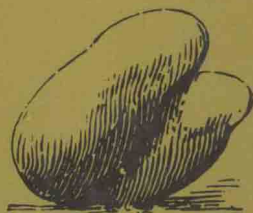




**THE ECONOMICS -
OF FUTURES TRADING
EDITED BY B A GOSS AND
B SYAMEY
SECOND EDITION**



The Economics of Futures Trading

*Readings Selected, Edited and
Introduced*

by

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Second Edition



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Preface

Several of the major futures markets of today have been established for about a century or longer. Yet the writings of economists on the operation and implications of futures trading were sparse until after the Second World War. It is true that notable publications appeared before 1945 – one thinks, for instance, of the studies by H. C. Emery, C. O. Hardy, J. G. Smith and G. Wright Hoffman. These early works tended to concentrate on descriptions and explanations of futures exchanges, the contracts traded in them and their trading procedures; and in the process they contributed materially towards the formation of analytical ideas about the economics of futures trading and its economic roles and consequences in terms of hedging and speculation. Mainly theoretical contributions came from J. M. Keynes, J. R. Hicks and N. Kaldor.

The volume of publication increased greatly after 1945. The post-war literature on futures trading has covered all aspects of the subject, from chronicles of events in particular markets to the construction and articulation of abstract theories of price behaviour and price relationships. Much of it was inspired (occasionally provoked) by the pioneering inquiries and writings of Holbrook Working, of the Food Research Institute, Stanford University, whose own publications straddle five decades.

In this book we present a selection of papers on futures trading, the majority published since 1945. The main emphasis in the selection is on more theoretical writings, although several mainly empirical studies are included. This bias in the selection reflects nothing more than the impact of two considerations: first, limitations of space tend to work against the inclusion of more empirical papers, which often are necessarily lengthy and also difficult to abridge for reprinting by the omission of whole sections; second, in our long introductory essay which precedes the reprinted papers it has been easier to incorporate briefly the main findings of empirical studies than to include satisfactorily potted versions of primarily theoretical work. Fortunately, analysis and empirical work have tended to go hand in hand in the study of futures markets, so that the distinction between theory and application is not a sharp one.

The first consideration – limitations of space – has a further consequence. It has not been possible to include examples of the work of all the leading contributors to the study of the economics of futures trading.

We trust it is not invidious to name H. Houthakker and L. G. Telser in this context as authors who have made notable contributions to the subject but are not represented in this book.

We are deeply indebted to those authors and publishers (acknowledged individually in the appropriate places) who have allowed us to reprint published material in this book. The publishers have made every effort to trace the copyright-holders but if they have inadvertently overlooked any, they will be pleased to make the necessary arrangements at the first opportunity. We are also in debt to numerous traders and market officials who have, over many years, supplied us with information and answers to our questions. Finally, we gratefully record our thanks to the Wincott Foundation, London, for a research grant which has greatly facilitated our work in preparing our introductory essay as well as the book as a whole.

B. A. GOSS
B. S. YAMEY

Preface to the Second Edition

In this second edition we have added a postscript referring mainly to recent contributions to the professional literature.

B. A. G.
B. S. Y.

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Introduction: The Economics of Futures Trading

The Editors

INTRODUCTORY

Futures trading in an organised commodity market or exchange consists of the sale and purchase of the commodity through the medium of highly standardised futures contracts (called futures) which provide for the delivery of the defined subject-matter at defined future dates. Futures contracts are contracts which provide for the delivery of the contracted goods; but in fact in many futures markets only a small proportion of all contracts are settled by actual delivery. Hence futures markets are sometimes also referred to as paper markets; it is possible to deal in futures without ever actually seeing or handling the physical commodity.

Futures trading has often been controversial, and has increasingly been brought under public control or supervision or been threatened with such measures. Public concern has focused on the supposed effects of futures trading (and of the speculation which it facilitates) on the level and movement of the prices of the traded commodities. Economists have been interested in futures trading for the same reason, and also, in more general terms, because of their interest in the efficiency of the inter-temporal allocation of resources. These markets have been attracting renewed attention because of growing interest in the effects of uncertainty on resource allocation as well as on the nature of information, search and transactions costs and their minimisation by means of special forms of contract and market institution.

