19
2. COMMODITY TRADING	21
2.1 <u>Copper</u>	21
2.2 <u>Cocoa</u>	30
2.3 <u>Coffee</u>	36
2.4 <u>Lead</u>	42
2.5 <u>Sugar</u>	46
2.6 <u>Zinc</u>	51
<u>CHAPTER III : PRODUCERS, CONSUMERS AND TERMINAL MARKETS</u>	57
1. INTRODUCTION	57
2. HOW PRODUCERS CAN USE TERMINAL MARKETS	61
3. HOW CONSUMERS CAN USE TERMINAL MARKETS	66
4. CONCLUSION	68

<u>CONTENTS</u>	<u>Page</u>
<u>CHAPTER IV : SPECULATION AND NON-TRADE INTEREST IN <u>TERMINAL MARKETS</u></u>	71
1. INTRODUCTION	71
2. SPECULATION ON TERMINAL MARKETS	73
2.1 <u>Now Speculators Operate</u>	76
2.2 <u>The LME Aluminium Contract</u>	78
3. INVESTMENT IN COMMODITY FUTURES	81
3.1 <u>Commodity Futures as a Protection Against Inflation</u>	82
3.2 <u>Bank Involvement in Commodity Futures</u>	84
4. CURRENCY INSTABILITY AND TERMINAL MARKET TRADING	86
4.1 <u>The Devaluation of Sterling, November 1977</u>	88
4.2 <u>LME Turnover and Currency Instability</u>	91
<u>CHAPTER V : TERMINAL MARKET PROCEDURES AND PRICE <u>STABILITY</u></u>	99
1. INTRODUCTION	99
2. TERMINAL MARKET TRADING RULES AND PROCEDURES	101
2.1 <u>Margin Calls</u>	101
2.2 <u>Stop-Loss Limits</u>	103
3. AN EXAMPLE OF SPECULATION AND MARKET INSTABILITY	105
3.1 <u>Speculation in the Silver Market</u>	105
<u>CHAPTER VI : SUMMARY AND CONCLUSIONS</u>	109
1. COMMODITY PRICE VOLATILITY AND FUTURES TRADING : THE EMPIRICAL EVIDENCE	109
2. SOURCES OF FUTURES TRADING	111

CONTENTS

Page

3.	THE ROLE OF TERMINAL MARKETS	116
3.1	<u>The Long-Run Trend Price of Commodities</u>	117
3.2	<u>Terminal Market Trading and Commodity Price Volatility</u>	118
3.3	<u>Commodity Market Efficiency</u>	119
3.4	<u>Commodity Marketing Arrangements</u>	120

RECENT TRENDS IN COMMODITY MARKETING

<u>LIST OF TABLES</u>	<u>Page</u>
Table 2.1 : Copper Prices, 1960-1978	23
Table 2.2 : Real Copper Prices, 1960-1978 in 1970 US cents/lb	25
Table 2.3 : Terminal Market Turnover and World Production of Refined Copper, 1960-1978	26
Table 2.4 : Comex Copper Turnover	29
Table 2.5 : Terminal Market Cocoa Prices, 1960-1978	31
Table 2.6 : Terminal Market Turnover and World Production of Cocoa, 1960-1978	33
Table 2.7 : New York Cocoa Turnover	34
Table 2.8 : New York Coffee Prices, 1960-1978 (cents per lb)	37
Table 2.9 : Terminal Market Trading and World Production of Coffee, 1960-1978	40
Table 2.10: Comparative Lead Prices, 1960-1978	43
Table 2.11: Terminal Market Turnover and World Production of Lead, 1960-1978	44
Table 2.12: Sugar Prices, 1961-1978	49
Table 2.13: Terminal Market Turnover and World Production of Sugar, 1961-1978	50
Table 2.14: Terminal Market Turnover and World Production of Refined Zinc, 1960-1978	52
Table 2.15: Comparative Zinc Prices, 1960-1978	54
Table 2.16: Comparative Real Zinc Prices, 1960-1978 (in 1970, US cents per lb)	55
Table 3.1 : US Producer Prices, LME Copper Prices and US Producer Stocks of Copper, 1974-1978	58
Table 4.1 : LME Monthly Copper Turnover and Annual Non- Socialist World Refined Copper production	92
Table 6.1 : Analysis of Trading in Soyabeans Futures on the Chicago Board of Trade	115

CHAPTER I : COMMODITY MARKETING

1. INTRODUCTION

Over the past decade the prices of commodities traded on the world market have fluctuated considerably. The spectacular boom in commodity prices after 1972 was followed by a steep decline by 1975. Since then, against a background of speculative activity, uncertain prospects for industrial growth, and political upheavals in producing countries, instability has continued.

For producers, as well as for consumers, this market instability has been a major problem. In the recession, developing countries see export revenues slashed as the market value of their output has plummeted. Consumers of metals, agricultural raw materials and food products have been faced with sudden unpredictable cost rises to pass on to a resistant market. For producers, consumers and merchants, price fluctuations have also brought the risk of heavy financial losses with the changing value of stocks and raw material in process.

What have been the causes of the instability in commodities markets? Changes in consumption, buying patterns of purchasing divisions of major user industries, over-expansion of productive capacity or crop failures and other supply interruptions continually cause mismatching of supply and demand. In addition, there have been other non-industry influences popularly judged to be causes of price fluctuations and market vagaries. These can loosely be grouped together under the heading of 'speculation'.

As it stands, the term 'speculation' covers everything from gambling on the price of commodities through buying or selling ahead of requirement or ahead of production, through dealing in

the paper transactions of commodity exchanges to physical or paper deals designed to "corner" markets so as to dictate prices and make huge capital gains. The discussion which follows examines the influence of these "outside" interests upon commodity markets. To do this it is necessary to look more closely at the patterns of commodity marketing.

We shall focus particularly on the last decade and attempt to pinpoint some of the factors behind the increased market volatility, in particular how far this can be associated with increased activity on commodity terminal markets. In the remainder of this chapter, we shall set out the general characteristics of two commodity marketing systems, producer pricing and terminal market pricing. Then we can look empirically at the trends of development in a diverse range of markets for commodities, before we go on to explain these trends and their implications for market stability.

2. PRODUCER PRICING AND TERMINAL MARKET PRICING

2.1 Two Systems

There are two major systems for determining the prices at which the bulk of commodities are traded: producer pricing and terminal market pricing. Producer prices, as the name suggests, are set by the major producers of a commodity for the sale of their output to customers. Producers may set a range of prices, rather than a single 'producer price', to reflect differences in quality and other factors. In some countries, producers are forbidden by law from agreeing on prices amongst themselves, but often one supplier effectively dominates pricing. Producers take account of prevailing market conditions, but they do not necessarily follow every fluctuation in the market with an alteration in price.

A producer price will, in general, be for immediate delivery of the commodity, but the producer will often enter into an unpriced contract to deliver (perhaps monthly) to the consumer over a period of a year or more. The price for the delivered commodities will be that prevailing at delivery dates. In practice, on both spot and contract sales, discounts may be offered on the published producer price to certain consumers if market conditions are weak.

Terminal market pricing is a little more complicated. A forum is provided where dealers operating on behalf of producers, consumers and merchants, exchange offers and bids until a price is reached at which the day's demand and supply are equated. In principle, neither producers nor any other group should have direct control over this price-setting mechanism.

Commodity exchanges may determine various prices: a daily 'spot' or 'cash' price, the price for immediate delivery of the

commodity; a monthly 'spot' price, for delivery in the current month; a daily or a monthly 'future' price, for delivery on a future specific day or month. Terminal markets are those which set prices for future delivery; however, since forward delivery contracts can themselves be bought and sold at any time up to the day of delivery, exchanges can provide the means of determining prices for any day back to the present. This is formally recognised in the London Metal Exchange (LME), which reports daily spot prices and prices three months in the future, while the New York Commodity Exchange (Comex) has a monthly spot price and a monthly future price for up to thirteen months ahead.

It should be noted that some commodity markets may conduct only spot business and issue daily prices (e.g., the special tin concentrate market operated by the smelters in Penang) although this is rare, while others may deal only in futures or give prices for specified delivery months (e.g., the New York Mercantile Exchange). In this report, we are concerned with futures markets which provide for secondary dealing in contracts.

A further point to note is that some producers may operate a modified exchange/producer price system. Instead of charging the exchange price for the day of delivery or fixing their own price, they may quote a price based on a premium over one month's average exchange prices. For example, Latin American copper producers in the past based their prices directly on the LME daily quotations, but today sell their copper at fixed premia to monthly average LME prices.

There is another system for determining commodity prices, which stands between producer pricing and terminal market pricing. This is where producers and consumers of a commodity enter into an agreement to keep the price within a specified range. The price is allowed to fluctuate within the limits agreed, according to commodity exchange quotations, but measures are

taken to boost prices when they fall to the lower limit and restrain prices when they rise to the upper limit. These measures may include production or export quotas for producers, rationing of available supplies to consumers, and purchases or sales of the commodity from a buffer stock.

In practice, this form of price determination has had only limited success. Agreements have tended to become inoperative or break down under pressure from changes in the market. This has happened with International Coffee Agreements and the International Cocoa Agreements. The more comprehensive measures of the successive International Tin Agreements have been unable to prevent prices from rising to well above the agreed range.

We shall not deal with these international commodity agreements separately, but incorporate an analysis of the problems these face into our discussion of producer pricing in a later chapter. This is a justifiable procedure, even if for many commodities international agreements have been more common than attempts at producer pricing. A discussion of producer pricing, and the problems that arise for this system, when in conflict with the free market, will bring out the difficulties of administering prices more clearly than a separate analysis of international commodity agreements.

2.2 Producer Pricing

A system of producer pricing can clearly only be effective if producers can maintain a dominant position in the market. For this reason, producer pricing is found only in those countries which are not sizeable net importers of the commodity in question. Among the metals, the USA provides perhaps the best historical example of a country with effective producer price setting, with the examples of copper and lead. In Western Europe, the zinc market is controlled by producers setting a European producer price.

The main advantage claimed for producer pricing is a greater price stability than occurs when prices are determined on a commodity exchange. Overall, the producer price changes less frequently than the commodity exchange price and follows a lower amplitude cycle, remaining above the free market price in times of recession and below in times of booming demand.

Producers benefit from the price stability and their control over the market since this creates a better climate for investment planning. Consumers can also benefit by being more certain of supplies of raw material at a known price. In so far as both are satisfied with the system, there need be no recourse to specialist dealings in commodities (e.g. via futures markets) to guard against damaging price fluctuations. Any temporary advantage, through maintaining an average level of prices above or below the free market price, is of course a disadvantage to the other and cannot be cited as a general advantage of producer pricing; but it has tended, in the past, to be the case that producer pricing systems for non-fuel commodities, because of their vulnerability to political pressures in times of inflation, have given rise to lower average prices than terminal market systems. Thus, the recent experience has been that consumers of these commodities have benefited more from producer pricing systems than have producers.

As noted above, the producer price is not determined entirely independently of prevailing market conditions. If producers decided to raise prices when demand was falling, they would be faced, either with mounting levels of stocks, or the need to cut back production, perhaps to uneconomic levels of capacity utilisation. If, on the other hand, prices were cut when demand was increasing, then supplies to customers would have to be rationed, unless significant increases in output were possible.

The pressure of the free market is particularly felt when purchases and sales of a commodity can take place at commodity exchange prices as well as at producer prices. This is very often the case in countries with producer price systems. Even if the domestic free market were not used, dealers may import or export the commodity to profit from a difference between the local producer price and a commodity exchange quotation. For example, producers would be straining the loyalty of their customers if they posted prices which greatly exceeded the price at which consumers could buy from other sources. On the other hand, if the producers underprice their supplies, purchasers could resell on a commodity exchange for an easy profit. Pressures such as these have been major elements in undermining producer price systems, as we shall see below.

2.3 Terminal Market Pricing

The recognised prices for many commodities are determined on commodity exchanges. Here, dealing between traders is conducted under formal rules drawn up by the governing body of the exchange, and official prices are announced each trading day. Evidently, considerable fluctuations in prices are possible. Under 'normal' market conditions, the price would tend to change by only a small amount from day to day, balancing small changes in supply and demand. But in response to news of production problems, strikes and other factors, the price could oscillate sharply.

Terminal markets perform three basic functions to producers, consumers and merchants of a commodity. They act as institutions to set prices for transactions in particular commodities; they offer facilities for hedging price risks; and they can be used as a physical market for buying from and selling into registered warehouses. The price setting function is clearly important, but how widely the prices quoted are used in commodity trade depends on a number of factors, not least the existence of

alternative producer pricing systems. We shall return to these in a later chapter. The most important function of terminal markets is, however, that of hedging. Hedging business by far outweighs that for physical delivery to or from exchange warehouses; and it is in the nature of hedging that most contracts to receive or deliver commodities traded on the exchange are cancelled out by opposing contracts to close a hedge position.

To understand this important role played by commodity terminal markets, it is first necessary to appreciate that, while making price fluctuations possible, they also offer a means of insuring against adverse price movements. Because their markets set future as well as spot prices, it is possible to 'hedge' price risks. The basic principle of hedging is to buy a future delivery or supply contract, which is equal and opposite to the trading commitment entered into outside the exchange. Then, any loss on the latter deal, resulting from a disadvantageous movement of prices, is offset by a profit on the exchange transaction.

A simple example of a hedge can be given for a fabricator, purchasing copper wirebars for conversion into wirerod to sell in three months time, with the selling price of the wirerod based on the ruling cash price of wirebars on the day of sale, plus a fixed charge for transformation costs and profit. The fabricator is at risk if the future cash price falls, since his revenue would not cover the costs of his raw material purchases.

By balancing his physical transactions with transactions on a commodity terminal market, such as the LME, the fabricator can insure against adverse price movements. He sells a contract to deliver three months in the future the same quantity of wirebars that he originally bought for production of wirerod. Then, when delivery of the wirerod is due, he meets his contract to deliver wirebars by purchasing a cash contract for wirebars for

delivery on the due date. The LME transactions (a sale followed by a purchase) cancel out, but the fabricator has managed to arrange that the final LME purchase is at the same price as the base price he receives for wirerod. If the wirebar price on the LME fell during the three months, he would have made a loss on his wirerod deal, but would have made a profit of exactly the same amount on his LME deal. The result of the hedging and physical transactions is that the effect of price fluctuations are neutralised, since gains would also be cancelled out. If the LME quotation rose £10 per tonne over the period, the fabricator will make a £10 per tonne capital gain on his original purchase of wirebars for processing, and an exactly counterbalancing £10 loss on his LME dealings.

The transaction is not without costs, of course. Apart from brokerage fees, other costs may be involved. If the forward price for wirebars is less than the LME cash price at which the fabricator buys wirebar for conversion, i.e. if there is a 'backwardation', the cost per tonne equals the size of the backwardation. However, if a 'contango' is present, i.e. if the forward price exceeds the cash price, then the hedger benefits. But, here again, the relevant consideration is that the ruling backwardation or contango is known, so that, whether giving a cost or a benefit, it can be incorporated fully into the fabricator's margin, and there is no risk involved.

Hedging is very often confused with speculation. They are related, but they have the relationship of opposites. Hedging, as we have seen, is essentially a means of insuring against price risk. Speculation, on the other hand, involves deliberately taking a risk on price movements, up or down, in the hope of profit. In our example above, the wirerod maker would have been guilty of extreme speculation if he had not sold wirebars forward on the LME. By hedging, he ruled out the chance of a speculative gain as well as a speculative loss. The buyer of his wirebar contract could have been another trade hedger, or a speculator taking a different view of the future spot price, and

wishing to profit by it. Without this active difference of opinion, no bargain could have been struck.

Hedging and speculation thus both involve the purchase and sale of cash and futures contracts. Since, on commodity exchanges, a dealer may be operating on behalf of a client, it is difficult to separate the two types of business when looking at the total market turnover in a commodity. In addition, a hedger may advance or delay the closing of his hedge transaction to become a speculator himself at the margin, on very short term price movements.

Selling the futures contract will be difficult unless someone either happens to be setting up an opposite hedge, or wants physical metal on the future date, or believes that the commodity price will rise. The purchaser in the third case is a speculator. Acting against the market trend or view, he is willing to bear the risk or loss on a fall in the price, and so provides the necessary complement to the hedge transaction.

Speculation may be carried out by producers, consumers or merchants in the commodity trade. But it is also conducted by 'outside interests' - bankers, stockbrokers, insurance companies, and industrialists with short-term money assets they wish to invest in commodities.

For these outside interests, the standardisation of contracts on commodity exchanges greatly simplifies dealing. To deal profitably, it is more important to understand the mechanisms of the exchange than the characteristics of any particular commodity. It is only with the price aspect of a commodity that one is concerned when dealing on commodity markets. Quality considerations are guaranteed by the acceptability of a particular brand of commodity (e.g. lead from a certain refinery, coffee from specific countries) for trading on the exchange; differences in quality between different brands, for which

consumers may be willing to pay premia, are of little concern to the non-trade speculator, who merely wants an easily liquidated asset.

Two other factors also facilitate non-trade interest in commodity exchanges. Firstly, dealing is conducted in terms of 'warrants', which are receipts representing stocks of the commodity in the exchange warehouse. Therefore, as long as the purchaser of a contract is willing to pay warehouse charges, he need never actually take delivery of the copper, cocoa, wool, rubber etc. The warrant can then be resold without the buyer ever having seen his original purchase. This is clearly a convenient service provided by commodity exchanges, particularly for speculators, who are more likely to receive and hold contracts than are hedgers, whose aim is to cancel out their exchange dealings.

Secondly, when buying a futures contract through a broker or exchange dealer, the buyer does not have to advance the whole value of the contract. He gives the broker only a 'margin', equal to perhaps 10 per cent of the value of the contract. The size of the margin fluctuates according to the brokers' estimate of the risk involved in the purchase, but rarely exceeds 50 per cent. At a low percentage, the speculator, who profits by buying a futures contract at a low price, and selling at a time when the price rises higher, has made a considerable profit in relation to the capital actually advanced. However, since the speculator is still liable to pay for his purchase, no matter what the margin, all of the capital value is still at risk if the market moves adversely. Margin requirements enable the speculator to gamble with commodities whose value is several times that of his available money-capital. As we shall see, 'margin-calls' - a broker's request for more funds to protect his position if prices move adversely for his clients - can add a further element to market volatility.

