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NORMAL BACKWARDATION, FORECASTING, AND THE RETURNS TO COMMODITY FUTURES TRADERS†

INTRODUCTION AND SUMMARY

Two theories are advanced to explain the returns of speculators in commodity futures markets. One, the "theory of normal backwardation," views speculative returns as directly linked to the bearing of risk; the other, which we shall call the "forecasting theory," considers returns to be determined by the ability of speculators to forecast prices accurately. Although competitive, these theories are not mutually exclusive. This paper presents evidence on the extent to which each of these competing explanations may have been operative in United States commodity futures markets from 1947 to 1965.

The approach used here is similar to that employed by Professor Houthakker in his article "Can Speculators Forecast Prices?" (*3*). That is, the commitments of reporting speculators, hedgers, spreaders and non-reporting traders are obtained from Commodity Exchange Authority (CEA) data and are then multiplied by an appropriate price measure to obtain an estimate of that group's futures market return. The principal difference between this study and that of Professor Houthakker is the much broader coverage obtained here. While Houthakker had available approximately 324 monthly observations on three markets (cotton,[1] wheat, and corn) from 1937 to 1940 and 1946 to 1952, we make use of over 7,900 semimonthly observations covering 25 markets for the 18 years since 1947. This broader coverage makes possible much more conclusive inferences about the mechanism which determines the returns to speculators and the futures costs of hedging.

The quantitative arguments of this study use only the values of the variables and their first moments. The fact that the sign of the aggregate profit estimates presented in this paper is often critically dependent upon the results of a particular year and market is consistent with the existing evidence that futures prices

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[1] The data on cotton cover the full period from 1937 to 1952.

may be of the stable Paretian type and consequently have infinite variances. Therefore, neither estimates of variances nor significance tests are made. This is not unduly restrictive since the most important findings of the paper are concerned with the sign of variables, and in the fortunate cases where the wrong sign is encountered no measure of dispersion is required. In the less fortunate cases, the persuasiveness of the conclusions concerning the flow of profits must rest upon casual inspections of the consistency over markets and through time of the dollar value of the profit flow and upon the economic significance of these profits as measured by the rate of return on traders' holdings (average annual profits divided by the value of the outstanding contracts which the trader holds). Although it is possible to make significance tests without using second moments, limitations of funds and time prohibited this. Therefore the quantitative breadth of this study is gained at the cost of some statistical sharpness.

The first section of the paper defines the theory of normal backwardation and examines the different assumptions which are made concerning the forecasting ability of speculators. In its simplest form, the theory assumes that speculators: (1) are net long; (2) require positive profits; and (3) are unable to forecast prices. These assumptions may be satisfied if futures prices rise on the average during the lives of each contract, and this is the chief prediction of the theory. If speculators are assumed to be unable to forecast prices, it is appropriate to consider all of their profits to be a reward for risk-bearing and none to be a reward for forecasting. Consequently, advocates of this version of the theory contend that the profit flow between hedgers and speculators is analogous to the flow of insurance premiums between insured and insurer. Speculators, like insurers, are guaranteed an actuarial expectation of gain simply by being long. The amount of their gain depends only upon the size of their position (the amount of risk they bear) and not upon their forecasting ability.

However, because of the third assumption (that speculators are unable to forecast prices) it is possible to construct counter examples showing that the three assumptions are neither necessary nor sufficient to warrant the conclusion of rising prices.[2] More recent formulations of the theory of normal backwardation avoid these counter examples by dropping the third assumption and instead assume that speculators are able to forecast prices. They also contain a corollary that if speculators are net short prices must fall. These improvements in the theory, however, make the interpretation of speculators' profits ambiguous. Since profits depend upon forecasting ability as well as upon the quantity of risk borne, the insurance premium analogy is no longer adequate in itself. Determination of the proportion in which profits divide between a risk premium and a forecasting reward is the principal objective of this paper.