Origins of futures trading

It has been claimed that futures trading originated as early as the seventeenth century in Amsterdam, in commodities such as grains, brandy, whale oil and coffee. John Cary, writing of Amsterdam in 1695, said: 'They invent new ways of trade, great quantities of brandy being disposed of every year, which are never intended to be delivered, only the buyer and seller get or lose according to the rates it bears at the time

agreed on to make good the bargains.¹ It has also been claimed that the practice developed independently and more or less contemporaneously in Japan.² But it is difficult to judge on the basis of the information now available whether and to what extent the early trading in commodity options and forward contracts resembled what is now understood by trading in futures. Clearing houses for the settlement of contracts do not seem to have existed.

The nineteenth century witnessed the development of the modern futures exchanges in Chicago, New Orleans, New York, Liverpool, London, Berlin and elsewhere. It seems that futures contracts typically evolved from less standardised forward contracts in situations in which merchants (including exporters and importers), processors and manufacturers were exposed to price risks in respect of stocks held or of forward sales commitments undertaken.³ As futures markets increased in number and range of commodities covered, so futures trading directly or indirectly influenced the production, storage, marketing and processing of larger volumes of domestically and internationally traded commodities and drew more 'outside' capital into these operations.

Present extent of futures trading

Today the great bulk of futures trading takes place in the United States. It has been estimated that in 1968 60 per cent of agricultural commodity production in the United States was of commodities for which there were futures markets.⁴ In all markets the volume of business, expressed in number of contracts, more than trebled between 1960 and 1970. About one-third of this increase was represented by trading in commodities for which no futures trading had been available in 1960.⁵ There is, or has been at some time since the Second World War, futures trading in the following commodities: aluminium, apples, barley, beef (dressed), beef (frozen boneless), bran, broilers (iced), burlap, butter, cattle (live), cocoa, coconut oil, coffee, copper, corn, cotton, cottonseed meal, cottonseed oil, crude oil, eggs (fresh), eggs (refrigerated), fishmeal, flaxseed, foreign currencies, gold, grain sorghums, hams (skinned), hides, hogs (live), lard, lead, lumber, molasses, mercury, middlings, nickel, oats, onions, orange juice concentrate, palladium, pepper, platinum, plywood, pork bellies (frozen), potatoes, propane, rice, rubber, rye, silver, shorts, shrimps (frozen), silver, silver coins, soybeans, soybean meal, soybean oil, sugar, tallow, tin, tomato paste, turkeys (eviscerated), wheat, wool, wool tops and zinc. The main exchanges are in Chicago and New York.

There is futures trading in a number of countries outside the United States. In Winnipeg there is trading in grain and gold futures. London at present has futures trading in cocoa, coffee, copper, cotton (since the demise of the market in Liverpool), grains, lead, rubber, silver, sugar, tin, wool tops and zinc; there was futures trading in shellac and

in various vegetable oils; and a market in soybean meal futures has started recently, in spite of a failed attempt to launch trading in fishmeal futures. Between 1965 and 1973 turnover on the major London exchanges increased from £1,200 million to £15,000 million – a large increase even when allowance is made for changes in the general level of prices.⁶ In continental Europe there are (or have been at some period since 1945) futures markets in Antwerp; Amsterdam and Rotterdam; Bremen and Hamburg; Milan; Le Havre, Paris and Roubaix–Tourcoing; and Lisbon. The commodities traded include cocoa, coffee, copra, cotton, grains, linseed oil, pepper, rubber, silk, sugar and wool tops.⁷

There was a cotton exchange in Alexandria, and there is one in Sao Paulo.

In Asia there is futures trading in India, Japan, Malaysia and Singapore, and an exchange has been planned to open in Hong Kong. In India there were in the 1960s a number of exchanges with futures trading covering cotton, groundnuts, various oil seeds, turmeric, copra, raw jute, jute goods and pepper, while futures trading in other commodities (such as cotton yarn and cloth, shellac, wheat and maize) had been banned officially (Natu, 1962). The list of traded commodities has shrunk with further prohibitions. In Japan there are nineteen exchanges, with futures trading in various types of beans, potato starch, sugar, cotton yarn, worsted yarn, rayon filament, rayon yarn, raw silk, dried cocoons and rubber. Futures trading in rice flourished in Japan until it was terminated by government in 1939. It has not been allowed to recommence. In Kuala Lumpur and Singapore there are futures markets in rubber.