The comments on terminal markets in this section have served both to bring out the general points of contrast with producer pricing systems and to provide an introduction to our assessment of the influence of terminal markets on commodity trading. The chapters that follow will describe and attempt to explain the relative growth of terminal markets, and judge their overall impact.

CHAPTER II : THE GROWTH OF TERMINAL MARKETS

1. INTRODUCTION

In this chapter we shall present market profiles of several commodities to illustrate the scope and extent of the growth of terminal market trading. The commodities dealt with, both metals and agricultural (or 'soft' commodities), are a diverse group with different market characteristics, offering a wide range of examples of trends in the international marketing of commodities. For convenience of comparison, as far as possible we have covered the same time period for each commodity - from the early 'sixties' up to the present.

The commodity profiles will outline the principal market features for each. These include the volume of world production, the main production and consumption centres, international trade, market structure, the location and importance of terminal markets compared to other pricing systems, and the stability of the market. Once we have presented the overall picture, we will be in a position to examine why terminal market trading has grown. This question will be the subject of the following two chapters. The discussion of this chapter forms a necessary preliminary to the analysis of whether, and in what sense, terminal markets pose a 'problem' in the marketing of commodities.

Two factors will be examined in each of the commodity profiles. Firstly, the volatility of terminal market prices compared to other price quotations. It will be seen that, even looking at annual average prices, leaving aside monthly price fluctuations, the terminal market price can be quite unstable. A useful statistical measure of volatility is the coefficient of variation. This is equal to the ratio of the standard deviation of a series to its average value. Assuming that the values in the series are

independently and normally distributed, a value of 0.1 for the coefficient of variation means that a single year's price will be within plus or minus 10 per cent of the average value about two-thirds of the time. (The coefficient of variation allows the volatility of different series to be compared because it standardises the absolute variation by relating it to the mean value of the series. However, one should bear in mind that, in a series whose values are on a strong upward trend, the average value will be relatively low for the period as a whole. This will tend to overstate price volatility, when compared to coefficients of variation calculated over a shorter time period).

Secondly, one can look at the ratio of total turnover on terminal markets to total world production of a commodity. If terminal market trading volume bears a stable relationship to total world production, the ratio will be constant. So a significant rise in this ratio will indicate the increasing importance of futures markets.

As noted in Chapter I, very little business conducted on terminal markets results in physical deliveries. Thus, even if terminal market turnover is, for example, only 50 per cent of world production, it is not implied that half of world output passes through the terminal market. In many cases, as we shall see below, market turnover is several times world production, showing very clearly that most business has nothing to do with the physical requirements of traders.

In the profiles that follow, we shall indicate, wherever possible, just how unimportant are physical deliveries in the context of most major terminal markets. However, physical deliveries are peripheral to the main objective of the present chapter, which is to examine whether, and to what degree, the growth in terminal market turnover in the past twenty years has been associated with an increase in commodity price volatility.

2. COMMODITY TRADING

2.1 Copper

Copper is one of the most widely traded commodities, and certainly the most widely traded non-ferrous metal. As we shall see below, it provides a good example of the decline of producer pricing in the face of competition from commodity terminal markets.

Annually, some three million tonnes of refined copper enter into international trade, out of the total production of seven million tonnes in the non-Socialist World. The main copper producing countries are Zaire and Zambia in Africa, Chile in Latin America, the USA and Canada, and West Germany and Japan. These latter two countries have little or no domestic copper mine capacity and import concentrates and blister copper for refining.

The main copper consuming countries in the non-Socialist world are the USA, Japan and West Germany. Owing to its large domestic copper production capacity, the USA is nearly self-sufficient in copper supplies, although, as the biggest industrialised country, it remains a net importer of refined copper. Net imports are some 300,000 mtpy compared to a total refined copper consumption in excess of 2,000,000 mtpy. This relative self-sufficiency, together with the high degree of integration between copper mining companies and downstream semi-manufacturers, has been the basis of the US producer pricing system.

Until 1978, the system of producer pricing of copper was directly counterposed to pricing through a commodity terminal market. Throughout the USA and Canada, the main copper producers would announce the terms on which they sold refined

copper, altering their prices only infrequently in response to the changed balance of supply and demand.

The short-run stability of the system of producer pricing stood in marked contrast to the vagaries of the free market price. In North America, scrap prices are determined by reference to the daily quotations on New York's Comex exchange. Outside the USA and Canada, copper prices are set by the daily quotations of the London Metal Exchange. These, like those on Comex, would fluctuate from day to day, perhaps quite sharply, in response to disturbances in the market - a mine disaster, labour dispute at a refinery, etc - or from outside the copper market, e.g. commodity speculation. Table 2.1 gives annual averages for the US producer price for wirebars compared to the average of the LME wirebar quotation (in £ per tonne and US cents per lb) from 1960-78.

From the coefficient of variation, also given in Table 2.1, we can see that price volatility decreased after 1969. This was particularly true for the LME price, whose coefficient fell from 0.35 to 0.21 between 1960-69 and 1969-78. Over the period as a whole, the US Producer Price does not appear much less volatile than the LME price (particularly when this is transformed into US cents per lb., so discounting fluctuations due to exchange rate changes). However, one must remember that the LME price also fluctuated from day to day, whereas the US Producer Price changed infrequently. For example, during January to April 1974, when the LME price rocketed from a low of £863 to a high of £1400, the US Producer Price remained constant at 68.7 cents.

A brief inspection of Table 2.1 shows that the US Producer Price was above the LME price when the latter was weak (1960-63, 1971-72, 1975-78) and below the LME when the LME was booming. In particular, the US Producer Price did not rise to the heights of the LME in 1974, nor fall so sharply in succeeding years. This indicates a certain stabilising effect of the

Table 2.1 : Copper Prices, 1960-1978

	US Producer Price ¹		LME Copper Price ²	
	(US cents per lb)	(US cents per lb)	(US cents per lb)	(£/per tonne)
1960	32.05	30.75		242.07
1961	29.92	28.59		225.94
1962	30.60	29.28		230.29
1963	30.60	29.32		230.57
1964	31.96	43.86		345.52
1965	35.02	58.73		462.46
1966	36.17	69.13		545.71
1967	38.23	51.24		410.75
1968	41.85	56.01		515.70
1969	47.52	66.29		611.44
1970	57.71	63.89		587.90
1971	51.43	49.27		444.43
1972	50.62	48.55		427.96
1973	58.86	80.81		726.82
1974	76.65	93.10		877.00
1975	63.54	56.11		556.81
1976	68.82	64.05		782.40
1977	65.81	59.38		752.68
1978	65.51	61.83		710.13

Coefficient
of Variation

1960-69	0.14	0.31	0.35
1970-78	0.11	0.20	0.21
1960-78	0.30	0.30	0.38

Notes : 1. Annual average cash wirebar price

2. Annual average cash settlement wirebar price

Source : WBMS

producer pricing system. However, the stability of the US Producer Price for copper came under increasing strain after 1974, as more costly domestic copper faced growing competition from cheaper, imported metal, priced on an LME basis. In 1975, the monthly average price changed four times; in 1976 seven times; and in 1977 nine times. By 1978, the US Producer Price system in its traditional sense was abandoned, when major US copper producers decided to link their prices to those of Comex. (An analysis of this development is given in Chapter 3 below).

A serious problem that arises with measures of price volatility, such as those, presented in Table 2.1, is that the period under review experienced considerable inflation. Accordingly, the coefficients of variation in the 1960's and 1970's were distorted by changes in prices that owed little or nothing to conditions in the supply/demand balance of the copper market.

For this reason, we have calculated the real copper price between 1960 and 1978, using the UN index of prices of world manufactured product exports as the deflator. The revised statistics are presented in Table 2.2.. It is remarkable to observe how the adjustment for inflation transforms the picture of price volatility. Instead of a decline in volatility, as implied by Table 2.1, there has been, if anything, a slight increase in volatility since the 1960's, which must be considered unexpected, occurring, as it did, during a decade containing several years overshadowed by an unusually severe recession. The question arises as to how this is associated with terminal market trading, or at least whether terminal markets exacerbated any underlying fluctuations.

A useful indicator of terminal market trading in copper is given in Table 2.3, which compares turnover on the LME and Comex (the only two terminal markets for copper) with world copper production. Looking at the ratio of turnover to

Table 2.2 : Real Copper Prices, 1960-1978¹
in 1970 US cents/lb

	<u>Real US Producer Price</u>	<u>Real LME Copper Price</u>
1960	38.1	36.6
1961	35.2	33.6
1962	36.0	34.4
1963	36.0	34.5
1964	37.2	51.0
1965	39.8	66.7
1966	39.8	76.0
1967	42.0	56.3
1968	46.0	61.5
1969	50.5	70.5
1970	57.7	63.9
1971	49.0	46.1
1972	44.8	43.0
1973	44.3	60.8
1974	47.3	57.5
1975	34.9	30.8
1976	37.6	35.0
1977	33.1	29.8
1978	28.9	27.2

Coefficient of
variation

1960-69	0.11	0.28
1970-78	0.20	0.28
1960-78	0.15	0.30

Note : 1. The UN index of the price of exports of manufactured goods is the deflator.

Table 2.3 : Terminal Market Turnover and World Production of Refined Copper, 1960-1978

	<u>LME Turnover</u> ('000 mt)	<u>Comex² Turnover</u> ('000 mt)	<u>Total Turnover</u> ('000 mt)	<u>World Production¹</u> ('000 mt)	<u>Total Turnover as % World Production</u>
1960	779.3	-	-	4,191.6	-
1961	809.1	1,871.0	2,680.1	4,273.4	63
1962	517.9	1,235.2	1,753.1	4,379.0	40
1963	190.4	889.9	1,080.3	4,440.9	24
1964	737.3	224.9	962.2	4,745.0	20
1965	901.2	2,517.6	3,418.8	5,040.7	68
1966	1303.6	3,848.7	5,152.3	5,173.8	100
1967	1834.5	1,067.0	2,901.5	4,777.3	61
1968	2133.2	1,137.6	3,270.8	5,397.6	61
1969	2335.7	977.4	3,313.1	5,879.7	56
1970	2671.0	2,012.4	4,683.4	6,121.5	77
1971	2888.0	2,669.1	5,557.1	5,773.6	96
1972	2509.8	2,848.8	5,358.6	6,367.3	84
1973	4676.1	6,402.3	11,078.4	6,668.0	166
1974	3171.0	4,661.5	7,832.5	6,945.0	113
1975	3500.0	5,602.1	9,102.1	6,263.8	145
1976	5067.4	14,095.5	19,162.9	6,640.5	289
1977	4325.5	12,136.0	16,461.5	6,874.9	239
1978	5270.6	15,974.3	21,244.9	6,913.4	307

Notes: 1. Non-Socialist World Production of Refined Copper.

2. Until 1969, the Comex turnover statistics refer to the twelve months ending 30th November.

Sources : LME, AMM, WBMS, Comex.

production in the last column, we can observe a substantial rise, from averaging barely 50 per cent in the 'sixties to over 300 per cent in the late 'seventies.

Turnover fell to low levels between 1962 and 1964, because of the attempt by non-US copper producers (in Latin America and Africa) to stabilise the LME price and set up an alternative producer pricing system. The role of the LME as a means of hedging became less valuable when the LME price remained fixed over a long period, and so business declined. However, after 1964, turnover resumed an upward path as the new producer pricing system collapsed under the pressure of lower LME stock levels, the Unilateral Declaration of Independence in Rhodesia and changes of regime in Central Africa. In the 1970's, turnover rose steadily. On the LME, it rose very sharply in 1973, the year of the boom in copper prices, to over 4.5 million tonnes, and reached another peak of over 5 million tonnes in 1976. Copper prices also rose in this latter year, but, as we shall see later, the greater interest in LME dealing was also associated with the marked decline of the sterling exchange rate.

Comex copper turnover has risen much more rapidly than that on the LME; more than trebling between 1970 and 1973, and more than doubling again after 1975. (However, official LME figures significantly understate actual turnover because they do not include dealings negotiated outside the official Ring). By 1976, the Comex turnover of over 14 million tonnes was more than double the entire world production of refined copper. Using information from the US Commodity Futures Trading Commission, we can examine briefly some characteristics of this growth.

Table 2.4 indicates the proportion of deliveries to total copper turnover on Comex. Despite considerable fluctuations between 1974 and 1978, this remained less than five per cent,

even through Comex was being used as a delivery point for nearly 200,000 tonnes of surplus stocks. Market estimates of business on the LME indicate a somewhat higher figure, but still only 15 per cent of officially recorded Ring turnover at most. The Comex delivery figures underline the fact that terminal markets are used mainly for hedging and speculative transactions. This is further borne out by looking at the figures for "open interest", or the volume of outstanding futures contracts. From an end-month average of 136,000 tonnes in 1974, open interest increased substantially to 553,000 tonnes in the 1978 fiscal year.

Table 2.4 : Comex Copper Turnover

	<u>Turnover</u> ('000 mt)	<u>Deliveries</u> ('000 mt)	<u>Deliveries</u> as per cent of <u>Turnover</u>	<u>Average Open²</u> <u>Interest ('000 mt)</u>
1974	5854	25	0.4	136
1975	3595	163	4.5	142
1976	10795	126	1.2	445
1977	12721	397	3.1	520
1978	13829	331	2.4	553

Source : CFTC, Databank '78

Notes : 1. All data are based on fiscal years, not calendar years. The fiscal year for 1974, 1975 and 1976 is July 1 to June 30; for 1977 and 1978 it is October 1 - September 30.

2. "Open interest" refers to the volume of futures contracts outstanding, i.e. not liquidated by an offsetting transaction or fulfilled by delivery. The average open interest shown is the average of open interest on the last day of each month of the fiscal year.

2.2 Cocoa

In 1978, world production of cocoa beans amounted to just over 1.4 million tonnes, after a peak of over 1.5 million tonnes earlier in the decade. The main producing countries are in West Africa (Ghana, Nigeria, Ivory Coast and the Camerouns in order of importance). Outside West Africa, the only significant producer is Brazil. Over 70 per cent of production is exported to consuming countries, and around half of imports are absorbed by the USA and the EEC countries, in particular, West Germany and the UK.

The market for cocoa has been considerably more volatile than that for copper in the 'seventies, although in the previous decade it was more stable in terms of the market price. The cocoa market has elements of instability built into it which do not operate, or operate to a lesser degree, for metals. Firstly cocoa is a seasonal crop, with an uneven schedule of production and supply to the market. Secondly, the consumption of cocoa is highly sensitive both to price and incomes. Consequently, major market imbalances very often arise, resulting in significant price fluctuations.

Price fluctuations have an important effect on the foreign exchange earnings of producing countries. In order to try and reduce the volatility of prices (see Table 2.5), an International Cocoa Agreement was negotiated, and, after 15 years of discussions between exporting and importing countries, was concluded in 1972. The Agreement aimed to keep prices within an agreed range. However, its economic clauses have remained inoperative, since supply shortages have kept prices well above the official upper price limit. Prices are now lower, but there is uncertainty over renewal of the Agreement because of differences between producing and consuming countries as to appropriate new lower and upper limits.

Table 2.5 : Terminal Market Cocoa Prices, 1960-1978

	London Spot Ghana Price (£ per tonne)	New York Spot Ghana Price (cents per lb)	
		Nominal	Real (1970c/lb) ¹
1960	222.3	28.4	33.8
1961	177.1	22.6	26.6
1962	167.4	21.0	24.7
1963	204.9	25.3	29.8
1974	187.7	23.4	27.2
1965	138.4	17.3	19.7
1966	193.2	24.4	26.8
1967	238.0	29.1	32.0
1968	319.5	34.4	37.8
1969	415.5	45.7	48.6
1970	305.5	34.2	34.2
1971	232.4	26.8	25.5
1972	270.5	32.3	28.6
1973	585.4	64.4	48.4
1974	990.1	98.1	60.6
1975	722.7	74.8	41.1
1976	1399.4	109.3	59.7
1977	2943.8	202.6	101.8
1978	2005.6	174.2	76.7

Coefficient of
Variation

1960-69	0.32	0.26	0.23
1970-78	0.79	0.61	0.42
1960-78	1.15	0.88	0.48

Note : 1. As for Table 2.2, above.

Source : Gill & Duffus Cocoa Statistics, ICO Quarterly Bulletin of Cocoa Statistics.

As noted above, volatility has been particularly marked in the 'seventies. Table 2.5 gives the annual averages for the price of cocoa on the main futures markets trading cocoa, in London and New York, from 1960-78.

Prices have clearly been very unstable, even on an annual average basis. Between 1960 and 1969, the coefficients of variation of the London and New York spot prices for Ghana cocoa were 0.32 and 0.26 respectively. In the next decade, instability on this measure more than doubled to 0.79 and 0.61 respectively. Adjusting for inflation does not alter the picture. The coefficient of variation of the real price rose from 0.23 in the 1960's to 0.42 in the 1970's. The price of cocoa more than trebled between 1972 and 1974, and, after a setback in 1975, quadrupled again in London, to reach a peak of nearly £3000 per tonne, and almost trebled in New York to over \$2 per pound.

What relation has there been between these price fluctuations and futures trading? It would be foolish to imply that dealing on terminal markets has been the main cause of price instability, because factors such as changing demand and crop diseases affecting cocoa supplies have clearly underpinned the major movements. Nevertheless, it is interesting to look at the growth of futures trading and see if any prima facie link with market instability is present.

Table 2.6 gives market turnover figures for the two principal cocoa terminal markets, London and New York, and their relation to world production of cocoa. Other terminal markets dealing in cocoa are Amsterdam and Paris. Trading in Paris is more than ten times that in Amsterdam, but at most only some twenty per cent of that in either London and New York. In recent years the market in Paris has traded less than 300,000 tonnes of cocoa contracts per year. Consequently we shall only look at the London and New York markets.