The second section of the paper briefly describes the data and estimation techniques used and presents the estimated profit flows both in terms of dollar values and rates of return. To facilitate reading, the text does not contain data classified by individual markets. Instead, three different market aggregations are used: (1) an "All Markets" total representing aggregation over all 25 markets; (2) a "Large Markets" total which includes only wheat at Chicago, cotton

[2] These counter examples involve fluctuating commitment levels for speculators. See page 112.

at New York and soybeans; and (3) a "Small Markets" total which excludes the three markets mentioned above. The reason for excluding these three markets is shown graphically on the abscissa of Chart 1A, page 124. Wheat at Chicago, cotton at New York and soybeans have such large average values of open interest that these markets can be meaningfully differentiated from all others. A complete set of tables for individual markets may be obtained from the author.

Inspection of the dollar value of profits and the rates of return before commissions indicates that the flow of profits in the three large markets is quite different from that in the 23 small markets. However, in both aggregations, large speculators make substantial and consistent profits. In the large markets small traders make positive but inconsequential profits so that the losses of hedgers become the profits of large speculators. In the small markets, however, it is hedgers who make positive but inconsequential gains with the result that the profits of large speculators come from the pockets of small speculators. It is a general characteristic of the results for all 25 markets that they are determined by what happens in the three large markets. Consequently, the overall 6 per cent profit rate of large speculators is financed by a modest 2 per cent rate of loss by hedgers. It should be noted that the true rate of return on investment for speculators differs grossly from the rate measured here due to the existence of very small (5 or 10 per cent) margin requirements. Finally, the rates of return on the long open interest tend to be symmetrically distributed around zero for the 23 smaller markets, whereas the rates of return in the three markets with the largest average value of the open interest are positive, and quite substantial.

Having measured the profit flow, we next attempt to determine the proportion of this flow which can be attributed to normal backwardation. This is done by defining normal backwardation as the returns which would accrue to a naïve speculator who is long when hedgers are net short and short when hedgers are net long. The magnitude of his positions is assumed to be proportional to the size of the open interest. An inspection of the naïve traders' returns yields two conclusions: first, the corollary to the theory of normal backwardation which states that prices should fall when speculators are net short is false—prices rise consistently under these conditions causing losses to short speculators; second, the rate of gain which accrues to the naïve speculator when he is net long is so small relative to the dispersion of that rate for different markets that we conclude there is no significant tendency toward normal backwardation in the markets investigated here. The dispersion of the rates of return by market for the naïve trader is plotted in Chart 2, page 127.

This failure to find any consistent evidence of normal backwardation implies the acceptance of the extreme alternative hypothesis that all important profit flows are to be explained in terms of forecasting ability. That is, the proportion of profits attributable to normal backwardation is zero. However, it is possible to define two levels of forecasting skill: first, an elementary ability which is called Basic Forecasting Skill; and second, a more sophisticated ability which is called Special Forecasting Skill. Basic Skill measures the ability of a group to be long in markets where prices rise over the total period of observation and short in markets where prices fall over the total period of observation. Special Skill, therefore, measures a trader's ability to forecast price movements whose

duration is shorter than the total period of observation. An examination of the results of this division of profit confirms the conclusion that it is the degree of forecasting ability which controls the flow of profits. We find that hedgers have negative values for both Basic and Special Forecasting Skills; small traders have a positive value for Basic Skill but an equally large negative value for Special Skill; and large speculators have positive values for both measures (1.3 and 4.8 per cent rates of return respectively). Thus large speculators, the only trading group to earn consistent and economically significant profits, acquire three-quarters of these profits because of their ability to forecast short-term price trends and only one-fourth because of their ability to forecast long-term price trends.

In summary, the evidence presented here indicates that it is forecasting ability and not the bearing of risk that determines the profits of speculators. While the theory of normal backwardation may be valid for particular markets under special conditions, it is not adequate as a general explanation of the flow of profits in commodity markets.

The fact that the gross profits of small traders are zero implies that they consistently make substantial net losses after commissions. Since this group is predominantly composed of small speculators, and since this group holds 46 per cent of the value of all contracts, the principal assumptions of the theory of normal backwardation are not met. Small speculators do not require an ex post history of profits in order to continue trading. There are at least three possible explanations of this. Small speculators are either risk seekers (and are consequently willing to lose money for the privilege of speculating); comprise a stable population of risk averters who are unable to forecast prices, but do not realize this; or finally, constitute a changing population of risk averters, in which the successful forecasters rise to become large speculators while the unsuccessful withdraw from the market and are replaced with new blood.[3] Unfortunately, we are unable to ascertain the relative validity of these hypotheses.