Finally, there is a thriving market in greasy wool futures in Sydney, established in 1960.⁸

The establishment since 1945 of futures trading in additional commodities or in additional places reflects the entrepreneurial initiatives of particular exchanges, groups of interested traders or of firms or institutions providing clearing-house facilities. There have been great successes (as in soybeans and pork bellies) and some failures (such as that of the refined sugar market in Paris) as well as the contraction of some traditional markets, notably the cotton futures markets. In the aggregate, futures markets have attained unprecedented volumes of business in recent decades, paradoxically in a political environment which has often been hostile to them or critical of them.

CHARACTERISTICS OF FUTURES CONTRACTS AND MARKETS

Standardisation of futures contract

For each commodity in which there is a futures market there is a parallel market in which the trading in the actual physical commodity takes place.⁹ We refer to the latter as the actuals market, which need

not be organised or have trading centralised in a particular marketplace. Two main differences between trading in the two types of market may be noted, apart from the fact that a futures market is necessarily an organised market in which trading is confined to members of the market organisation or exchange. First, an actuals market contract and its contract terms can be tailor-made to suit the requirements of the two parties as regards grade of the commodity, quantity, place and time of delivery. In a futures market contracts are highly standardised in each of these respects. Thus, one cocoa futures contract for December delivery in the London market is in all respects interchangeable with another contract of the same delivery month. Second, contracts in an actuals market are settled between the parties in any manner agreed by them. In a futures market settlement of contractual obligations is almost invariably managed by the market or exchange authority or clearing house which interposes itself between the two parties; this settlement procedure is made possible by the standardisation of contracts.

Futures markets are wholesale markets. Individual contracts are for relatively large quantities, for example 5000 bushels of wheat, 27,600 lbs of choice steers, 18,000 dozen fresh eggs, £10,000 sterling, 50,000 lbs of copper, 10 flasks of mercury and 100,000 gallons of propane (all in United States markets).¹⁰ Futures contracts can be entered into for delivery several months ahead, the range being from twenty-one months for rubber in the London market to three months for the non-ferrous metals on the London metal exchange (where, however, there are arrangements available for the extension of a contract). In some markets, such as that for shell eggs in the United States, futures contracts for delivery in each month within the period covered are available for trading. In others, only certain months are delivery months, selected according to the requirements of the trade. In United States markets there are the same five delivery months for wheat, corn and oats, and seven for soybeans. The New York platinum futures contract is quoted for January, April, July and October, and the Sydney greasy wool contract for March, May, July, October and December delivery – in both markets up to eighteen months ahead.

Seller's options

A third major difference between contracts in an actuals market and contracts in a futures market is that in the latter the seller typically is given some options as to delivery, exercisable at his discretion. The presence of these options does not derogate from the standardisation of futures contracts, since all contracts of the same class have the same set of options. The options relate to grade, place and date of delivery.

Many futures contracts allow the seller to deliver either the specified contract grade (sometimes called the basis grade) or any one of a

prescribed list of deliverable or substitutable grades. For example, the Chicago wheat contract allows over twenty-five deliverable grades, the soybeans four and the corn three. The subject-matter of the present London copper wirebars contract is either electrolytic copper wirebars or high conductivity fire refined copper wirebars. But not all futures contracts allow substitutions, and most of the metals futures in fact are single-grade contracts. The New York nickel contract, for instance, relates to one grade only – new electrolytic nickel cathodes of a defined standard (though even here the seller can deliver the material in any one of a number of sizes).