Table 2.6 : Terminal Market Turnover and World Production of
Cocoa, 1960-1978

	<u>London</u> <u>('000 mt)</u>	<u>New York</u> <u>('000 mt)</u>	<u>Total</u> <u>('000 mt)</u>	<u>World</u> <u>Production</u> <u>('000 mt)</u>	¹ <u>Turnover as</u> <u>% World</u> <u>Production</u>
1960	262.0	961.9	1,223.9	1164	105
1961	427.2	1,737.8	2,165.0	1123	193
1962	446.8	1,573.3	2,040.1	1162	176
1963	916.0	2,805.4	3,721.4	1238	301
1964	723.6	1,578.8	2,302.4	1490	155
1965	1,263.6	3,025.6	4,289.2	1219	352
1966	1,977.4	6,934.4	8,911.8	1336	667
1967	2,118.1	5,543.0	7,661.1	1352	567
1968	3,596.3	5,405.5	9,001.8	1236	728
1979	5,029.7	5,540.5	10,570.2	1424	742
1970	5,736.9	4,267.4	10,004.3	1493	670
1971	5,227.3	2,895.0	8,122.3	1583	513
1972	5,242.0	3,774.5	9,016.5	1398	645
1973	11,474.0	5,874.1	17,348.1	1548	1121
1974	9,543.7	4,697.8	14,241.5	1511	943
1975	7,425.8	4,269.6	11,695.4	1341	872
1976	11,717.1	4,537.2	16,254.3	1491	1090
1977	11,477.3	4,186.2	15,663.5	1425	1099
1978	9,826.3	3,037.6	12,863.9		

Note : 1. Crop year 1960-61 production is attributed to 1960
and similarly for the following years.

Sources : ICCH, Gill & Duffus, Commodity Research Bureau Commodity
Yearbook.

Table 2.7 : New York Cocoa Turnover¹

	<u>Turnover</u> ('000 mt)	<u>Deliveries</u> ('000 mt)	<u>Deliveries as %</u> <u>of Turnover</u>	<u>Average Open (2)</u> <u>Interest ('000 mt)</u>
1974	5315	7	0.1	149
1975	4452	4	0.1	130
1976	4305	2	0.0	128
1977	4346	6	0.1	149
1978	3288	4	0.1	113

Source: CFTC Databook '78

NOTES: 1. See Note 1 Table 2.4 on the period of the fiscal year.

2. See Note 2 Table 2.4.

From Table 2.6 we can see that market turnover in both London and New York increased substantially between 1960 and 1978, although somewhat faster in the former case, so that London trading is now roughly twice the volume of New York's market. By comparing turnover with world cocoa production, the relative increase is from near twice world production at the start of the period to over ten times world production by the late 'seventies. Evidently, a considerable proportion of futures contracts cannot have resulted in a final delivery to the consumer!

Market turnover can also be seen to be related to price volatility. Apart from the upward trend of each, in general a sharp upward or downward movement in prices coincides with a similar change in turnover. The doubling of cocoa prices between 1972 and 1973 saw a near quadrupling of total cocoa trading (the main increase being in London). In the next year, trading fell back only slightly as prices moved up further. Between 1975 and 1978, the leap in cocoa prices, followed by a sharp decline, was also, to a certain extent, mirrored by movements in turnover.

An insight into the nature of cocoa futures turnover is gained by looking at the volume of deliveries and hedging business. This breakdown for the New York Cocoa Exchange is given in Table 2.7. Between 1974 and 1978, deliveries were very small indeed. In 1976 (the fiscal year from 1 July 1976 to 30 June 1977), as a percentage of total turnover, they were less than 0.5 per cent. This was the period of the sharpest increase in cocoa prices and one might assume that a greater than normal proportion of trade was hedging price uncertainty. (Some confirmation for this is found in the fact that, although the volume of open interest declined over the period shown in the table, its level relative to total trade increased).

2.3 Coffee

Coffee trees are best suited to a tropical, highland climate. They require ample rainfall, and drought or frost can severely damage the harvest. The right conditions, however, can produce a bumper crop. Coffee production generally follows a two year cycle, since the trees need rejuvenation in alternate years, following seasons of heavy production. It takes five years before a new seedling can produce coffee, but a mature tree will produce coffee for up to thirty years. Consequently, it takes many years for the supply of coffee to react to changes in demand and price conditions.

The main coffee producing regions of the world are Latin America and West Africa. The 13 major producing countries account for 90 per cent of world exports, and Brazil alone accounts for more than one-third of world exports. Roughly a third of the world's supply of coffee is imported by the USA, and another third by the EEC countries.

Because the world supply of coffee is crucially dependent on the Brazilian crop, a frost in Brazil can have a disastrous effect on world production. This occurred in 1970 and 1973; and also in 1975, when one night's frost killed most of the 1976 Brazilian crop and damaged production prospects for years to come. Production has still not recovered, and the latest forecast for 1980 production is 20 million bags (one bag is 60 kg), well below the 27 million bags, which had been forecast for 1976, before the frost struck. World production is expected to be back to 'normal' by 1981, barring further disasters.

The Brazilian frost in 1975 caused such a supply shortage that prices rocketed, and demand fell dramatically. However, despite continued high prices, the demand for coffee has subsequently recovered, in part because the prices of competitive beverages have risen as strongly as those of coffee.

Table 2.8: New York Coffee Prices, 1960-1978
(cents per lb)

	<u>New York Brazilian Coffee</u>	
	<u>Nominal</u>	<u>Real (1970 c/lb)¹</u>
1960	36.6	43.6
1961	36.0	42.4
1962	34.0	40.0
1963	34.1	40.1
1964	46.7	54.3
1965	43.8	49.8
1966	40.6	44.6
1967	37.7	41.4
1968	37.4	41.1
1969	40.9	43.5
1970	55.8	55.8
1971	44.7	41.8
1972	52.6	46.5
1973	69.2	52.0
1974	73.3	45.3
1975	82.6	45.4
1976	149.5	81.7
1977	267.2	134.3
1978	165.3	72.8

Coefficient of
Variation:-

1960-69	0.10	0.10
1970-78	0.62	0.44
1960-78	0.81	0.47

Note : 1. As for Table 2.2, above.

Source : IFS.

The first International Coffee Agreement was set up in 1962, with the objective of stabilising prices to the mutual benefit of producers and consumers. The Agreement was successful, and was renewed in 1968. However, in 1971 the dollar was devalued, and as the price of coffee is generally quoted in dollars, this bit deeply into the foreign exchange earnings of coffee-exporting countries.

Producers then demanded a compensatory 4 cents per lb increase in coffee prices in the Agreement. The USA and Canada later rejected a compromise 2 cents per lb increase, and within a few months the Agreement had collapsed.

A new Agreement was negotiated at the end of 1975, which included export quotas designed to reduce the flow of coffee to the markets and keep the price up. However, the export quotas proved unnecessary, as supply shortages caused by frost damage were sufficient to keep prices at high levels.

More important than the Agreement in recent years has been the Bogota Fund, established by leading South American producers, which plays an important role in stabilising the market by buying when prices threaten to fall, and selling when the market is strong. In May 1979, the Fund enjoyed an extra boost, when a frost in Brazil provided it with a substantial windfall profit. Since then, it has spent large sums of money propping up the price, which is under constant pressure because of excess supply.

The activities of the Bogota Fund have caused considerable resentment in the USA, where it is claimed that producers are manipulating prices in their favour. Under pressure from consumers, the US government has taken action to investigate the activities of producers on the New York coffee futures market.

The unilateral action of coffee producers has undermined co-operation between exporters and importers, based on the International Coffee Agreement, and consequently the Agreement has little control over the market.

Coffee futures contracts are traded in London, New York and Paris; the latter market being fairly insignificant. The contracts in London and Paris are for Robusta coffee, whilst the New York contract has been for Arabica coffee. However, in April of this year, a futures market for Arabica coffee was re-launched in London. The contract had previously failed due to lack of interest; but it is now felt that the lifting of exchange controls, by allowing unrestricted trading in a dollar contract, has made a futures contract in Arabica coffee a viable proposition. A further reason for launching the contract is that the Arabica contract in New York is being surrounded with more curbs and regulations, as the CFTC seeks to gain control over futures markets. The CFTC has investigated the intervention on the New York market by the Bogota Fund, which apparently insisted on taking physical delivery of coffee, thereby squeezing supplies and pushing prices up. With coffee, as with cocoa, and other perishable crops, terminal markets exist predominantly to undertake "paper" transactions, rather than to see actual delivery made of large numbers of contracts. Hence, the holding of futures contracts to maturity, as was done by the Bogota Fund, constitutes a highly effective means of forcing up prices, at least temporarily. Since the US futures markets are becoming increasingly concerned about the role of "foreign" traders in the markets, it is believed that representatives of the Bogota Fund suggested the launching of the London Arabica contract, which would provide them with an alternative trading centre.

During the 1960's and early 1970's, the price stability created by the International Coffee Agreement led to a loss of interest in futures trading on the New York market. As trading declined, market liquidity declined, and consequently the market was less open to speculative influences. This can be seen from Table 2.9.

Table 2.9 : Terminal Market Trading and World Production of Coffee, 1960-1978

	London Turnover ('000 mt)	New York Turnover ('000 mt)	Total Turnover ('000 mt)	World Production ('000 mt)	Total Turnover as % of World Production
1960	117.3	394.5	511.8	3168.8	16
1961	40.6	304.6	345.2	3496.5	10
1962	27.1	76.2	103.3	3203.6	3
1963	80.5	94.1	174.6	3414.1	5
1964	320.6	559.7	880.3	2152.7	41
1965	455.7	257.2	712.9	3974.6	18
1966	329.4	54.5	383.9	2669.0	14
1967	194.9	7.6	202.5	3103.6	6
1968	190.9	1.3	192.2	2604.6	7
1969	246.6	1.2	247.8	2884.7	9
1970	540.3	1.8	542.1	2409.2	23
1971	397.5	2.7	400.2	3185.0	13
1972	306.6	130.3	436.9	3437.1	13
1973	774.4	3106.1	3880.5	2660.4	148
1974	2117.6	2584.0	4701.6	3772.9	125
1975	1141.5	1209.1	2350.6	3289.7	71
1976	3300.9	2968.2	6269.1	2633.2	238
1977	5695.9	3643.6	9339.5	3072.1	304
1978	4151.5	2788.9	6940.4	3118.7	223

Note : Crop year attributed to beginning of period.

Sources : ICCH, New York Coffee and Sugar Exchange, Commodity Bureau 'Commodity Yearbook'.

However, the marked price fluctuations of the 1970's - shown in Table 2.8 as an increase in the coefficient of variation of the real price from 0.10 in the 1960's to 0.44 - increased the need for hedging, and opened the door to speculative activity on the London and New York futures markets. Table 2.9 shows that the volume of futures trading rose dramatically, from a mere 13 per cent of world production in 1972 to more than three times world production in 1977.

2.4 Lead

Half of the non-Socialist world's production of refined lead comes from just four countries - the USA, the UK, West Germany and Japan. Canada and Australia, however, are important producers of primary lead and are the two leading exporters of lead concentrates. Of the three million tonnes of refined lead consumed annually in the non-Socialist world, the USA accounts for one-third and the EEC countries another third.

In the USA, a producer price system operates for lead, but unlike the case with zinc and copper, lead is not traded on Comex. In 1977, the US Council on Wage and Price Stability argued that there was no historical relationship between movements in the LME lead price and the US Producer Price for lead. COWPS concluded that lead should therefore be included in the voluntary price controls the government was promoting. This view appears to be borne out by Table 2.10, tabulating the USPP and the LME prices for lead between 1960 and 1978. For example, from 1972-73, the LME price rose by 46 per cent while the USPP rose only 8 per cent, and from 1977-78, the LME price fell by 31 per cent while the USPP rose by 10 per cent.

For both the LME price and the USPP, nominal price instability, as measured by the coefficient of variation, increased during the 'seventies. However, a good deal of the fluctuations in price were caused by inflation, rather than shifts in supply and demand. Once prices are adjusted for the effects of inflation, the volatility of the real lead price can be seen to have decreased slightly between the 1960's and the 1970's. The only conclusion that remains valid is that, over the whole period from 1960-78, the LME price was considerably more volatile than the USPP.

Table 2.10: Comparative Lead Prices, 1960-1978

	LME Price		US Producer Price	
	<u>Nominal</u> (£ per tonne)	<u>Real</u> ¹ (1970 US cents/lb)	<u>Nominal</u> (US cents/lb)	<u>Real</u> ¹ (1970 US cents/lb)
1960	73.30	11.1	11.95	14.2
1961	65.24	9.7	10.87	12.8
1962	57.22	8.6	9.63	11.3
1963	64.44	9.6	11.14	13.1
1964	102.66	15.2	13.60	15.8
1965	116.97	16.9	16.00	18.2
1966	96.70	13.5	15.12	16.6
1967	85.16	11.7	14.00	15.4
1968	103.42	12.3	13.20	14.5
1969	124.59	14.4	14.90	15.9
1970	126.60	13.8	15.62	15.6
1971	103.92	11.0	13.82	13.2
1972	120.62	12.1	15.03	13.3
1973	175.05	14.6	16.29	12.2
1974	252.80	16.6	22.50	13.9
1975	185.88	10.3	21.53	11.8
1976	249.82	11.2	23.10	12.6
1977	353.62	14.0	30.70	15.4
1978	242.55	9.3	33.65	14.8

Coefficient of
Variation :-

1960-1969	0.23	0.21	0.14	0.14
1970-1978	0.35	0.18	0.29	0.10
1960-1978	0.54	0.19	0.36	0.13

Note : 1. As for Table 2.2, above.

Source : Metallgesellschaft, 'Metal Statistics'.

Table 2.11: Terminal Market Turnover and World Production of Lead, 1960-1978

	<u>LME Turnover ('000 mt)</u>	<u>Non-Socialist World Production of Refined Lead ('000 mt)</u>	<u>LME Turnover as % World Production</u>
1960	395.1	2140.7	18.5
1961	435.8	2195.7	19.8
1962	356.5	2111.8	16.9
1963	454.2	2261.2	20.1
1964	578.9	2347.7	24.7
1965	588.3	2427.5	24.2
1966	445.8	2495.6	17.9
1967	461.8	2530.1	18,3
1968	564.7	2668.1	21.2
1969	699.9	2963.2	23.6
1970	721.3	3061.1	23.6
1971	778.8	2929.9	26.6
1972	910.8	3027.8	30.1
1973	1341.3	3118.7	43.0
1974	974.4	3125.7	31.2
1975	931.3	2890.3	32.2
1976	1179.9	3065.6	38.5
1977	1901.7	3157.6	60.2
1978	1876.1	3132.8	59.9

Source : LME; Metallgesellschaft, 'Metal Statistics'.

Outside North America, the price is determined on the LME. Unlike zinc, there is no European producer list price, and consequently lead producers intervene on the LME so that the market will more directly reflect changes on the supply side. However, the producers' active participation in the market was due partly to the existence of an Australian producers' cartel. The cartel arranged sales of lead onto the LME and purchases from it in order to maintain price and revenue stability during 1976; but the US Justice Department has been investigating its activities, and its influence is likely to have diminished sharply.

The volume of turnover on the LME has more than doubled over the past decade, as shown in Table 2.11. In recent years, it has been some 60 per cent of non-Socialist world refined lead production. The increased volume of trading appears to reflect in part the desire of producers, merchants and consumers to hedge price risks, particularly in Europe. However, LME trading still seems fairly limited. This may simply be because there is a large volume of unrecorded dealings on the LME, but we believe that the continuing predominance of producer pricing systems in North America (which both impair the effectiveness of hedging, and also reduce the need for it) is an important factor.

2.5 Sugar

Sugar is produced either from beet or cane. Beet sugar is produced in temperate climates, and cane sugar in tropical, or semi-tropical, climates. This climatic range enables sugar to be produced in nearly every country of the world. The world's main producers are the EEC countries, the Soviet Union, and Cuba. The main exporting countries are, in order of importance, Cuba, Brazil, Australia, Philippines and France.

However, protectionism has been a historical feature of the world sugar market. Industrialised countries have used it as a method of fostering domestic beet production, to attain self-sufficiency in sugar. The EEC has achieved this aim, and its exports of white sugar have risen in recent years. As a result of protectionism and various trade agreements between producing and consuming countries, trading on terminal markets directly affects the selling prices of a relatively small amount of world production.

The two important terminal markets for sugar are in London and New York. There is a relatively insignificant market in Paris. New York has two contracts : a domestic contract, calling for delivery in the ports of New York and Philadelphia, and a world contract which calls for delivery in any one of twenty-one cane sugar exporting countries. The volume of trading on the domestic contract is only five per cent of that on the world contract. The London contract calls for delivery in Great Britain.

Both European and American beet producers are aided by price support schemes. Prices in the USA are supported by specific tariffs which hold the domestic price above the terminal market price by the amount of the tariff plus the cost of delivery to the USA.

Since the late 1960's, the sugar market has resisted all attempts to impose price stability on it. In 1966, the market price was only 1.9 cents per lb, whereas the subsidised price in the USA was 7 cents per lb. Stocks were at an all-time high; consequently, in 1967 an International Sugar Agreement was established for 1968-73, the aims of which were to stabilise prices, guarantee incomes for producer countries, and to balance production and consumption. However, the low price of sugar led to the abandonment of the development of sugar substitutes and there was a resurgence of demand. Although the production of sugar also increased, the price rose by almost 500 per cent during the period of the Agreement. Consequently, the powers granted under the Agreement saw little use.

The re-negotiation of the Agreement in 1973 merely re-iterated the main elements of the old Agreement, without reaching a consensus on the important questions of export quotas and prices. In 1974, the US Congress refused to ratify the Agreement, opening up the American market to imported sugar. The same year also saw the withdrawal of Britain from the British Commonwealth Sugar Agreement, under which Britain bought most of the sugar produced in the Commonwealth. Both of these developments led to more physical trade being based on terminal market quotations.

In 1974 and 1975, prices reached peak levels. The consequent growth of production during 1975-77 was rapid; but the burden of large carry-over stocks in 1977 forced prices below the production costs of many countries. Hence, another International Sugar Agreement was established in 1978.

Tables 2.12 and 2.13 summarise price and terminal market trading information for sugar. From Table 2.12, we can see that prices have been very volatile, and that nominal price instability in both New York and London has increased in the 1970's. The trend in the instability of the real sugar price is less clearcut.

As we noted above, the proportion of world trade affected by terminal market trading has been fairly limited in sugar,

by comparison with a number of other commodities. Nevertheless, the volume of trading in relation to world sugar production rose to a peak of almost 120 per cent in 1972 and 1973, over treble the level of the mid 1960's, and has subsequently fallen back only modestly.