The implication of these findings with respect to the price effects of speculation may now be stated. The existence of a subset of speculators who are able to forecast price changes causes futures prices on the average to be an unbiased estimate of the ultimate spot price. In a modified form, however, this conclusion readmits a question which the theory of normal backwardation was thought to answer: why are large speculators consistently net long, even when we consider sets of markets where there is clearly no tendency for prices to rise?[4] Since large speculators own only a small fraction of all commitments, it is quite possible for them to be either net short or net long quite independently of the sign of net hedging commitments. The answer to this may be that even the more sophisticated speculators have an irrational preference for the long side. However, it may well be equally true that the distribution of price changes is asymmetric so that skewness and moments other than the mean influence the decisions of speculators to be net long.

That futures prices, on the average, are unbiased estimates of ultimate spot prices need not imply that this result holds either for all markets or for all time

[3] This explanation is stressed by Lester Telser (*8*, p. 407).

[4] Large speculators' long positions account for 11 per cent of the value of the total open interest while their short positions account for only 5 per cent. These statistics are presented in Table 2, p. 117.

periods within a market. As an example of the former, coffee futures prices (a market not covered by this study) have exhibited a strong upward tendency in the postwar period that is quite consistent with the theory of normal backwardation. As an example of the latter, this study shows that if hedgers are net long, futures prices tend to rise. Similar examples of temporary price bias conditional upon special conditions of time and market structure may be found in the papers presented by Lester Telser and Paul Cootner at this Symposium. Perhaps the principal value of this paper is that it puts into better perspective these, as well as other studies, which demonstrate the existence of price bias. The results presented here suggest that this evidence of bias is critically dependent both upon the markets which are selected and upon the special structural characteristics which determine any conditional price forecasts. In contrast, the overall generalization from the data investigated here is that the futures price is an unbiased estimate of the ultimate spot price.

THE ROLE OF FORECASTING IN THE THEORY OF NORMAL BACKWARDATION

The theory of normal backwardation predicts that under certain assumptions it is necessary on the average for the price of futures contracts to rise. Two of the assumptions of the theory as originally stated by Keynes (*5*, pp. 784–86) are that speculators be net long and be risk averters (that is, they require a positive history of profits if they are to continue trading). Under these circumstances, a rising trend in prices is the mechanism that rewards long speculators for the risks they bear.

To Keynes, the possibility that speculators may be better forecasters than hedgers is a "dubious proposition" (*5*, p. 785). This contention appears to be reversed in later formulations of the theory of normal backwardation by Hicks (*2*, p. 138) and Houthakker (*4*, p. 23). Since forecasting ability, or its absence, is a central theme in this paper, and since Keynes' position as stated in the *Manchester Guardian Commercial* is not very well known, an extensive quote from that source may be helpful (*5*, p. 785).

> In most writings on this subject, great stress is laid on the service performed by the professional speculator in bringing about a harmony between short-period and long-period demand and supply, through his action in stimulating or retarding in *good time* the one or the other. This may be the case. But it presumes that the speculator is better informed on the average than the producers and consumers themselves. Which, speaking generally, is rather a dubious proposition. The most important function of the speculator in the great organized "Futures" markets is, I think, somewhat different. He is not so much a prophet (though it may be a belief in his own gifts of prophecy that tempts him into the business), as a risk-bearer ... without paying the slightest attention to the prospects of the commodity he deals in or giving a thought to it, he may, one decade with another, earn substantial remuneration *merely* by running risks and allowing the results of one season to average with those of others: just as an insurance company makes profits....