Contracts usually give the seller a choice of delivery in one of a number of exchange-licensed warehouses or depositories either in a single locality or in several localities. The New York palladium and platinum contracts allow delivery in approved depositories in the New York metropolitan area within a radius of 50 miles from Columbus Circle. The nickel contract allows delivery in New York or Chicago. The two London tin contracts (high grade tin and standard tin) provide for delivery in an approved warehouse in 'either London, Birmingham, Manchester, Liverpool, Birkenhead, Hull, Newcastle-on-Tyne, Glasgow, Avonmouth, Swansea, Rotterdam, Hamburg (free port area) and Antwerp in seller's option'. Some sugar contracts include delivery points throughout the world. At the other extreme, the newly introduced New York crude oil contract specifies delivery in Rotterdam alone.

The typical futures contract refers to a particular month of delivery; and the seller is at liberty to make delivery on any day within the delivery month or a specified part of it, subject to giving appropriate notice of intention to deliver. Exceptionally a longer period of delivery is sometimes specified. When trading on the Liverpool cotton market was reopened after the Second World War, the futures contract allowed delivery within a two-month (instead of the pre-war one-month) period in recognition of the expected slow building-up of cotton stocks in the United Kingdom (Yamey, 1959). At the other extreme, the London contracts in the four non-ferrous metals now stipulate delivery on a single specified day (the 'prompt').¹¹ The Chicago foreign currency futures also require delivery on a single day (the third Wednesday of the chosen month), whilst, in contrast, the corresponding New York contracts allow delivery at any time within the delivery month.

Difference systems

Futures contracts allow the seller to exercise his choice of date of delivery within the permitted period without attracting any contractual premium or penalty. This is also true of most contracts as regards choice of precise place of delivery, although some contracts specify discounts payable to the buyer if certain of the permitted delivery locations are chosen. An example of the latter is the Chicago live cattle

contract: the contract delivery point is Chicago, but delivery in Omaha or Kansas City is optional, at discounts of 75 cents and \$1 per hundred-weight. However, where options as to deliverable grade are allowed, contracts almost invariably prescribe the receipt of premia from the buyer, or the payment of discounts to the buyer, according to the grade actually tendered.

The contract rules regulating grade of delivery mainly fall into one of two categories: the commercial difference system and the fixed difference system. The latter is by far the more common.

The commercial difference system is used in some cotton futures contracts.¹² The contract grade is deliverable at par. Other deliverable grades are deliverable at premia or discounts, determined daily according to the inter-grade price differences prevailing in the market for physical cotton (the actuals market). The premia and discounts fluctuate, therefore, according to changes in conditions in the actuals market. Drawbacks of the system are that the differences payable or receivable are not known in advance, and that the market authorities have to determine grade price differences in the actuals market, a determination which may lead to abuse and in any case may be difficult when activity in the actuals market is meagre and discontinuous or the market is not organised.¹³

A contract which incorporates the fixed difference system itself specifies the exact amounts to be paid on the delivery of the various non-basis grades. Thus the Chicago wheat contract lists eight grades deliverable at par, ten at a premium of 1 cent, one at a premium of .5 cents, and six at a discount of 1 cent a lb. The soybean contract has one grade at par, one at a 3 cent premium, and one at a discount of 2 cents or 5 cents according to whether the moisture content is below or above 14 per cent. The London copper wirebar contract makes electrolytic copper deliverable at par and the alternative high conductivity fire refined copper at a discount of £20 per ton.¹⁴ The first post-war Amsterdam cocoa contract named defined cocoas of several countries of origin as the basis of contract, specified a premium of 5 gulden per 100 kilos for superior types, and allowed delivery of two groups of inferior cocoas at discounts of 5 and 10 gulden respectively.

The fixed differences governing delivery of different grades are reviewed from time to time, so as not to become too far out of line with prevailing average relative prices in the actuals market. The rules of the post-war coffee futures market organisation in Hamburg provided for an annual review of the permitted grades and the applicable differences. In some markets the fixed differences are changed more frequently in the light of prevailing actuals market prices. Thus on the Sydney greasy wool market the differences governing delivery within a particular month are fixed on the first day of that month; the same practice is followed for the London wool tops contract. The more frequent the

revision of differences, the more closely does the fixed difference system in its effects approximate the commercial difference system.