Table 2.12 : Sugar Prices, 1961-1978

	London Spot Price		New York World Spot Price ²	
	Nominal (£ per tonne)	Real ¹ (1970 US cents/lb)	Nominal (US cents/lb)	Real ¹ (1970 US cents/lb)
1961	25.3	3.8	2.7	3.2
1962	25.2	3.8	2.8	3.3
1963	70.6	10.6	8.5	10.0
1964	50.3	7.4	5.9	6.9
1965	21.2	3.1	2.1	2.4
1966	17.6	2.4	1.9	2.1
1967	19.1	2.6	2.0	2.2
1968	21.5	2.6	2.0	2.2
1969	33.3	3.8	3.3	3.5
1970	39.4	4.3	3.7	3.7
1971	45.5	4.8	4.5	4.3
1972	71.5	7.2	7.4	6.5
1973	97.9	8.2	9.6	7.2
1974	300.3	19.7	29.9	18.5
1975	213.0	11.8	20.4	11.2
1976	151.0	6.7	11.5	6.3
1977	114.9	4.5	8.2	4.1
1978	101.2	3.9	n.a.	n.a.

Coefficient
of Variation

1961-69	0.49	0.59	0.59	0.68
1970-78	0.59	0.61	0.66 ²	0.64 ²
1961-78	0.92	0.68	0.95 ²	0.74 ²

Sources : New York Coffee and Sugar Exchange; London Commodity Exchange

Notes : 1. As for Table 2.2, above.

2. The New York quotations only extend up until 3rd November 1977. After that date, spot quotations were suspended.

Table 2.13: Terminal Market Turnover and World Production of Sugar, 1961-1978

	<u>New York Turnover</u> (<u>'000 mt</u>)	<u>London Turnover</u> (<u>'000 mt</u>)	<u>Total Turnover</u> (<u>'000 mt</u>)	<u>World</u> <u>Production</u> (<u>'000 mt</u>)	<u>Total Turnover</u> <u>as % World</u> <u>Production</u>
1961	630	2,292	2,922	51,699	6
1962	3,209	4,031	7,240	49,800	15
1963	17,521	15,364	32,885	54,358	60
1964	11,944	13,303	25,247	65,831	38
1965	9,528	10,295	19,823	62,861	32
1966	13,261	8,740	22,001	64,511	34
1967	31,725	23,242	54,967	66,230	83
1968	26,715	20,095	46,810	67,618	69
1969	27,234	29,439	56,673	71,894	79
1970	18,218	26,970	45,188	70,523	64
1971	23,113	34,350	57,463	70,595	81
1972	44,461	44,657	89,118	75,520	118
1973	52,307	43,388	95,694	80,488	119
1974	37,438	48,598	86,036	78,620	109
1975	40,166	41,875	82,041	81,888	100
1976	50,024	43,567	93,619	86,913	108
1977	53,647	48,670	102,317	92,065	111
1978	51,654	34,642	86,296	90,170	96

Source: New York Coffee and Sugar Exchange, ICCH, Commodity Research Bureau 'Commodity Yearbook'.

2.6 Zinc

Canada is the main non-Socialist producer of zinc, supplying 25 per cent of total world production; other important producers are the USA and Japan. Approximately half of non-Socialist world production of refined zinc is exported, principally by Canada and Australia. Western Europe, the USA and Japan account for over 80 per cent of world consumption.

American zinc prices are based on the US Producer Price, which is determined by producers on the basis of output costs and the state of the free market. Whilst the USPP follows the LME price, it displays less short run volatility, although it tends to exhibit a stronger correlation when the price is rising. The relative degrees of stability of the LME price and the USPP are illustrated by the coefficient of variation. Between 1960 and 1978 the coefficient was 0.67 for the LME price, and 0.48 for the USPP, or, where prices are adjusted for inflation, 0.37 and 0.15 respectively.

A futures market in zinc was revived on Comex in 1978, but has received little support. Only 675 contracts were traded in the market's first year, largely because consumers and producers have historically negotiated directly with each other in North America.

Outside North America, the reference price for producers selling onto the European market has, until recently, been the European Producer Price (EPP), established by primary producers and smelters in 1964. Prior to 1964, the non-US price was determined on the LME.

As can be seen from Table 2.14, the creation of the EPP system resulted in a sharp drop in the volume of metal traded on the LME. Producers party to the agreement refrained from placing metal on the LME, and the greater price stability induced by

Table 2.14 : Terminal Market Turnover and World Production of Refined Zinc, 1960-1978

	<u>LME Turnover</u> ('000 mt)	<u>Non-Socialist World</u> <u>Production of</u> <u>Refined Zinc</u> ('000 mt)	<u>LME Turnover as</u> <u>% World Production</u>
1960	304.6	2,438.4	12.5
1961	379.7	2,566.3	14.8
1962	351.7	2,659.5	13.2
1963	402.7	2,748.2	14.7
1964	527.0	2,961.8	17.8
1965	358.4	3,127.5	11.5
1966	308.3	3,295.7	9.4
1967	226.3	3,284.8	6.9
1968	276.3	3,689.0	7.5
1969	391.6	4,056.8	9.7
1970	301.5	3,954.6	7.6
1971	640.2	3,762.5	17.0
1972	941.4	4,091.2	23.0
1973	1,324.6	4,246.6	31.2
1974	1,205.1	4,359.6	27.6
1975	1,158.5	3,743.6	30.9
1976	1,326.6	4,109.1	32.3
1977	1,259.0	4,270.6	29.5
1978	1,287.8	4,288.9	30.0

Sources: LME, Metallgesellschaft 'Metal Statistics'.

the new producer price system reduced the need for hedging. However, the LME has retained as influence through its ability to highlight market disequilibria, and has managed to maintain its turnover at historically high levels since the commodity price boom of the early 1970's.

The zinc traded on the LME comes mainly from the Socialist countries, who do not participate in the producer price system, and from consumers re-selling onto the market. Western producers rarely sell onto the LME, although they may buy in order to support the price. Indeed, in 1977, it was revealed that a zinc producers' cartel had existed since 1974, and met informally to set a minimum price. As prices began to fluctuate in the 'seventies, the producers organised buying on the LME to boost the LME price, which can exert a downward pressure on the EPP when the market is weak.

The EPP was intended to provide revenue stabilisation for producers and reduce price uncertainty for consumers. This worked well during the 'sixties, when free market fluctuations stayed within reasonable limits and zinc consumption and smelter capacity grew in tandem. However, the sharp cyclical variations in economic activity during the 'seventies have destroyed the hopes of revenue stabilisation, and led to wide fluctuations in the LME price. Since the 1975 recession, the EPP has been under severe pressure from the LME price. For long periods in 1976 and 1977, European producers found themselves obliged to sell their metal at a discount to their own EPP, and even at a discount to the LME price (as occurred in 1977 and 1978). As a result, since 1977, the prices received by producers have fluctuated in line with LME prices, and consequently no longer provide either price or income stabilisation for producers or consumers.

Table 2.15 : Comparative Zinc Prices, 1960-1978

	<u>LME Price¹</u> <u>(£ per tonne)</u>	<u>European Producer Price</u> <u>(£ per tonne)</u>	<u>US Producer Price</u> <u>(cents per lb.)</u>
1960	90.75	-	12.95
1961	79.00	-	11.55
1962	68.54	-	11.63
1963	78.00	-	12.01
1964	119.78	-	13.57
1965	114.78	111.77	14.50
1966	103.63	105.47	14.50
1967	102.15	103.40	13.85
1968	112.94	116.16	13.50
1969	123.07	123.46	14.65
1970	123.13	127.95	15.32
1971	126.76	139.81	16.14
1972	150.98	156.25	17.73
1973	346.70	215.48	20.84
1974	528.13	332.14	35.94
1975	335.38	366.30	38.89
1976	394.36	440.15	37.38
1977	338.17	412.32	35.21
1978	308.39	316.34	31.30

Coefficient of Variation:

1965-1970	0.06	0.06	0.03
1971-1978	0.36	0.34	0.29
1965-1978	0.57	0.54	0.43
1960-1978	0.67		0.48

Note : 1. Annual average standard cash price
 Source : Metallgesellschaft, 'Metal Statistics'

Table 2.16 : Comparative Real Zinc Prices, 1960-1978
(in 1970, US cents per lb)

	<u>LME Price</u>	<u>European Producer Price</u>	<u>US Producer Price</u>
1960	13.7	-	15.4
1961	11.8	-	13.6
1962	10.2	-	13.7
1963	11.7	-	14.1
1964	17.7	-	15.8
1965	16.6	16.1	16.5
1966	14.4	14.7	15.9
1967	14.0	14.2	15.2
1968	13.5	13.9	14.8
1969	14.2	14.2	15.6
1970	13.4	13.9	15.4
1971	13.4	14.8	15.4
1972	15.2	15.7	15.7
1973	29.0	18.0	15.7
1974	34.6	21.8	22.2
1975	18.6	20.3	21.4
1976	17.6	19.7	20.4
1977	13.4	16.3	17.7
1978	11.8	12.1	13.8
<hr/>			
Coefficient of Variation			
1965-1970	0.07	0.05	0.04
1971-1978	0.40	0.17	0.18
1965-1978	0.37	0.17	0.16
<hr/>			
1960-1970	0.15	-	0.06
1960-1978	0.37	-	0.15

Note : 1. As for Table 2.2, above.

Between 1975 and 1970, the coefficients of variations of the nominal LME price and the EPP were both 0.06, indicating that both prices were relatively stable over this period. However, between 1971 and 1978, the coefficients of variation were 0.36 for the LME price and 0.34 for the EPP. For the EPP, as for the USPP, the general inflation in commodity prices has been one cause of the apparent increase in price volatility in the 1970's; but Table 2.16, in which appropriate deflators have been applied to the various zinc prices, demonstrates that, for the real, as well as the nominal zinc price, price variability increased dramatically during the 'seventies, especially on the LME.

One result of the increased uncertainty of the 'seventies, is seen in Table 2.14. There has been a massive increase in the volume of trading on the LME : from 301,500 tonnes in 1970, to 1,380,200 tonnes in 1979.

In the following chapters we shall examine more closely the reasons behind the greater activity on terminal markets. By looking at the way producers and consumers can use terminal markets, and assessing the role of non-trade interests, we will be able to gain a clearer understanding of the relation between terminal markets and market stability.

CHAPTER III : PRODUCERS, CONSUMERS AND TERMINAL MARKETS

1. INTRODUCTION

Chapter II illustrated how the volume of trading on terminal markets has increased over the past decade for a wide range of commodities. To understand why terminal market trading has grown in importance, we shall now examine how producers and consumers of commodities can make use of terminal markets, and what advantages they offer. In the next chapter, we shall study the reasons behind the expansion of non-trade interest in terminal markets.

The positive advantages of terminal market trading for producers and consumers are dealt with in the following sections. But, first of all, a 'negative' reason for using terminal markets can be noted here. We observed in Chapter I that the alternative to terminal markets was a system of producer pricing. Insofar as this alternative becomes unviable, whether in the form of a strict producer controlled market or a commodity agreement between producers and consumers, then terminal markets will tend to fill the gap.

A clear example of the collapse of a producer system under the pressure of economic events is provided by the recent demise of producer pricing in the US copper market. We made the point in Chapter I that producer prices will tend to be below the free market when prices are strong, and above the free market when prices are weak. The ultimate cause of the collapse of the US Producer Pricing system was the exceptional duration and severity of the recession in the world copper market in the mid and late 1970's.

The peak LME copper price was recorded in April 1974. During the following months, the price fell back sharply, and even by

1979 had not regained its nominal value in 1974, let alone its real value, allowing for inflation. Throughout this period, the US Producer Price stood at a considerable premium to the LME, as can be seen from Table 3.1. The consequence was a rapid build up of US producer stocks of refined copper to record levels, despite efforts to restrain US mine output.

Table 3.1 : US Producer Prices, LME Copper Prices and US Producer Stocks of Copper, 1974-1978

	<u>US Producer Price (c/lb)</u>	<u>LME Price (c/lb)</u>	<u>Difference (c/lb)</u>	<u>Year-End US Producer Stocks ('000 mt)</u>
1974	76.65	93.10	-16.45	137.6
1975	63.54	56.11	+ 7.43	236.5
1976	68.82	64.05	+ 4.77	247.5
1977	65.81	59.38	+ 6.43	260.1
1978	65.51	61.83	+ 3.68	181.7

Source : WBMS

High US Producer Prices caused consumers to reduce their purchases from domestic producers to minimum, while accepting copper priced on the lower LME quotation (via imports) or from Comex. Meanwhile, the US mines faced pressure from the US Administration to cut prices, as part of its anti-inflation package, and felt direct financial pressures upon resources, stretched by the tying up of some \$400 million of working capital in stocks, during a period of low profitability.

Eventually, in May 1978, Kennecott, formerly one of the main advocates of the producer pricing system, changed its tactics. It decided to introduce a price for its cathodes which was set at a fixed 2.5 cents per pound premium over Comex. Shortly

afterwards, Anaconda, another major US producer, followed suit. While the remaining large US producers, e.g. Phelps Dodge and Asarco, were reluctant to drop the producer price system entirely, they had no choice but to keep their quoted prices closely in line with the Comex price, and they altered their 'producer prices' very much more frequently in response. In 1979, Phelps Dodge changed its copper price an unprecedented 39 times; while Asarco, in order to keep itself competitive, changed its price no less than 82 times, equivalent to once every three working days.

The result was as desired. US producers were able to increase their sales of copper and run down stocks almost immediately. End-1978 stock levels were some 80,000 tonnes below those recorded twelve months before; and they fell by another 90,000 tonnes during 1979. However, the pressure that had built up over the previous four years had spelt the end of the US Producer Price system. In the following sections, we shall bring out other problems of producer pricing which enhance the relative merits of a terminal market pricing system.

The example of copper is a vivid one, because it encompasses the demise of a very long-standing producer pricing system, but the lessons to be learnt from it are wide-ranging. Producer pricing systems can generate considerable benefits for consumers and producers alike, by increasing the stability of commodity prices. However, producer pricing systems come under great pressure in periods both of high and low prices. When demand is strong and commodity prices are tending to rise, there are obvious attractions for producers to break ranks, and take advantage of the higher prices available in the terminal market. But, producers don't always gain commensurately when free market quotations fall below producer prices in times of recession, because, at such times, free market supplies tend to nibble away at the market shares of those producers sticking

loyally to a producer pricing system, just when they hope to be rewarded by customers for their under-pricing during the earlier boom. As long as the ups and downs of the commodity cycle are of a roughly comparable duration, producer pricing systems are fairly well equipped to survive, even alongside well established and thriving terminal markets. The difficulties arise when the cycle proves to have an unusually long peak or trough. In either case, the restraint of those producers setting their own administered price becomes sorely tried before the market turns; and it may need only one modest sized producer to break ranks for the whole system to collapse.

2. HOW PRODUCERS CAN USE TERMINAL MARKETS

There are a number of facilities that terminal markets offer the producers of commodities. To what extent these are used depends on the sophistication of the producer in question. However, changes in economic and market circumstances may force producers to look more closely at the potential benefits they can derive from trading on commodity futures markets.

Firstly, terminal markets can be used as a 'market of last resort' for the physical commodity. We have noted earlier that deliveries to and from exchange warehouses form only a very small part of the total business transacted. However, a producer who wishes to sell excess output, produced over and above his regular contractual commitments, can sell onto the terminal market. The commodity has to meet a minimum necessary quality standard to be acceptable by the exchange for trading on its contract; but in practice, in order to generate sufficient interest in trading, futures markets rarely stipulate top quality requirements. This also means that producers of second grade material, who tend to find some difficulty in making direct sales to customers during times of market weakness, have a ready made outlet when they most badly require one.

On the other hand, producers may also buy from terminal markets. If they are faced with production difficulties and do not want to declare 'force majeure' - i.e. an inability to meet the customers' contracted requirements - it may be possible, conditions of quality permitting, to supply commodities from the exchange. This is not a common use of terminal markets, and may also prove very costly if the current price level is high and heavy transport costs from an exchange warehouse to the consumer are incurred.

A second use of terminal markets by producers is to finance stocks. In Section 1, we saw that stocks can absorb considerable amounts of a company's working capital. This burden can be alleviated somewhat through using terminal markets. In 'normal times', when there is not a shortage of the commodity, its spot price tends to be less than its forward price; in market terminology, a 'contango' rules.

A knowledgeable producer, with surplus stocks of raw material awaiting processing, can finance some of the costs of holding onto these stocks by selling forward the tonnage tied up in surplus stocks. By doing so, he "earns" the contango. For example, consider the case of a company recycling lead batteries, and with surplus stocks of batteries on its hands at a time when the spot price of lead (which determines the value of the batteries) is £300 per tonne, and the three month forward price is £310. The company can gain £10 per tonne by selling three months forward the tonnage that it expects to require for processing in three months' time. Then, when the three months has elapsed, he buys back the contract that he sold on the terminal market, and the price that he pays will be the spot price ruling at that time. By means of these transactions, the company has, in fact, met two objectives at one and the same time. It has earned the contango, and thereby reduced the costs of financing and storing stocks, while also hedging the value of the metal in its stocks (since the effect of the transactions is to shift the purchase price of the metal from that ruling at the start of the period, to that ruling when the three months have passed).

At times of market weakness, when stocks are large, the contango moves very close to its theoretical limit - equal to interest charges and warehousing costs (plus the costs of deteriorating quality, where these are relevant). The deadweight

of large stocks tends to push up the contango during a recession, but, if the contango rises above this limit, it becomes profitable for an institution such as a bank to intervene to reduce the contango by buying the commodity on the physical market and selling the same tonnage forward simultaneously. Therefore, at the very time that stock financing will, in all probability, be a serious problem for producers, the terminal market is most likely to offer attractive opportunities for reducing the burden of working capital.

The possibilities for using terminal markets to reduce stock financing costs exist only when there is a contango. Sometimes, the spectrum of forward prices is characterised, as it often is during a boom, by a scarcity of physical metal for delivery in the immediate future, with forward prices standing below spot prices (in market terminology, this is known as a "backwardation"). In these circumstances, the logic of the pattern of prices is that those people holding surplus stocks of metal should be encouraged to sell these stocks to the market, (and, if necessary, buy a similar tonnage for future delivery, at a discount equal to the backwardation), rather than seek to use the terminal market to reduce financing costs.

The example of a scrap lead processor, presented above, demonstrated not only that terminal markets can assist in stock financing, but also that they provide facilities for producers to meet another major objective - the hedging of price uncertainty.