Hybrid difference systems are to be found in some futures contracts. In the earlier Chicago eggs futures contract differences allowable to the buyer on the delivery of non-basis grades or descriptions were expressed in terms of specified numbers of eggs per case. The New York hides contract provides for percentage premia and discounts according to the average weight of delivered hides, modified to take account of the season of off-take. These premia and discounts are used to determine the total weight of hides to be delivered (i.e. a smaller net weight of superior hides and a larger net weight of inferior hides has to be delivered as compared with the 40,000 lbs of basis grade hides).

Implications of seller's options

A futures contract in which the seller has no options as to grade, place or date of delivery is considered undesirable because it would facilitate corners and squeezes. A buyer could accumulate a large holding of contracts of a particular maturity and at the same time gain control of the major part of the physical commodity eligible for delivery. He would then be able to squeeze the sellers of the contracts as the delivery date drew near. The resulting increase in actuals and futures prices would disrupt the market and serve no economic purpose. The broader the contract is based in terms of its seller's options, the more difficult it is for such manipulation to be feasible, since the volume of eligible supplies is increased.¹⁵ Historically, the introduction of grade and place of delivery options seems to have been designed primarily to reduce the risk of corners and of the development unintentionally of similar tight-supply situations. However, the range of deliverable grades in some modern futures contracts is almost certainly wider than is necessary to preclude such undesirable developments; and some apparently narrow-based contracts do not experience the apprehended difficulties.¹⁶ Moreover, in most futures exchanges the governing bodies have wide powers of intervention when manipulations or other untoward developments in the market are suspected or experienced. Thus, the rules of the London Wool Terminal Market Association allow sellers to deliver otherwise non-tenderable grades of wool tops or to defer delivery for one or two months (on terms announced) whenever the appropriate authority decides 'that a "corner" is in existence or threatened'.

The inclusion of seller's options, by reducing the risk of deliberate manipulation or of unintended technically tight delivery situations, serves directly to increase the attractiveness of dealing in futures contracts. Indirectly, a broadly drawn contract also widens the market in futures by making it less likely that contracts will be settled by the delivery of the physical commodity. Since the buyer is subject to the

risk that he may be delivered an unwanted grade of the commodity at an inconvenient time or place, a futures contract is ordinarily not suitable as an instrument for the acquisition of desired supplies of the commodity, and is not used for that purpose. Rather, it is used primarily by operators known as hedgers and speculators who are not interested in making or taking delivery in settlement of their commitments on futures contracts. Typically, obligations on one contract are discharged by means of a subsequent off-setting contract (a purchase being followed by a sale), price differences being dealt with by an appropriate monetary settlement. The availability and low cost of this latter alternative method of settlement, itself made possible by the standardisation of contracts and facilitated by the operation of clearing houses, attract hedgers and speculators interested in the futures market for enabling them to 'trade in price changes' and not for enabling them to dispose of or to acquire supplies of the physical commodity.

In most large-volume futures markets only a small proportion of futures contracts are settled by delivery of the actual commodity. Percentages below 1 per cent are recorded for commodities such as wheat, soybeans, cotton, potatoes, cattle, pork bellies and eggs in the United States. In the Sydney wool futures market deliveries are generally less than 2 per cent of total contracts made (Snape, 1968, p. 169); and low percentages have been reported in Indian markets.¹⁷ On the other hand, some futures contracts contain such limited seller's options that they approximate quite closely to actuals contracts and consequentially are used relatively more frequently as vehicles for the disposal and acquisition of physical supplies, especially as the rules of the exchanges or their clearing houses provide virtually cast-iron guarantees of contract fulfilment.¹⁸ Futures contracts in metals provide examples, although the range of delivery points included in the London non-ferrous metals contracts is some discouragement to buyers. Deliveries are relatively more frequent on the wool tops contracts on the Antwerp and Roubaix-Tourcoing exchanges than on the London exchange; this difference has been attributed to the narrower range of deliverable grades on the former contracts.

Settlement of contracts

Standardisation of futures contracts makes possible the use of economical methods for the transaction of business. No inspection of the subject-matter is necessary, and the individual buyer or seller need not seek out the trading partner most appropriate to his particular needs. Dealing is centralised in the exchange, and further economy is achieved by limiting hours of dealing. Trading normally proceeds on the basis of open outcry¹⁹ so that the market is sensitively responsive to changing market views, and bids and offers are quickly brought into equilibrium.

Transaction prices, as well as bid and asked prices, can be recorded publicly and transmitted readily.

In the typical futures markets there are arrangements which reduce the risks of default. Trading on the floor of the exchange is limited to members of the exchange, which can require general financial guarantees or otherwise screen new members for financial strength. Risks of default are further reduced, indeed virtually eliminated, by the operation of clearing houses. Most futures markets require futures contracts to be handled by a clearing house, whether owned and operated by the exchange itself or by an independent company.²⁰ In effect, the clearing house interposes itself between the seller and buyer of the futures contract, assuming the opposite position to each of the two parties. By requiring initial deposits from each party, and by requiring additional margins from the losing party to the extent that price changes adversely, the clearing house is protected against loss by subsequent default of either party; and each party need not concern himself with the financial reliability of the other party. At the same time the arrangements serve to minimise members' capital locked up in respect of uncompleted (i.e. open) contracts. Further, the clearing house is able to arrange the monetary settlement of price differences on off-setting transactions in contracts of the same delivery month. It is also well placed to organise physical deliveries on those expiring contracts which remain open at the end of the delivery period. The clearing-house mechanism therefore serves not only to facilitate the settlement of contracts by the making of off-setting contracts but also to facilitate the settlement of the minority of contracts where delivery is made.

Members of an exchange can trade on behalf of non-members, but they act as principals *vis-à-vis* the exchange and its members. Subject to the rules of the exchange and any government regulation, it is for the member (broker) to decide whether he should require deposits and additional margins from his various clients.

The standardisation of the futures contract, the method of trading in futures and the operations of the clearing house all contribute to economy in the performance of business²¹ and to impersonality in the making and settlement of transactions. Entry into the ranks of the users of futures markets, both hedgers and speculators, is thus facilitated. A well-functioning futures market is perhaps the closest real-world counterpart to the abstract model of a perfectly competitive market.

Design of futures contracts

In designing a futures contract choices have to be made in respect of the various terms of the contract. The choices made affect the market price of the futures contract relative to the prices of the various grades of the commodity in different actuals-market locations. Such price

relationships and changes in them are of critical importance to the practice of hedging; and the volume of hedging is of critical importance to the health of a futures market. Care has to be taken, therefore, in the initial design of a futures contract and its subsequent modification to meet changes in market requirements.²²

RELATION BETWEEN ACTUALS AND FUTURES PRICES

Three types of basis or futures–actuals price differences

The term 'basis' is used for the difference between the price of a futures contract and the price of the commodity in the related actuals market. Three types of basis or futures–actuals price differences may be distinguished: the price of the futures contract in its delivery month *less* the price of the commodity for immediate delivery (the so-called spot price) in the actuals market (here called the maturity basis); the price of a futures contract stipulating delivery in a future month *less* the spot price of the commodity in the actuals market (here called simply the basis); and the price of a futures contract stipulating delivery in a future month *less* the price in the actuals market of the commodity for forward delivery in that same month. If f is price in the futures market, and a is price in the actuals market, and the first sub-script refers to the date of delivery and the second the date of the price, the three types of basis are:

- (i) $f_{0,0} - a_{0,0}$
- (ii) $f_{i,0} - a_{0,0}$
- (iii) $f_{i,0} - a_{i,0}$

where i is a future date and 0 the present date.

It follows that at any time there are as many values of the second and third types of basis as there are different months for which futures contracts are quoted; and it is necessary to stipulate which forward month is being considered.

It follows also that, for each of the three types of basis, there is a separate value of basis for every grade of the commodity in every actuals-market location. Except where the opposite is indicated, we adopt the usual simplification of defining the actuals price a as being the price of the basis grade at the contract delivery point (that is, the grade and location which involve neither premium nor discount under the contract).

The maturity basis

In its delivery month the price of a futures contract tends to be approximately the same as the spot price of the underlying commodity in the actuals market. This tendency to equality is a consequence of the right of a seller of a futures contract to make delivery of the commodity and of the buyer (unless held by the exchange authorities to be engaged in