In practice, producers do not make great use of hedging facilities, but they are important for reducing the price risks faced by producers. The technical name for the hedging operation that is specific to producers of commodities is a 'price fixing hedge', where producers can fix a price for the future delivery of commodity, even if the contract with the

consumer stipulates that the delivery price will be the spot price on the future date, which is, therefore, unknown. This type of hedge protects producers from an unexpected fall in the delivery price.

An example of a price fixing hedge can be given for the Chilean copper refiner Enami. In May 1979, Enami's futures trading on the LME made Chile the first CIPEC country to hedge on a large scale on a terminal market. Enami sells futures on the LME for the day when it is to make physical delivery at the ruling LME cash price. When the delivery date arrives, Enami purchases cash LME contracts to cancel out its futures position. If the LME price falls by £100 per tonne, Enami will lose this amount on its physical transaction, but regain it when buying the cash LME contracts at the cheaper price. The result is that the change in the LME cash price falls out of the reckoning, and Enami has fixed its selling price at the futures price known when the hedge was initiated. Enami is reported to be covering over 8000 tonnes per month of its copper sales in this way, or almost all its production of refined copper.

The position of Enami is unusual, in that the company exists primarily to buy and process the production of ore from Chile's small mines sector. Since Enami has to buy the ore on the basis of the price ruling on the day of purchase, it could find itself very exposed if it had not hedged during a collapse in the market price.

A more representative example of the manner in which producers benefit from the facilities that a terminal market affords for hedging is that provided by the vast US agricultural sector. Many banks making seasonal loans to farmers growing crops such as soya beans, maize wheat or oats, insist upon the loan recipients insuring themselves against adverse price

movements by making price fixing hedge sales of a significant proportion of their likely output.

The commodities examined in detail in Chapter II have longer gestation periods between investment and production than grain crops, but an illustration of a growing trend towards hedging by mineral producers is given by the Philippines gold producer, Benguet Consolidated. Faced with a major investment in new machinery to expand a low grade, high cost gold mine, Benguet, last year, made a price fixing sale of roughly half of the output from the mine at prices which guaranteed a reasonable profit, enabling a go-ahead decision to be made without undue risk.

3. HOW CONSUMERS CAN USE TERMINAL MARKETS

Consumers can make use of terminal markets in a similar manner to producers, but with the obvious distinction that they stand at the opposite end of the flow of commodities, with all the differences in risk that this implies.

Terminal markets can play the role of a market of last resort for consumers as well as producers. If consumers are faced with a shortage of raw material, or else are holding stocks in excess of their requirements, they may be able to eliminate the imbalance through buying from or selling onto the commodity exchange. However, for consumers, much more than producers, the quality stipulations of the exchange contract in a particular commodity are a limiting factor.

The broadly based contract favoured for terminal markets often means that a consumer purchasing from the exchange is unable to obtain material of the desired quality. Consumers then have to enter into a deal with a merchant to provide a specific brand of the commodity from his own stocks; and, of course, consumers are obliged to pay for this service. For this reason, terminal markets are only used for consumers' marginal physical needs.

Consumers are also similar to producers, in finding a terminal market's hedging facilities of value. However, in general, producers face only one kind of price risk in commodity dealings, namely that the price received for the commodity will not be sufficient to cover production costs and yield a satisfactory profit. Consumers, by contrast, are vulnerable both on the buying and selling side. When buying their raw material inputs consumers face fluctuating prices, where they buy cocoa beans, refined copper or wool etc., for processing. And subsequently, when they sell their manufactured product, they often find that

the market price of the product is directed related to the ruling price of the raw material. To protect their processing costs and profit margins, therefore, consumers are forced to hedge. The extremely active terminal markets in soya products - soya beans, soya bean oil and soya bean meal - are firmly based upon the hedging operations of soya bean processors.

These considerations explain why hedging is much more widespread among consumers of commodities, than among producers, of course, consumers are glad to take advantage of the stability of a producer price system when one exists, but once such a system cannot guarantee reasonable stability of prices, the need for a means of offsetting price risks - hedging on a terminal market - emerges.

In a third respect, too, consumers are similar to producers in their use of terminal markets. In much the same way that producers can use the contango to reduce the costs of financing inventories of commodities, so also can consumers. By analogy with the example of producers, consumers are not restricted solely to the commodities actually traded on terminal markets when it comes to "earning the contango". They can also use the terminal market to finance stocks of processed and semi-processed goods, whose prices move in line with the primary commodity in question. For example, a producer of cocoa butter, or a maker of woollen yarn, or a manufacturer of lead strip for car batteries, can use a cocoa, wool or lead terminal market respectively to reduce the financing costs of inventories of their finished products.

4. CONCLUSION

The previous sections have outlined the main advantages for producers and consumers of using terminal markets. It will be evident from the discussion of the advantages that exist for consumers in using terminal markets that intermediaries, such as merchants, buying commodities from a supplier, and subsequently selling them, are particularly vulnerable to small movements in commodity prices. Hence, both the hedging and inventory financing facilities provided by terminal markets are very widely used by this special group.

As administered producer price systems have weakened in commodity markets as diverse as those for zinc, sugar, aluminium and copper, trade interests, comprising producers, consumers and merchants, have had perfectly valid, non-speculative reasons for increasing the volume of terminal market trading activity undertaken by them. If we leave aside, for the moment, the influence of speculators and non-trade involvement, we can see that, in a situation of growing market instability, terminal markets will tend to be used more by 'legitimate' trade interests. Producers can use the futures prices on terminal markets to fix a price for the future sale of their output, and so hedge the risk that they face. Consumers will also trade in futures contracts to offset the risk of losses in processing margins, caused by price fluctuations. And, both producers and consumers will utilise terminal markets for their physical commodity requirements, and to ease the burden of inventory finance. For merchants, the need for a straightforward hedging of commodity price risks is paramount.

An important conclusion, therefore, is that at least part of the increased volume of business on terminal markets is accounted for by producers, consumers and merchants of the

commodity concerned. This is not to say that 'legitimate' traders do not speculate, nor that involvement in the market is necessarily beneficial to overall market stability. To assist in assessing the importance of such issues, the next chapter will examine the controversial issue of non-trade involvement in terminal markets.

CHAPTER IV : SPECULATION AND NON-TRADE INTEREST IN TERMINAL
MARKETS

1. INTRODUCTION

The growth of commodity futures trading over the past twenty years has been explosive. In 1960, 3,878,151 contracts were traded on U.S. Exchanges. By 1977, the number of contracts traded had reached 42,880,318, an increase of over 1,000 per cent*. Whilst part of the growth of trading activity can be accounted for by the growing realisation by producers and consumers that terminal markets provide an effective way of hedging their price risks, there are two other important factors influencing the growth of trading.

Firstly, the influence of speculators and investors in the market has grown enormously. Secondly, new futures markets have sprung up, offering contracts in a variety of physical commodities, and even in interest rates and government bonds.

The instability of the world economy and traditional spheres of investment over the past decade has caused speculative and investment capital to flow into the futures markets, seeking, in the process, to satisfy three major objectives. The primary objective was undoubtedly to discover more profitable forms of investment than those traditionally available. A second attribute that terminal markets were able to offer certain speculators was the possibility of undertaking high risk, highly geared (or in US terminology, high leverage) speculation, by virtue of the possibility of trading on margin. This is explained more fully, below. The third attraction of futures markets was of relevance mainly to a totally different type of investor, managing a large non-speculative portfolio, who saw, in futures contracts, a new class of financial instruments, allowing him to reduce his risks by diversifying his portfolio beyond its traditional composition.

Note : * Commodities Yearbook, 1978. These figures include financial futures.

The growth of non-trade involvement in terminal markets has not been universally welcomed. Many critics have argued that the flood of capital into commodity markets is destabilising, and that it causes commodity prices increasingly to become divorced from actual supply and demand conditions. In the remainder of this chapter we shall look at the role of speculators and investors in commodity markets. Some of the effects of their activities on the markets will be considered in Chapter V.

The distinction between speculation and investment is not a clear cut one; however, it is useful to create a distinction for the purposes of exposition. At the risk of over-simplification, speculators can be described as those who risk their capital in the short-run in order to make a profit. Often they are prepared to accept a number of losses in the expectation of making one big gain. Investors, on the other hand, are concerned with maintaining and adding to the real purchasing power of their capital in the long run by investing in commodities.

2. SPECULATION ON TERMINAL MARKETS

Despite the view of the Chicago Mercantile Exchange that "to be viable, a futures market must have probably at least 50 per cent investor or speculative activity", the predominant feeling among those responsible for supervising terminal markets is that non-trade involvement in such markets is healthy only if kept within reasonable bounds. The problem is always to determine precisely what those bounds should be. The Chicago Mercantile Exchange spokesman's statement reflects the belief that a sizeable proportion of trading on a terminal market has to be speculative, if the market is to possess enough liquidity to enable it to perform its legitimate function of transferring risk away from producers, consumers and merchants. However, it would be queried by many observers whether 50 per cent is the minimum proportion of business that needs to be of speculative origin.

A major problem with any analysis of terminal market trading is making the distinction between speculation and legitimate trade hedging. There are many ways in which trade interests can speculate on terminal markets by allowing their holdings of futures contracts to diverge from the pattern that would most efficiently minimise the risk from price fluctuations. For example, a processor expecting commodity prices to fall over a weekend may well allow his "book" of futures contracts to be excessively "short" at the end of trading on Friday (in other words, he will have sold forward more contracts than he needed purely for hedging reasons), in the intention of getting back into balance on the next Monday morning.

Conversely, there are occasions when non-trade interests behave in totally proper, non-speculative ways. Very important instances of such behaviour can be given for terminal markets during periods of depressed commodity prices, when the contangos

embodied in futures quotations moved close to the short run costs of financing and storing the commodity in question. At such times, large non-trade financial institutions entered the commodity markets, in effect, to finance stocks, by buying large tonnages of the commodity stored in the commodity exchange warehouses and selling the same tonnage forward as a futures contract, earning the contango in the process. In this manner, banks, insurance companies and pension funds were able to earn a competitive short term, risk-free, return, without in any way speculating upon short run movements in commodity prices.

The difficulties of distinguishing speculative from non-speculative trading on terminal markets have not deterred supervisory authorities from trying to limit speculative activity, when they feel that it is threatening to disturb the balance of the market. In Britain, the Bank of England has no hard and fast rules; however, it is said to intervene, usually informally, but on rare occasions formally (restricting the number of new contracts that can be entered into), if non-trade interests account for much more than 30 per cent of the contracts outstanding in a futures market at any time. British authorities tend to adopt a more generous definition of "trade interests" than do their US counterparts, but, even so, it is interesting to compare the British maximum of 30 per cent non-trade involvement in a futures contract with the Chicago exchange's minimum requirement of a 50 per cent investor or speculative involvement.

The authorities in the USA share the British concern about the extent of speculative activity on terminal markets. In November 1979, and again in March 1980, Paul Volcker, chairman of the US Federal Reserve Board, cautioned US banks against financing speculative trading, and, on the latter occasion, this proved very effective in reducing such trading.

Criticism of speculative activity has also come from within the futures industry itself, as well as from producers of raw materials in developing countries. David T. Johnston, the chairman of the US Futures Industry Association, believes that the industry (sic) must avoid an excessive build up of speculative positions which will subject the prices of raw materials to squeezes or manipulation. Johnston believes that price volatility has attracted 'unethical and dishonest persons into fringe areas of the business', which has led to adverse publicity, and the clamour for regulation of speculative activity.

From the commodity producer's point of view, speculation is seen as an evil which accentuates the price and revenue fluctuation experienced by exporters of raw materials. When opening a meeting of the ten nation Cocoa Producers' Alliance, President Houphouet-Boigny of the Ivory Coast said that speculation should be rooted out of trade between developed countries and the Third World, and that it was 'unfair' that cocoa prices were determined by 'stock exchange operations made in a dehumanised atmosphere.' During the second quarter of 1980 the Ivory Coast took the lead in trying to resist declining cocoa prices, by withholding a large part of its crop from the market until prices improved. However, the perishable nature of cocoa made this strategy impossible to sustain for more than a few months, and in June, the Ivory Coast had to acknowledge the failure of its policy, and incurred a loss estimated at over \$90 mn in disposing of its cocoa stocks.

Clearly, speculative activity is under criticism from all sides : from the governments of producing and consuming nations, from those who believe that money is being channelled into 'non-productive' activity, and even from officials of the futures markets themselves. However, the most important question to be answered is whether or not this criticism is justified. Is

speculative activity responsible for the violent price fluctuation of recent years, or is it simply a response to instability? To answer this question first requires an understanding of the role of speculators in futures trading.

2.1 How Speculators Operate

The operation of hedging deliberately eliminates the possibility of making a gain from price changes in order to safeguard against the risk of a loss. Speculators, however, deliberately risk their capital in the hope of making a profit. The capital which speculators bring to the markets creates the liquidity necessary for hedgers to be able to transfer their risks.

To some degree, the operations of hedgers selling 'short' will be offset by other hedgers buying 'long', and vice versa. However, it will not always be the case that 'short' hedges exactly offset 'long' hedges. Consequently, if successful hedging is to be possible, the market requires additional liquidity in the form of speculators who are prepared to buy from, or sell to, hedgers. Consequently, speculation is an integral part of a futures market. It is important to stress that hedging cannot be successful without the liquidity which speculation provides.

Speculators can, and do, operate in the spot market for commodities. Successful speculation here is dependent on a rising market which enables the speculator to sell when he feels the price has reached its high point. A speculator can 'squeeze' the market by buying large quantities of the commodity, taking delivery and so forcing up the price, and then selling in order to take his profit. However, spot market speculation has the considerable disadvantage for the speculator that he has to pay for the commodity in full. He far prefers it when he can speculate by committing initially

only a small proportion of the value of the commodity in question, since, then, he is much more highly geared from a financial point of view. Terminal markets typically enable a speculator to achieve this ideal, because futures contracts are bought and sold on a "margin", of only a small percentage of the commodity's price.

In practice, futures markets have two distinct advantages over spot market from the point of view of the speculator. Firstly, as futures contracts can be bought on a margin, giving the speculator a very high rate of gearing, large profits can be made from a small initial outlay. For example, a speculator who bought a 25,000 lb July 1979 Comex copper contract on Dec. 11th 1978 at 72 cents per lb., and sold it in March 1979 at 92 cents per lb., would have pocketed 5,000 dollars profit on an initial investment of \$1,000, as the margin requirement on the \$18,000 of copper was only 5.5 per cent. Margins also allow speculators to diversify their capital into a number of different markets, thus minimizing the risk to the total value of their assets arising from a loss in one market.

Secondly, successful speculation does not depend on a rising market; it simply requires the correct identification of future trends in the market - up or down. If a speculator believes the price is likely to fall, he can sell forward on the futures market, wait for the price to fall, and then buy on the spot market to meet his **contractual** commitment. The differences between the price at which the commodity is bought on the spot market and price at which it was initially sold on the futures market constitutes the speculator's profit. Alternatively, the speculator can sell forward three months, and then buy two months forward a month after the original sale, when the price has fallen. In this case, the speculator takes his profit without ever having to trade in the spot market.

Conversely, if a speculator expects a rising market in the future, he can buy three months forward on the futures market and then sell onto the spot market when the price has risen. He can also sell two months forward a month after his initial purchase, so that his contracts to buy and sell cancel each other out.

It is clear from the preceding analysis that speculative activity requires a degree of price instability in order to be viable. In this sense, speculation is a reaction to, rather than a cause of, price instability. Whether or not speculation accentuates price instability will be dealt with in Chapter V.

2.2. The LME Aluminium Contract

One example where speculation can be considered as having an effect on price stability is through the creation of a futures market for a commodity whose price was formerly relatively stable. The LME contract in aluminium is one such market.

Prior to the establishment of the LME aluminium contract in October 1978, it seemed that almost everyone involved in the industry was against it. The producers argued that the industry's high degree of vertical integration, coupled with a producer pricing system, gave the industry a stable price which was beneficial to producers and consumers. It was also pointed out by the producers that the inclusion of aluminium on the LME would introduce a speculative interest in the metal. This was thought to threaten the advantage of price stability that aluminium had over competing materials, especially copper. Furthermore, aluminium fabricators had little need for hedging facilities, as the prices of semi-fabricated aluminium products are not based directly on the price of aluminium ingots.

The majority of merchants dealing in aluminium were also against the new contract, as they were already enjoying a significant volume of business outside the LME. Those merchants who were in favour of the new contract were Ring-dealing members of the LME. For them, the contract would mean a significant volume of new business, and the opportunity to speculate.

The LME lobby's main argument in favour of the contract was that the start up of new capacity in the Middle East in the early 1980's might upset the supply/demand balance for aluminium. The new capacity would bring considerable quantities of uncommitted aluminium onto the free market.

Although the new contract was clearly not required by the aluminium industry, and despite the objections raised in many quarters, the new contract was launched. Because of the controversy that surrounded its inception, the LME contract has been blamed by its critics for encouraging a shift in aluminium product pricing away from a producer price basis towards a free market price basis, which would give an important role to the LME. However, whether or not this change occurs, it is unlikely to be as a result of the new LME contract. It will depend, rather, on changes in the structure of production of primary aluminium and of the manufacture of semi-fabricated products. Should there be large numbers of competing producers selling to large numbers of independent metal fabricators, it is unlikely that the producer price system could survive the ensuing competition.

Since its inception, the LME aluminium market has attracted a steadily growing volume of physical metal. Supplies have come mainly from the Socialist countries and small independent producers in the non-Socialist world. However, because the LME price has generally been above the producer price, the attraction of the LME to the large producers have been growing. Most of the metal traded on the LME is that which was previously sold on the free market, to merchants. Consequently

the main beneficiaries of the contract have been those merchants who are Ring-dealing members of the LME. Whilst the LME price has fluctuated considerably more than the merchant price would have done in the absence of the LME contract, as yet it has had little effect on the stability of the producer price.

3. INVESTMENT IN COMMODITY FUTURES

All types of investment have three characteristics which must be weighed up against each other when selecting an investment portfolio : liquidity, expected rate of return, and risk. Risk and expected rate of return, in particular, are closely related.

Over the past decade, historically low risk investments, such as gilt-edged government stock with a fixed interest rate, have become almost as risky as placing capital in an investment whose price fluctuates sharply. This is because inflation has meant that a nominal fixed interest return may mean a negative return in real terms. Commodities and commodity futures, however, although involving undoubted risk, also offer the possibility of attractive rates of return.

Futures contracts have the added advantages that they can be liquidated easily. An active futures market will provide a buyer for the investor who wishes to sell his holdings. However, there is, of course, the risk of a loss due to price changes if investors are forced to liquidate their contracts at short notice.

There are four broad reasons why institutional investors choose to invest in commodities and commodity futures. Firstly, an investor's portfolio should always be diversified in order to minimize the risk of loss; an investor should not 'put all his eggs in one basket'. Secondly, commodity futures offer the possibility of high rates of return. Thirdly, other possible investments (bonds, equities and property) have become comparatively unattractive alternatives in recent years, while commodity prices are believed to provide good long run prospects for at least equalling the rate of inflation. Finally, as we have already mentioned in our discussion of speculation, an important advantage of futures trading is that money can be

made whether the market is rising or falling. Investment in stocks or physical commodities can only be successful in times of rising prices. But a futures trader will be successful as long as he correctly identifies a trend - it does not matter whether the trend is up or down.

Broadly speaking, financial and non-physical stores of wealth have, within the past decade, been reassessed as investments, and are now considered to be inherently risky, on account of inflation, interest rate movements and exchange rate fluctuations. Consequently, commodities, or contracts to buy or sell commodities in the future, have become more highly regarded as a means of maintaining the real value of assets. It is felt that, in a world of inflation and monetary instability, raw materials must retain a basic value reflecting the increased cost of production.

3.1 Commodity Futures as a Protection Against Inflation

In order to protect himself successfully against inflation using commodity futures, the investor requires a knowledge of how the markets work, and how to take advantage of the trends that develop. Not every investor has this knowledge, of course, and specialist investment units and commodity funds exist for the purpose of managing the investment strategy.

Commodity investment funds are often set up in suitable offshore tax havens. This enables the fund to issue shares on a regular basis and avoid some of the control associated with direct investment in commodities. Purchases and redemptions of shares are made at the end of certain periods (normally one month). At the end of the period, the net asset value of the company is calculated in per share terms, and purchases and redemptions of shares are based on this. Thus, an

investor with only a small amount of capital, and no knowledge of the futures markets, can invest in such a commodity fund in the hope that the spread of investments made by the fund will safeguard the value of his capital.

Sterling-denominated commodity investment funds have been set up over the past five or six years. Their emphasis is on longer term investment, with managers holding a strategic mix of commodities to reflect prevailing conditions. The Vice-President of Drexel Burnham Lambert, a firm of commodity brokers, has estimated that the amount of European money in formally established commodity futures funds of various kinds has grown from under \$10 million seven years ago to more than \$200 million today, and he is confident that the growth of the past seven years will continue unabated.

Drexel Burnham Lambert's own commodity futures trading fund, Worldwide Fund Limited, was started in April 1978, with \$1 million provided by two leading U.K. investment trusts. Since then, the fund has grown to \$15 million, and now boasts some of the leading European institutional investors as shareholders, including private and commercial banks. More significantly, the shareholders include pension funds and insurance companies.

Old Court Commodity Trust is now the largest of the UK commodity funds. Formed in January 1976, its value had appreciated by 108 per cent by September 1979. Old Court has achieved a rate of return well above the rate of inflation in the UK. The fund is unique in that it invests in both commodities and in commodity related shares, with shareholdings in most of the major world stock markets.

The commodity related shares are held for two reasons. Firstly, it means the fund can take a wider participation in commodities than by investment directly; secondly, the shares provide a less risky form of investment for part of the fund's capital.

Approximately 10 per cent of Old Court's fund is retained in cash. However, the managers have been prepared to raise liquidity to a higher percentage under potentially adverse conditions. The fund makes an annual distribution to shareholders in March of each year.

Whilst investment in commodity futures has been a recent trend in Europe, the futures industry in the USA has been a sphere of significant investment since the beginning of the 1970's. The growth of futures trading in the USA has been so tremendous that many have argued that it is taking risk capital away from the stock and bond markets, depriving industry of cash needed for investment. This criticism has been rebutted by a former chairman of the US Commodity Futures Trading Commission, who estimates the money involved in futures markets at \$6 billion*, compared with the much larger sums tied up in the stock and bond markets.

3.2 Bank Involvement in Commodity Futures

The financing of commodity futures transactions has been aided by the establishment of futures financing departments by major banks; although, in response to criticism of speculative loans by the chairman of the Federal Reserve Board, US banks have argued that loans are granted for hedging activity rather than speculation. Typical of the pattern among US banks is the recent decision by the First National Bank of Chicago to establish a futures financing department. This will, the bank says, finance only relatively risk-free transactions, involving hedging or spreading (the simultaneous sale and purchase of futures in different delivery months of the same commodity).

The FNBC has thus joined the ranks of the leading US banks, such as the Continental Bank, Citibank, Bank of America and Harris Bank, for whom commodity futures have become an integral

Note : * The reader is reminded that the use of margins in futures trading means that the paper value of the outstanding futures contracts in existence in the USA at an time will be very much greater than \$6 billion; a total of over \$50 billion is quite probable.

part of their short term and seasonal lending operations. However, few banks will publicly admit to loaning money knowingly to professional speculators to enable them to carry on uncovered long or short positions.

Banks' involvement in futures market is not necessarily confined to the provision of finance for other people to undertake hedging transactions. We have already mentioned, in earlier sections, the valuable service provided by banks and other financial institutions in financing stocks accumulated in commodity exchange warehouses during times of economic recession. Under this so-called "cash and carry" business, banks buy commodities on a spot - or "cash" basis - on a terminal market and simultaneously sell the same tonnage in the futures market, having "carried" the stocks for the intervening period. The banks eliminate all risks related to the commodity price by buying and selling at the same time, but they manage to lock in the spread, or contango, between the spot and future quotations.

At the times that it is worth the while of commercial banks to intervene in terminal markets to earn the contango, the contango must at least cover warehousing costs and short term interest costs associated with a physical purchase of the commodity. But competition between financial institutions will set an upper limit to the size of the contango - to the benefit of commodity producers. In the meantime, the banks and other similar institutions greatly ease the burden of financing surplus commodity stocks.

The scale of the financial support provided by the banks and their associates can be very considerable indeed. It has been estimated that, for the copper market alone, up \$1 billion of LME and Comex stocks were financed in this manner between early 1975 and early 1978.

4. CURRENCY INSTABILITY AND TERMINAL MARKET TRADING

The fluctuating value of world currencies during the 1970's has made holding wealth in the form of money, or fixed interest bonds, particularly risky. The sudden devaluation of a currency, in which an investor is holding his assets, will cause an immediate reduction in the value of those assets. However, commodity markets can provide a method of protecting the investor against this risk.

Take an example where assets are held in sterling, and the value of sterling is expected to fall in relation to other currencies. Money assets denominated in sterling will decline in value when sterling's value falls. However, it can be expected that the real value of sterling-quoted commodities on the world market will remain constant. Consequently, the sterling price of such commodities should rise to compensate for the fall in the value of sterling.

To protect the value of his sterling assets, the investor can buy a commodity quoted in sterling, wait for the price of the commodity to rise, and then sell. In this way, the real value of the investor's wealth will have been maintained.

The validity of the example ought not to be weakened if the currency under pressure is not the one in which the commodity is quoted. As long as the real value of the commodity on the world market is unaffected by a devaluation of the currency under pressure, futures contracts, far enough forward to include the period during which a devaluation is anticipated, provide a cheap and efficient way to reduce possible losses associated with the devaluation.

If commodity markets are commonly used as an important means of minimising the losses caused by exchange rate fluctuations,

then the movement away from a fixed exchange rate regime to the present one, characterised by floating exchange rates, is likely to have increased the amount of trading on terminal markets that is unrelated to the actual supply/demand relationships of the commodity in question. But, it is first necessary to establish that commodity markets are used for this purpose.

Commodity terminal markets provide two significant attractions to people seeking a devaluation hedge : one is the likelihood that the real value of the commodity will be unaffected by the devaluation; the other is that the facilities provided for futures trading on margin enable the hedge to be undertaken for a relatively low outlay. However, it has been argued that both of these attractions also exist for a more direct means of hedging against a devaluation, namely by buying or selling a currency on the forward foreign exchange market. It is argued that it is not intelligent for someone concerned purely with currency uncertainty to aim to combine a devaluation hedge with a new form of uncertainty - commodity price uncertainty.

Against this, there are two reasons for believing that terminal markets have been used increasingly to reduce exchange rate uncertainties. The first is that there are many firms for whom commodity market trading is much more familiar than trading on the forward foreign exchange market. Indeed, the structure of exchange control regulations in many countries would make it difficult for companies to get permission at short notice for foreign exchange forward trading, but places no obstacles in the way of long-standing forward trading arrangements in commodity markets. Thus, terminal markets are the most natural forum for many companies to use, even when their objectives are foreign exchange rather than commodity-related.

The other reason for believing that commodity markets have become more popular as means for hedging foreign exchange risks

is paradoxically that forward foreign exchange markets are less attractive for this purpose, now that exchange rates are floating. When exchange rates were fixed, gambles on exchange rate changes were one-way bets; no-one expected sterling's value to appreciate in 1967; devaluation had, by then, become inevitable. With floating exchange rates, however, it is not at all clear which currencies should be chosen as the instrument for exchange rate hedging transactions. Furthermore, the real value of almost all currencies is being eroded by inflation. Consequently, in the present uncertain world, the prospect of commodities retaining their real value in the medium and long term is often sufficient to counterbalance the disadvantages of short run commodity price volatility.

The arguments just presented give strong a priori reasons for believing that foreign exchange uncertainties have been a significant influence upon terminal market trading in recent years, and that this influence has grown during the 1970's. In order to provide a partial test of this hypothesis, we have undertaken a detailed study of one particular terminal market, that for copper on the London Metal Exchange. First, we shall examine a clearcut, unambiguous example of the impact of exchange rate speculation upon commodity prices, the case of the devaluation of sterling in 1967. Then we shall consider the impact during a period of floating exchange rates, such as has existed during the 1970's.

4.1 The Devaluation of Sterling, November 1977

After the General Election in the UK, early in 1966, June to September witnessed a serious sterling crisis, followed by the introduction of deflationary economic measures. On the LME, trading and prices were greatly influenced by the collapse of the non-US producer price system during the year. Nevertheless, the flurry in LME trading volume in the third quarter described

in Table 4.1 (followed possibly by an unwinding of speculative positions in November, when three months forward contracts matured) appears to have been related to uncertainty about sterling's value.

It should be remembered that up until the late 1960's, fixed exchange rates were the rule, not the exception, for the world's currencies, and the framework established at Bretton Woods in 1944 still held away. Given the weakness of Britain's competitiveness, expressed in chronic trade deficits in the balance of payments, the British Government first of all attempted to deflate the economy to rectify the trade deficit. Deflation proved insufficient, however; and it became increasingly apparent that the decision to devalue sterling - one the Government was reluctant to make, given sterling's role as a reserve asset for international trade - became inevitable. Furthermore, since devaluation was a 'once for all' affair, before the present era of floating exchange rates, speculators against sterling had nothing to lose but brokerage fees when taking their positions.

1967 saw a growing pitch of speculation against sterling, until the eventual devaluation on 20 November. LME turnover moved closely in line with the intensity of the speculation, reaching a peak in the month before devaluation was announced. As in 1966, there were also clear signs that positions were unwound three months later, and turnover fell in February 1968.

It is difficult to assess the general effect on copper prices of speculation against sterling, because other important factors were influential during this period, notably labour disputes in the Chilean and US copper industries. The US copper strike lasted from July 1967 to March 1968, and some of the severest effects in terms of shortages of supply were felt towards the end of 1967. However, these longer term

influences should not have had an important impact upon daily movements in price at the time of devaluation itself. All other things being equal, a 14.3 per cent decline in the value of sterling should raise the sterling price of copper by 16.7 per cent. Since the magnitude of the devaluation was announced and was to be implemented at one blow, as it were, one can assume, in looking at the days immediately preceding and following 20 November, that all other factors were the same.

During the week before devaluation, from 13-17 November, the mean LME cash wirebar price was £497.85 per long ton, and the mean price on Friday 17 November was £502.50. The devaluation was announced on Monday 20th November, and the mean LME price rose to £556.00, an increase of 11.7 per cent over the week before, and of 10.6 per cent over the last official quotation on Friday. On Tuesday 21 November, the price rose to £562.50, the percentage increases over the previous week and the previous Friday being 13.0 per cent and 11.9 per cent respectively. Only at the beginning of the next week did prices rise to levels justified by the devaluation of sterling.

Why did prices on the LME fail to respond fully to devaluation? On Monday 20th November, the cash price per long ton was some £30 below what it would have been if the price had moved up by the full effect of the devaluation. The answer lies in the effect of speculation. On 18 November, a Financial Times correspondent commented on the situation regarding commodity speculation against sterling the day before:

' There was great activity in nearly all commodity markets. Prices showed sharp gains in morning dealings, driven upwards by heavy hedge buying.'

' On the London Metal Exchange, one broker described trading conditions as "tantamount to gambling".'

The price movements in copper during the week before devaluation were not marked because the uncertainty surrounding the US and Chilean labour disputes meant that, in the short term, copper was not as good a hedge as other metals. Nevertheless, hedge buying of copper against a fall in the value of sterling over the whole period was significant. Sales of copper, closing the hedge and taking profits in the days immediately after devaluation, had the effect of dampening the upward adjustment of the copper price.

4.2 LME Turnover and Currency Instability

The previous section has already given examples of how turnover on the LME reacted to turbulence in the foreign exchange market in the 1960's. In the next few paragraphs, we shall examine the extent of the interaction between 1970 and 1977.

In 1970, the main influence upon the foreign exchange markets, which found an immediate response in LME turnover figures, was the heavy selling of sterling in September and October. This was precipitated by the publicity given to floating exchange rate regimes at the September IMF meeting. Monthly LME turnover in October, listed in Table 4.1, rose to a peak of 4.38 per cent of annual non-Socialist world refined copper production.

The pressures for floating exchange rates continued throughout the first half of 1971, alongside heavy inflows of US dollars into Europe and Japan. Eventually, the authorities yielded and in August, sterling and a number of other European currencies, as well as the Japanese Yen, were allowed to float. The net impact upon sterling's international value was limited. In December, the Smithsonian agreement realigned all major currencies, and devalued the US dollar by roughly 10 per cent.

Table 4.1: LME MONTHLY COPPER TURNOVER AND ANNUAL NON-SOCIALIST
WORLD REFINED COPPER PRODUCTION.

(in tonnes)

	<u>Date</u>	<u>Turnover</u>	<u>Annual Production</u>	<u>Turnover as % of Production</u>
1966	J	92,600		1.8
	F	77,550		1.5
	M	86,075		1.7
	A	108,400		2.1
	M	87,025		1.7
	J	76,575		1.5
	J	110,200	5173,800	2.1
	A	134,700		2.6
	S	143,950		2.8
	O	118,925		2.3
	N	143,025		2.8
	D (TOTAL)	103,950 (1282,975)		2.0
1967	J	103,750		2.2
	F	129,900		2.7
	M	152,925		3.2
	A	132,950		2.8
	M	133,750		2.8
	J	134,950		2.8
	J	110,525	4777,300	2.3
	A	143,775		3.0
	S	150,775		3.2
	O	215,450		4.5
	N	204,175		4.3
	D (TOTAL)	192,550 (1805,475)		4.0
1968	J	257,825		4.8
	F	201,075		3.7
	M	194,000		3.6
	A	198,350		3.7
	M	203,950		3.8
	J	149,500		2.8
	J	155,050	5397,600	2.9
	A	138,175		2.6
	S	121,925		2.3
	O	152,900		2.8
	N	161,250		3.0
	D (TOTAL)	165,450 (2099,450)		3.1

Table 4.1: LME MONTHLY COPPER TURNOVER AND ANNUAL NON-SOCIALIST
WORLD REFINED COPPER PRODUCTION.
(in tonnes)

	<u>Date</u>	<u>Turnover</u>	<u>Annual Production</u>	<u>Turnover as % of Production</u>
1969	J	208,975		3.6
	F	154,600		2.6
	M	176,800		3.0
	A	206,425		3.5
	M	163,725		2.8
	J	171,875		2.9
	J	182,125	5879,700	3.1
	A	188,600		3.2
	S	235,850		4.0
	O	214,650		3.7
	N	190,275		3.2
	D (TOTAL)	204,900 (2298,800)		3.5
	1970	J	218,250	
F		188,250		3.1
M		209,075		3.4
A		239,125		3.9
M		232,325		3.8
J		222,225		3.6
J		237,150	6121,500	3.9
A		189,175		3.1
S		210,225		3.4
O		267,975		4.4
N		240,275		3.9
D (TOTAL)		216,900 (2670,950)		3.5
1971		J	233,950	
	F	197,325		3.4
	M	316,825		5.5
	A	244,425		4.2
	M	235,725		4.1
	J	318,825		5.5
	J	295,050	5773,600	5.1
	A	149,625		2.6
	S	247,800		4.3
	O	217,775		3.8
	N	215,150		3.7
	D (TOTAL)	215,525 (2888,000)		3.7

Table 4.1 :LME MONTHLY COPPER TURNOVER AND ANNUAL NON-SOCIALIST

WORLD REFINED COPPER PRODUCTION.

(in tonnes)

	<u>Date</u>	<u>Turnover</u>	<u>Annual Production</u>	<u>Turnover as % of Production</u>
1972	J	208,750		3.3
	F	185,475		2.9
	M	224,750		3.5
	A	180,150		2.8
	M	212,400		3.3
	J	262,150		4.1
	J	184,725	6384,500	2.9
	A	210,650		3.2
	S	218,400		3.4
	O	207,700		3.3
	N	202,900		3.2
	D (TOTAL)	220,700	(2509,750)	3.5
1973	J	334,775		5.8
	F	400,850		6.0
	M	480,125		7.2
	A	323,350		4.8
	M	436,900		6.5
	J	386,825		5.8
	J	453,400	6684,800	6.8
	A	405,325		6.1
	S	338,975		5.1
	O	462,550		6.9
	N	357,325		5.3
	D (TOTAL)	245,725	(4676,125)	3.7
1974	J	308,200		4.4
	F	282,475		4.1
	M	259,725		3.7
	A	246,550		3.5
	M	303,850		4.4
	J	276,875		4.0
	J	283,325	6945,700	4.1
	A	264,625		3.8
	S	219,050		3.2
	O	257,025		3.7
	N	265,525		3.8
	D (TOTAL)	203,800	(3171,025)	2.9

Table 4.1: LME MONTHLY COPPER TURNOVER AND ANNUAL NON-SOCIALIST
WORLD REFINED COPPER PRODUCTION.
(in tonnes)

	<u>Date</u>	<u>Turnover</u>	<u>Annual Production</u>	<u>Turnover as % of Production</u>
1975	J	273,675		4.4
	F	251,250		4.0
	M	227,250		3.6
	A	259,975		4.1
	M	261,075		4.2
	J	299,075		4.8
	J	326,875	6290,400	5.2
	A	285,675		4.5
	S	324,475		5.2
	O	348,625		5.5
	N	277,775		4.4
	D (TOTAL)	364,300	(3500,025)	5.8
	1976	J	366,550	
F		369,825		5.6
M		468,275		7.0
A		483,650		7.3
M		431,850		6.5
J		471,100		7.1
J		475,650	6663,500	7.1
A		373,300		5.6
S		472,450		7.1
O		421,050		6.3
N		412,925		6.2
D (TOTAL)		320,775	(5067,400)	4.8
1977		J	376,925	
	F	361,325		5.2
	M	391,700		5.7
	A	351,350		5.1
	M	366,975		5.3
	J	335,775		4.9
	J	339,750	6833,800	4.9
	A	340,100		4.9
	S	389,150		5.7
	O	362,625		5.3
	N	344,125		5.0
	D (TOTAL)	365,675	(4325,475)	5.3

Sources: LME, WBMS

The behaviour of LME turnover during 1971 demonstrates that it was speculation involving European currencies, and sterling in particular, that represented the main foreign exchange influence upon the LME. LME turnover in the months before August was much higher, in relation to world production, than at the time of sterling's 1967 devaluation. After the free floating of sterling in August, turnover fell back to levels that, while still historically high, were not very far above trend values. The Smithsonian agreement itself had only a limited impact on LME turnover.

During 1972, the foreign exchange markets were quieter. The EEC countries formed a currency bloc to limit exchange rate changes between them, but a dock strike in June, combined with general doubts about the health of the British economy, caused sudden pressure to build up against sterling. On 23 June, sterling was taken out of the EEC currency bloc and allowed to float.

LME turnover in 1972 closely paralleled sterling's fortunes. Turnover rose slightly in May, and more sharply in June, before falling back, with signs of traders unwinding in September three month positions taken up in June.

1973 was a year of frenzied activity on world foreign exchange markets. In January, a flight occurred from many European currencies, particularly the Italian lira, into the Swiss franc. As a result, the Swiss franc was allowed to float upwards at the end of the month. Then, in February there was pressure against the US dollar, sparked off by the announcement of the first US trade deficit in 30 years. Speculation against the dollar eventually led to a 10 per cent devaluation of the dollar and the floating of some other major currencies.

The dollar devaluation did not end currency speculation. In March, foreign exchange markets were closed, the Deutschemerk

revalued, and most European currencies were allowed to float against the dollar. But the pressure for a further revaluation of the Deutschemmark persisted, until it was revalued again in June.

Towards the second half of the year, sterling's position also came under attack. Heavy selling pressure developed in July, and sterling weakened until the end of the year. The Middle East war and the October announcement of the OPEC oil price rise maintained the tension until the year ended.

LME turnover was high throughout 1973, but, looking at monthly variations within the year, one notes that turnover was particularly high during the European currency crisis of the first quarter. Turnover was high again when the pressure against sterling was at its peak, but then eased off slightly, until the Middle East fighting and resultant oil crisis developed in October.

The foreign exchange markets were calmer in 1974. More interest focussed upon the ending of the commodity price boom (affecting copper, as well as other commodities) and the slide into economic recession.

Sterling came under growing pressure in 1975 and 1976. The Saudi Arabian decision at the end of 1974 to take payment for oil in dollars, rather than sterling, was a major reason, but pessimistic forecasts about the UK economy, together with growing UK balance of trade deficits and declining official UK foreign reserves, all added to the gloom. From a peak of \$2.4268 in February 1975, the pound sterling fell in fits and starts to an exchange rate of only \$1.6060 in October 1976, before showing gradual signs of recovery.

LME turnover rose, also in fits and starts, during this period, reaching a peak in the second quarter of 1976 before stabilising

near 500,000 tonnes per month of trading until sterling stopped falling in October. From October 1976, until late 1977 the speculative pressures shifted away somewhat from sterling towards other currencies such as the US dollar, the Yen, the Deutschemark and the Swiss franc. At the same time, LME turnover fell back somewhat.

This brief survey of trading activity on the LME has inevitably had to compress the discussion of external factors and their influence upon the LME. Nevertheless, we can draw some conclusions. Firstly, the circumstantial evidence suggests strongly that foreign exchange speculation has a very significant effect upon turnover on the LME. When exchange rates are under pressure, turnover increases. Secondly, the evidence of the copper contract on the LME is that, among the major currencies, it is speculation against sterling that has had the most substantial impact upon turnover. Variations in LME turnover appear to be related also, albeit to a lesser degree, to speculation affecting European currencies other than sterling. The connection between variations in LME turnover and speculation against the US dollar is relatively weak.

The strength of the link with sterling speculation serves to reinforce our earlier argument that many companies and individuals are unwilling or unable to use the most obvious, and most direct, means of hedging against currency fluctuations - namely a straightforward purchase or sale of a forward contract for foreign exchange. For holders of sterling assets, with a reluctance about dealing directly in foreign exchange futures the use of the LME is understandable. By contrast, one should note that non-UK residents dealing on the LME typically combine a commodity hedge with a foreign exchange hedge. Therefore, they are familiar with the operations of foreign exchange futures markets, and are less likely to turn to the LME in times of foreign exchange uncertainty than are their UK counterparts.

CHAPTER V : TERMINAL MARKET PROCEDURES AND PRICE STABILITY

1. INTRODUCTION

The preceding chapters of this study indicate that it is no straightforward matter to assess the influence of terminal markets on the price stability of commodities. As long as terminal markets reflect the true balance of supply and demand in the physical market (together with implied judgements of the future balance), then a shift in the real market will elicit a response from the quotations on the terminal market.

In the event of such a change in circumstances, it is difficult to judge whether the terminal market 'over-reacts' and exacerbates instability. However, we saw in Chapter IV that speculation, on the part of trade and non-trade interests, is an integral aspect of terminal market business. In this chapter, we will examine whether the rules and operating procedures of terminal markets are such that the speculation necessary for market liquidity is potentially destabilising.

A strong a priori reason for suspecting that the procedures of terminal markets are potentially destabilising is the manner in which they serve to emphasise the markets' financial and 'paper' character. Although terminal markets are ultimately based on the useful properties of the commodities they deal in, it is possible to trade commodity contracts purely on the basis of expectations about movements in the price. Indeed, this is the whole *raison d'etre* of terminal markets - to enable one to cope with the problem of price fluctuations. The more sophisticated the market, the further removed from the world of the physical commodity become the operations possible. Viewed as a store of value, the commodity becomes merely one possible form of holding wealth, in the short-term or long-term, alongside equities, foreign currency, gold and other assets.

For this reason, problems in other markets, having little or nothing to do with that of the commodity concerned, can have an important effect on its price. Chapter IV indicated how, in the case of copper, fluctuations in terminal market trading on the LME were related to exchange rate instability. In general it is difficult to unravel the impact of the many and varied influences on a particular market. However, the example given in Section 3, below, provides a strikingly vivid and topical illustration of the way in which terminal market operating procedures can accentuate the degree of price volatility experienced by a particular commodity. But, before doing so, it is useful, first, to identify the most important procedures that may affect trading in commodity futures.

2. TERMINAL MARKET TRADING RULES AND PROCEDURES

There are many rules and procedures for trading on terminal markets, covering all aspects of conducting business. These include, not only the fixed times for official trading during which the exchanges prices are set, nor merely the quality specifications for an eligible commodity. Other aspects that are regulated include limits on the amount by which prices can rise or fall during a single trading session; for example, on the New York Cocoa Exchange the price of futures contracts can move by six cents per lb up or down on the previous day's settlement price - however, trading is limited to a maximum six cents trading range. The only exception permitted concerns the contract for the current month, which is used as a basis for day-to-day physical business. In this case alone, there is no limit on fluctuations after the first notice day of the month concerned. Terminal markets also have set procedures for taking delivery of contracts, e.g. on the LME the seller has the option of asking the buying to accept delivery from any LME warehouse where he owns metal, and the buyer pays the delivery costs.

In this section, however, we shall only examine in detail two trading procedures, the 'margin calls' of a broker and the 'stop-loss limits' of a commodity trader. These are the aspects of trading which are common to most terminal markets, and which have the most relevance for the purposes of an analysis of the relationship between speculation and price instability.

2.1 Margin Calls

When a futures contract in a commodity is purchased through a dealer on a terminal market, the buyer does not have to put up the full amount of money for the purchase until delivery is due. In the meantime, a "margin" or deposit is required by the broker against the value of the contract.

In those terminal markets where a clearing house system operates, the size of the margin will be determined by the clearing house. The clearing house is the ultimate guarantor of all trading conducted on the exchange, so it will decide upon a prudent safety level for margin deposits to protect itself against the risk of the client's inability to meet his commitments. In other terminal markets, such as the LME, where there is no clearing house and market dealers are themselves responsible for honouring contracts, margin requirements will still be demanded. However, they are set at levels determined by the broker himself, reflecting the creditworthiness of the individual client.

An examination of the margin requirements of copper contracts on Comex will illustrate some of the problems that can arise from this procedure. In May 1980, the margins required for speculative transactions were \$2500 per contract, and for hedge transactions, \$1500 per contract. (The lower hedge margin corresponds with the lower degree of risk; however, for this distinction to work, it is necessary that the motives for futures trading are accurately reported.) A Comex contract is for 25,000 lb of refined copper, which, at a copper price of 90 cents per lb, has a value of \$22,500. Therefore, the initial margin varies from just under seven per cent for a hedger to just over 11 per cent of the total value of the contract for a speculator.

By virtue of the system of margin requirements, the futures trader can purchase copper worth up to fifteen times the amount of his initial outlay. This is beneficial in the sense that few financial resources are tied up unproductively, but as we have noted above, it enables a speculator to gamble with futures contracts whose total nominal value is greatly in excess of the money he has immediately available. This becomes a problem when the market moves adversely, causing the speculator to incur losses if he tries to liquidate his purchases.

The Comex Clearing Association protects itself from the client's potential losses in such circumstances, by raising the margin requirement with a margin call. In the case of a purchaser of a forward contract, when the spot price falls below the contract price, the difference is deducted from the original margin paid. When this deduction reaches 25 per cent of the original margin, the Clearing Association makes a margin call for further deposits to bring the total back up to 100 per cent of the original margin, and thereby ensures that it holds an adequate financial reserve to guard against a possible default. For example, if the spot price fell to 87.5 cents per lb against the contract price of 90 cents, the original deposit of \$2500 (on a speculative futures purchase) will be raised to \$3125 - a 25 per increase.

This increase in margin requirements is a standard procedure for all commodity terminal market clearing houses. Evidently, when a speculator has built up a sizeable 'long' position (though the purchase of futures contracts), he could suddenly find himself with excessive demands on available cash when the market price falls. A striking example of the possible consequences for market stability are examined in the case of the silver market crash below.

2.2 Stop-loss limits

Margin calls are a means of protecting the clearing house or the commodity broker from over-exposure to the risk of financial losses. 'Stop-loss limits' play a similar role for the speculator.

The speculator wants to buy when commodity prices are at their lowest point and sell when they are at their peak. However, he cannot know when turning points in the cycle of prices have been reached. The speculator is willing to bear some losses from an adverse movement of prices, since this is in the nature of his business. Yet he cannot risk seeing a large proportion of the value of his assets wiped out.

For this reason, speculators set 'stop-loss limits' to limit the losses they are liable for, if prices move adversely. A simple example can be given for a speculator who has bought coffee futures and plans to sell the contracts again at a higher price. If the level of prices fall, instead of rising, the speculator will clearly be in difficulties. He may not be in a position to accept delivery of the coffee and hold it until prices rise again, either because of the short-term nature of his investment programme, or because he does not want the coffee market to tie up money which may be needed to meet possible margin calls or other requirements. Therefore he will give instructions for his broker to sell the coffee without further delay if it falls below a certain level. This latter price is called the 'stop-loss limit' for the speculator.

If coffee were purchased at £1800 per tonne, the stop-loss selling limit might be £1500. Evidently, if a number of speculators were in a similar position, then a fall in market prices brought about by excess supply in the market, could be greatly accentuated. As the price breached £1500, thousands of tonnes of coffee futures would be sold to prevent further speculative losses, and the price would be driven down further, and perhaps cut across other stop-loss selling limits.

An analogous case can be given for stop-loss buying, if the speculator had sold forward and has to meet his commitment with a purchase. Here, speculators would enter a rising market and exacerbate the upward movement of prices. These examples are illustrations of the way that the particular characteristics of terminal market trading can, and do, lead to market instability in the short run. Sudden sharp changes in price are magnified by stop-loss transactions; but it must doubtful whether stop-loss trading has a major impact upon the stability of prices averaged over one year or more.

3. AN EXAMPLE OF SPECULATION AND MARKET INSTABILITY

Stop-loss trading is not the only way in which margin requirements serve to accentuate short-run price volatility. Terminal market authorities have the power to vary the level of margins if they believe that the situation warrants it. A build-up in speculative activity is often a cause for such action; and the example which follows demonstrates how this can generate extreme variations in price.

3.1 Speculation in the Silver Market

Perhaps the most famous example of commodity market speculation in recent years was that in the silver market involving the Texas oil billionaire Nelson Bunker Hunt. Looking at the details of this case, we find a clear illustration of how speculation can distort a market.

It appears that Hunt, backed by Arab investors, attempted to acquire sufficient silver to drive up the price and make a vast profit. Hunt bought silver futures, predominantly through his broker Bache Halsey Stuart Shields, and took delivery of the contracts as they matured, so as to create a shortage of metal in the market. At one point, Hunt was reputed to hold 200 million ounces of silver, with his purchases facilitated initially by a margin requirement of only \$1000 on a silver contract for 5,000 ounces.

Although the underlying outlook for silver supply and demand suggested that prices would rise, Hunt's actions had an excessive impact upon the price of silver. It rose from \$6 per ounce in January 1979 to around \$50 by mid-January 1980. Political uncertainty in late 1979, due to the Russian invasion of Afghanistan and President Carter's decision to seize Iranian assets in the USA in retaliation for the holding of American embassy hostages in

Tehran, boosted the demand for precious metals. Asset holders moved their wealth out of currencies, real estate, shares, etc., into what seemed a safer store of value. Consequently, it was not clear how far the rise in the silver price was due to market manipulation. This was soon to become apparent, however.

In response to the speculative involvement in the silver market, margin requirements on Comex were successively raised from \$1000 per contract to \$20,000, to \$40,000 and finally, in January 1980, to \$60,000. This put considerable pressure on speculators in general, and Hunt in particular. Further pressure was exerted when, in late January this year, Comex imposed restrictions on silver trading. Individuals, such as Hunt, were allowed to take delivery of only 500 contracts per delivery month - reducing their ability to squeeze supplies; there was a temporary ban on new futures purchases and most traders were restricted to liquidations only.

The response of Hunt to the growing restrictions upon speculative trading on Comex was to arrange for swaps with leading firms of merchants to substitute stocks of metal held in Europe for Hunt's contracts in New York. However, Comex's actions proved effective in clamping down upon other speculative interest in silver. The immediate result of the January measures was a fall in the silver price to \$36 by the end of January, one week after the restrictions were imposed. The price fluctuated sharply over the next month and a half, although on a downward trend, as the considerable upsurge in the recycling of silver-containing scrap, brought on by the previous run up in prices, created a sudden surplus of silver supplies.

Towards the end of March, the silver bubble finally burst. Hunt announced that he was to issue silver-backed bonds. This led to a crisis in the market which took the news as a sign that, short of cash to meet his financial commitments, Hunt would soon offload some of his silver holdings. A fall in the

price resulted. Hunt's problems were compounded since the fall meant that Bache, his broker, made a £100 million margin call which could not be met with available cash. Hunt's ability to manipulate the market was destroyed and the price of silver collapsed.

The aftermath of the silver market crash was numerous losses among small speculators and broking firms - NRT Metals went out of business and Bache itself lost \$40 million - and a threat to the stability of the whole financial system, as fears grew as to which assets Hunt and others would liquidate to pay off their debts. Only Hunt's limited interests in commodities, other than silver, prevented the panic spreading. In the end, the US Federal Reserve Board had to endorse bank loans to Hunt, despite a policy of disapproving financial aid to speculators, to limit the possible repercussions.

After Hunt's strategy failed, the price of silver returned to more more 'normal' levels. However, it would be complacent to conclude that 'in the long run everything was all right'. Serious manipulation of the silver market took place for at least a year, and the fluctuations in price risked extensive damage to other markets too. The extraordinary measures implemented by the authorities to prevent excessive speculation finally brought the market to heel, but almost precipitated a major crisis.

CHAPTER VI : SUMMARY AND CONCLUSIONS

In this final chapter, we shall pull together the various strands of analysis presented in the course of this study, and examine the more significant developments affecting commodity marketing in recent years. First, we shall summarise the empirical evidence concerning the changes that have occurred in the level of terminal market trading and in commodity price volatility in recent years. Then, we shall analyse the sources of the growing trading activity on futures markets. Finally, we shall place the growth of terminal market trading within the broader context of the evolution of attitudes towards financial assets and the structure of commodity pricing systems.

1. COMMODITY PRICE VOLATILITY AND FUTURES TRADING : THE EMPIRICAL EVIDENCE

The evidence contained in the studies of individual commodity markets in Chapter II is not sufficiently uniform to enable one to derive totally unambiguous conclusions about the trend in commodity trading. However, one feature that is common to all the markets examined is a considerable increase in the volume of trading on terminal markets - both absolutely, and in relation to the quantity of the commodity produced. The total volume of trading recorded in futures contracts worldwide (including financial as well as commodity futures) grew over tenfold between the early 1960's and the late 1970's.

An important element of the growth in futures trading has been the introduction of new futures contracts, but old well-established contracts have also shared in the boom. Of the commodities studied in Chapter II, coffee holds the pride of place with a twenty-fold increase in futures trading, as a proportion of world production, between the early 1960's and late 1970's. Sugar, cocoa and copper all experienced a tenfold

increase; and even the laggards, lead and zinc, saw the volume of futures trading more than double.

The growth in futures market turnover has generally occurred alongside an increase in the price volatility of commodities examined. But this is harder to establish than one might anticipate. The difficulty is to avoid the distortions caused to measures of price volatility by the shifts in exchange rates and variations in the pace of inflation that have beset the world economy since 1960. Accordingly, we have calculated the volatility of the real prices of the commodities, using the UN price index for world manufactured exports as a deflator.

With the same deflator applied to all six commodities reviewed in Chapter II, one discovers that three - cocoa, coffee and zinc - experienced a strong increase in the coefficient of variation of price between the 1960's and 1970's. The other three either saw the coefficient of variation remain unaltered between the two decades - as in the cases of sugar and copper- or recorded a slight decrease in the coefficient of variation, as occurred in the single case of lead.

The price data used to calculate the coefficients of variation were all annual averages. Therefore, the coefficients of variation do not enable one to draw conclusions about the changing pattern of price volatility in the short run, when speculative influences would be expected to have their strongest impact. However, it would appear from a closer analysis of monthly price movements among some of the commodities included in Chapter II that the tendency for price volatility to increase between the 1960's and 1970's would have been more pronounced if monthly, rather than annual, averages were used as the basis for calculation.

2. SOURCES OF FUTURES TRADING

The reasons behind the growth of terminal market trading are discussed mainly in Chapters III and IV. But Chapter II introduces one important factor in the growth of futures trading, namely the increase in the obstacles facing administered producer pricing systems in the last twenty years. In the case of copper, first the non-US producer price system collapsed after a short-lived attempt to stabilise prices in the early 1960's, and then the US producers finally abandoned their own distinct pricing system in the face of an unprecedented build-up of stocks in the competing free market sector. For zinc, the experience was somewhat similar, with the European producers finding it virtually impossible to maintain an independent administered price against the background of a very depressed free market. It is interesting to note that, among the metals, aluminium, too, shows signs of shifting increasingly from an administered producer price basis to one governed by terminal market prices, although the causes lie in a shift in the structure of production and consumption, rather than in competition to producers from free market stocks.

Sugar, like aluminium, has experienced changes in the pattern of production and marketing that have increased the importance of terminal market prices. The US market has become more open to imports during the 1970's, at roughly the same time that the entry of Britain into the EEC forced a large tonnage of Commonwealth cane sugar onto the free market.

The growing proportion of commodity trading being conducted on the basis of prices determined on futures markets has inevitably given rise to an increase in the amount of terminal market trading being undertaken by producers, consumers and merchants for 'legitimate' trade reasons. The facilities provided by a terminal market for hedging price risks constitute the major single attraction for trade interests, and have undoubtedly

played a large part in raising the number of futures transactions completed by such interests. Although it is impossible to quantify the rate of growth in trade hedging, it is evident that the proportion of physical commodity trade that involves some degree of terminal market hedging has risen significantly over the past two decades. Producers and consumers have become more sophisticated about the opportunities offered by terminal markets, at the same time as the dangers of price instability have become more fully appreciated.

The increased liquidity and sophistication of terminal markets have also succeeded in attracting a rising volume of non-hedging 'legitimate' trade business into futures transactions. The ability of such markets to act as an efficient market of last resort has been an element in the growth of non-hedging business; but the most important single non-hedging reason for legitimate trade interests boosting their involvement in futures trading has been a greater recognition of the scope offered by terminal markets for assistance towards the financing of commodity stocks during a period when futures quotations are higher than the price of products available for immediate delivery.

Significant though the increase in 'legitimate' trade business on terminal markets has been, it has been overshadowed by the upsurge in non-trade dealings and in the speculative (i.e. 'non-legitimate') uses of these markets by trade interests. At one extreme, one has the rapid growth that has been observed in the involvement in commodity markets by investment funds, and other financial institutions, holding stocks of commodities for investment purposes. One way in which this arises is totally non-speculative, and consists of the intervention of banks in the so-called 'cash and carry' financing of surplus commodity stocks, under which banks merely use the terminal markets to earn the contango in the manner described in

Chapter IV. As we explain there, the sums of money tied up in commodities in 'cash and carry' business can be very considerable, approaching \$1,000 million for copper alone after 1974. The other, more speculative way in which investment funds have become drawn into commodity trading has been in the purchase and stocking of commodities as a long time investment. An informed estimate has stated that the value of the funds tied up in such funds in Europe has increased twentyfold since 1973 alone.

At the other extreme, one has traders whose interests are purely short-term and speculative. For such people, terminal markets offer three great attractions : the liquidity that they provide; the possibility of speculating on margin, with a very high rate of gearing; and the opportunity to speculate just as easily on falls as on increases in prices. The greater the volatility of prices, the greater is the scope for making money from terminal markets. Hence, the increase in volatility that has occurred since the 1960's will have increased the interest in speculating in commodities.

While it is possible to cite particular individual examples of the impact of speculation, such as the recent well-publicised case of the silver market (described in Chapter V), it is much harder to produce an analysis of the repercussions of speculative trading over a longer period. However, we believe that the detailed analysis, presented in Chapter III, of the interactions between the LME copper market and foreign exchange speculation has demonstrated two very important facts, which can provide a basis for generalising about the manner in which foreign exchange uncertainties have affected terminal markets. The first, derived from an examination of copper price movements at the time of the 1967 sterling devaluation, is the evidence that exchange rate speculation definitely does affect the level of commodity prices, at least temporarily. The

second, yielded by a study of LME turnover during the 1970's, is that the volume of futures trading is closely correlated with the degree of foreign exchange uncertainty, particularly relating to sterling. Combining these two facts, it is reasonable to deduce that foreign exchange speculation has affected commodity prices throughout the 1960's and 1970's. Furthermore, we would argue that the changeover from a fixed exchange rate regime in the 1960's to a system of floating rates in the 1970's, by increasing exchange rate uncertainty, has tended to increase the amount of speculative trading undertaken on commodity futures markets.

The only information that is published giving a measure of analysis of the origins of terminal market trading is that provided by the US regulatory agency, the CFTC. Unfortunately, the data is not available on a consistent basis for more than a few years, and most of the commodities for which there exist several years of comparative statistics are agricultural products, whose futures markets cater for a limited domestic US clientele. Virtually the only commodity for which data extend back to 1970, and which might be considered to attract a sizeable amount of non-US trading, is soyabeans. The details of the trading motives of those dealing on the Chicago Board of Trade are presented in Table 6.1.

The evidence of Table 6.1 is not as clearcut as one might have anticipated. The gradual decline in the proportion of business undertaken by large traders complicates the analysis somewhat, as do the sharp swings in the relative proportions of long and short positions held by speculators and traders. However, among the business transacted by the larger traders, the proportion accounted for by hedging, as opposed to speculative, buyers and sellers has tended to decline - from around 60 per cent in the early 1970's to near 50 per cent in the late 1970's.

Table 6.1: Analysis of Trading in Soybeans Futures on the Chicago Board of Trade

(Unit 1000 Bushels)
 Averaged Monthend Commitments of Traders in All Futures Combined
 By Fiscal Year

Fiscal Year	Average Monthend Open Interest	Reporting (Large) Traders												Price \$/tonne c.i.f. Rotterdam
		Speculative		Long and Short (Spreading)		Hedging		Total		Nonreporting (small) Traders		Short		
		Long	Short	Long	Short	Long	Short	Long	Short	Long	Short			
1970	188,337	9,611	13,921	49,169	49,178	92,292	79,288	151,072	142,387	37,305	45,990	117		
1974	255,975	8,593	13,851	61,045	60,841	136,798	115,158	206,850	189,850	49,539	66,125	227		
1975	244,056	8,166	17,935	64,940	64,645	125,054	102,666	198,160	185,246	45,896	58,810	220		
1976	373,004	17,451	10,961	137,442	136,907	128,911	149,305	283,804	297,253	89,200	75,751	231		
1977	485,905	42,455	15,382	157,765	157,374	155,696	204,507	355,915	377,264	129,989	108,641	279		
1978	510,221	28,651	12,301	122,881	123,197	169,006	196,258	320,598	331,755	189,623	178,466	268		

Average Monthend percent of Open Interest Held by Each Group of Traders

1970	100.0%	5.1	7.4	26.1	26.1	49.0	42.1	80.2	75.6	19.8	24.4	
1974	100.0%	3.4	5.4	23.8	23.8	53.4	45.0	80.6	74.2	19.4	25.8	
1975	100.0%	3.4	7.3	26.6	26.5	51.2	42.1	81.2	75.9	18.8	24.1	
1976	100.0%	4.7	2.9	36.8	36.7	34.6	40.0	76.1	79.7	23.9	20.3	
1977	100.0%	8.7	3.2	32.5	32.4	32.0	42.1	73.2	77.6	26.8	22.4	
1978	100.0%	5.6	2.4	24.1	24.1	33.1	38.5	62.8	65.0	37.2	35.0	

Sources : CFTC, IFS

3. THE ROLE OF TERMINAL MARKETS

The first two sections of this chapter have focussed upon the empirical evidence that can be gleaned from a study of terminal markets over the past two decades. Briefly the main conclusions can be summarised as follows:

1. Turnover on terminal markets has grown very rapidly.
2. The volatility of commodity prices quoted on terminal markets has tended to increase between the 1960's and the 1970's.
3. The non-speculative use of terminal markets by trade interests, such as producers, consumers and merchants, has increased steadily, mainly for hedging, but also for stock financing reasons.
4. One factor in the growth in non-speculative trading has been the decline in administered producer pricing systems for certain major commodities.
5. The volume of speculative trading on terminal markets has risen substantially.
6. Investment in commodities by non-trade interests has grown very rapidly indeed since the early 1970's.
7. Foreign exchange uncertainty significantly affects both commodity prices and the volume of trading on terminal markets.

Many questions flow from these conclusions, but the four listed below are paramount, and we will attempt to answer these in the remainder of this section.

- A. Has the growth in terminal market trading affected the long run trend price of commodities?
- B. Has the growth in terminal market trading (particularly that from non-trade sources) been the cause of, or merely a response to greater price volatility?
- C. Has the growth in terminal market trading improved the efficiency of commodity markets?
- D. How is the further growth in terminal market trading likely to affect commodity marketing arrangements?

3.1 The Long-Run Trend Price of Commodities

At first sight, it might be considered self-evident that greater terminal market trading in a commodity ought to have no effect upon the long-run trend price. It might be agreed that a greater volume of terminal market trading in what are essentially paper contracts would have no impact whatever upon the actual physical demand for the commodity being traded. However, this overlooks the fact that the increase in terminal market trading has also generated a modest increase in the stocks of physical commodities held by speculators and others, who have allowed themselves to take delivery of futures contracts once they matured.

To the extent that a growing terminal market turnover has led to an ever greater demand for the commodity itself, it will have tended to raise the long run trend price. The magnitude of

this price effect is probably not large, but it should be noted that the circumstances of the short-lived commodity price boom of late-1979 and early-1980 suggested that the effect cannot be entirely ignored. For example, the copper market found itself at the end of 1979 with a level of stocks which, in relation to the demand for copper, was, in historical terms, above normal. Yet, the copper price rose dramatically early in 1980 because it was felt that so much of the metal stockpile was held in firm hands, by people such as investors and speculators, that there was a real threat of a shortage of physical metal for consumers.

Against this, one must acknowledge that the growing importance of terminal markets has weakened the link between the magnitude of supply surpluses for a commodity and the stocks held, and financed, by producers. For reasons explained more fully in section 3.4, a shift towards the use of terminal markets as a pricing basis seems likely to increase the tonnage of stocks accumulated during a recession, and, hence, to extend the duration of the recession. Whether this price-weakening factor outweighs the price-raising effect, described above, is not yet clear.

3.2 Terminal Market Trading and Commodity Price Volatility

The causal connection between the growth in terminal market turnover and commodity price volatility is one which works in both directions. The greater the price volatility, the stronger is the attraction of a commodity for speculators, who seek to profit from short term price movements. Therefore, the general increase in commodity price volatility over the past two decades has undoubtedly attracted a greater number of speculators to the terminal markets. Furthermore, greater price volatility makes the hedging of price uncertainty more important than ever, and, hence, boosts the volume of hedging undertaken by trade interests.

The causality also runs in the opposite direction, as Chapter V indicates. In addition to the widely acknowledged bandwagon effect that is common to most outbursts of speculation and the examples already given of foreign exchange induced speculation, the operational procedures of terminal markets act so as to exacerbate instability in the short run, as margin calls and stop-loss orders come into play. In the longer term, the impact of terminal market trading upon price volatility is less certain. On the one hand, those factors causing instability in the short run may be expected to have some repercussions over longer periods; but against this is the commonly presented view that the involvement of large numbers of speculators in a market increases the efficiency of the market, and thereby reduces price fluctuations. This view is considered in the next section.

3.3 Commodity Market Efficiency

In certain respects, the increase in terminal market trading has undoubtedly improved commodity market efficiency. By boosting the "density" of trading and adding to market liquidity, the market is inevitably able to function more smoothly, with negligible price movements required to buy or sell large tonnages of the commodity being traded. The growth of the involvement by financial institutions in financing commodity exchange stocks, through the so-called "cash and carry" transactions, has also helped to improve market efficiency by limiting the size of the contango - the spread between spot and forward quotations - to a maximum of that payable by a top quality borrower, able to obtain the most favourable terms on short term credit.

Against these benefits, there is only one potentially serious loss of market efficiency to be faced. This is the rise in the risk premium that may, by virtue of the increase in price volatility, be demanded on loans and investments in the production

and consumption of the commodity in question. On balance, however, the gains appear most likely to outweigh the losses of efficiency.

3.4 Commodity Marketing Arrangements

The upsurge in terminal market trading has inevitably had some impact upon competing marketing systems. When commodity prices are weak, and an active futures market exists, terminal market quotations tend to be below the levels set under administered producer pricing arrangements, and so free market purchases grow at the expense of the volume sold at producer prices. When commodity prices are strong, however, and producer prices are typically well below those ruling on the free market, there is a strong temptation for producers to break ranks and align their selling prices with free market quotations.

The dilemma facing those producers who have so far resisted the enticements of terminal markets, as an alternative means of pricing and marketing their output, is a difficult one. On the one hand, terminal markets provide facilities for hedging price risks, they also act as a market of last resort, and offer scope for reducing the costs of stock financing. Moreover, government intervention to control administered commodity prices during times of inflation has tended to reduce producers' ability to benefit from upturns in the market: by switching to a rival terminal market pricing basis, producers escape government controls and would be entitled to expect, on the evidence of historical data, a significant increase in the average price received for their product over the business cycle.

On the other hand, the adoption of a terminal market pricing basis deprives commodity producers of much of their power to influence short and medium term movements in price. As we have seen, an acceptance of terminal market prices also implies an

acceptance of the destabilisation of prices in the short term by foreign exchange speculation, by practices such as stop-loss trading, and by shifts in the portfolio preferences of financial institutions. In effect, the acceptance of terminal markets as a basis of trading implies an acceptance of the new found role of commodities as a financial instrument, offering benefits in the form of liquidity and the prospect of capital gain, but reducing the importance of underlying real factors - e.g. supply and demand.

Other disadvantages of terminal market pricing systems are less readily appreciated, and take some time to emerge. The most important is the way in which terminal markets, by absorbing and financing surplus stocks from the market, remove a good deal of the pressure upon producers to reduce output during a downturn in demand. When demand weakens, a producer operating an administered price system experiences a build-up of his stocks. If the weakness persists, producers burdened with large and growing stocks, which they have to finance themselves, eventually act to halt the increase in stocks by reducing production. Thus, a producer pricing system adds the pressure of stock financing to the problem of low prices at times of weakness, and ensures a fairly prompt response by producers to a downturn in demand.

By contrast, the pressures brought to bear upon producers using terminal market prices during a period of weakness are restricted to those caused directly by low prices. An increase in producer stocks is much less of a factor, because producers can deliver surplus stocks onto a terminal market. Accordingly, the accumulation of stocks during a recession tends to be much greater under a terminal market pricing basis than under a producer pricing system, and the duration of the recession is extended correspondingly. In the case of copper, the growth of a terminal market pricing basis was undoubtedly a very important factor behind the increase in LME stocks after the 1974/5 recession, to a level over five times greater than that experienced in any previous; and these stocks overshadowed

and depressed the LME price until 1979.

The bias towards excessive stock accumulation is not the only way in which terminal markets are suspected of working against the interests of producers. Terminal markets are also believed to make it harder for producers to work in concert to stabilise prices. Defending a floor price is no harder in a terminal market than in any other, since there is only a finite surplus stock of the commodity to be bought and taken off the market.

The problem of futures trading is that such trading makes it much harder to defend a ceiling price. If a commodity's price looks capable of breaking through a price ceiling, there is a virtually limitless amount of money that can be mobilised by speculators (whose buying power is increased by the use of margins in futures trading) to defeat the attempts of producers to keep the price within reasonable bounds.

The picture that emerges can, therefore, be seen to be a confusing one. Terminal markets, with a combination of the stick and the carrot, are certain to make further inroads into areas now dominated by administered producer pricing systems, but by allowing this to happen, producers are renouncing much of their ability to influence and control prices. What is potentially more serious from their point of view is the apparent tendency of a pricing system based upon terminal markets to deepen and prolong a downturn in commodity prices.

Against this, one must acknowledge the benefits that an increasing use of terminal markets (together with the concomitant growth in speculative trading) bring to producers and consumers, in the form of hedging facilities and ready access to stock financing opportunities. Whether the long run interests of producers and consumers are best served by the

shift from the combination of advantages and disadvantages embodied in administered producer pricing systems to the combination contained in a terminal market basis of pricing is, unfortunately, still unclear.

© Copyright 1980

Printed and published by
The Commonwealth Secretariat

May be purchased from
Commonwealth Secretariat Publications
Marlborough House
London SW1Y 5HX

ISBN 0 85092 192 9

ISBN 978-1-84859-313-8



9 781848 593138