In Keynes' version of the theory, it is the speculators' inability to forecast accurately that makes them dependent upon the incidental, and probably unan-

ticipated, rising price level to provide a positive history of profits. The assumption that speculators are unable to forecast prices makes it unambiguous to interpret whatever profits they receive as a risk premium paid to them by hedgers and not as a reward for forecasting. The postulation of "no forecasting" ability, however, raises problems concerning the prediction that prices must rise. If the level of the net short position of hedgers is subject to variations, it is possible for speculators to have a positive history of profits without prices rising on the average: for example, prices rise one unit in period one and fall one unit in period two, and speculators are net long two units in period one but only one unit in period two.[5] This, of course, implies that speculators do not correctly forecast the price fall in period two, which is quite consistent with the assumed absence of forecasting ability. The converse may also be shown: that is, a rise in prices need not result in profits for long speculators. Thus, the assumptions of the theory of normal backwardation are neither necessary nor sufficient for the prediction that prices rise.

The principal modification of the theory of normal backwardation made by Hicks and Houthakker is to assume that speculators are able to forecast prices. This distinction may be seen by contrasting the position of Keynes as stated above with that of Hicks in *Value and Capital* (2, p. 138).

> Futures prices are therefore nearly always made partly by *speculators*, ... whose action tends to raise the futures price to a more *reasonable level* (last italics mine).... But it is of the essence of speculation, as opposed to hedging, that the speculator puts himself into a more risky position as a result of his forward trading.... He will therefore only be willing to go on buying futures so long as the futures price remains definitely below the spot price he expects.... The difference between these two prices... is called by Keynes "normal backwardation."

It seems clear that while both Keynes and Hicks share the same prediction they do not agree upon the underlying model.

One consequence of granting speculators even a modest amount of predictive ability is that it frees the backwardation hypothesis from counter examples (such as the one stated above) that involve speculators being net long during periods when prices fall in a "predictable" manner.[6] Thus, the assumptions of the Hicks-Houthakker version of the theory necessarily imply that prices must rise on the average. However, this improvement in the logic of the theory is gained at a cost: the returns of speculators may no longer be viewed unambiguously as a reward for bearing risk. Rather they represent a mixed payment for forecasting and risk bearing, the proportions of the mixture being determinable only by empirical investigation. The view held by Keynes that the returns of speculators may be interpreted as an insurance premium, will be valid only if the forecasting component of profits is relatively small.

The empirical procedure originally planned for this study was first to mea-

[5] A version of this argument is used by Paul Cootner to support a "hedging pressure" theory of price movement (*1*, p. 400).

[6] For example, "hedging pressure" theories, where the direction of price change is directly related to the magnitude of short hedges, imply a lack of foresight by speculators who take positions early in the season that are inconsistent with the assumption of forecasting ability.

sure a normal backwardation component of profits and then define the difference between this amount and the actual returns as the forecasting component. Either component may be negative in value, but a negative backwardation component causes the selection of a distinctly different path of investigation from that caused by a negative forecasting component. For example, a negative value for forecasting profits, which is more than offset by a positive value for backwardation profits, would be quite consistent with the Keynesian version of the theory; negative forecasting ability is an admissible phenomenon. However, if backwardation profits are nonpositive, it necessitates the rejection of the theory and, hence, requires a different framework of analysis. In practice, we conclude that the backwardation component is zero and, therefore, adopt the position that forecasting ability is the only important determinant of profits. Although the last section of this paper divides profits into two components representing different degrees of forecasting skill, neither of these components is a measure of the profits attributable to normal backwardation. However, the significance of this division depends upon our first being able both to define an empirically meaningful measure of normal backwardation and show that its value is nonpositive.

It is convenient to discuss at this point two problems which arise in defining an empirical estimate of normal backwardation. The first problem arises when hedgers are net long rather than net short. The Keynes and Hicks formulations clearly assume hedgers to be net short. These authors, however, were concerned with the futures markets for international industrial commodities during the 1920's and 1930's when it may well be true that hedgers were consistently net short. On the other hand, the 25 markets covered by this study are predominately for agricultural commodities, and it will be shown that hedgers are net long for substantial periods of time. It is difficult to see any reason why the theory of normal backwardation in either its Keynesian or Hicks-Houthakker formulation should not be broadened to predict a price fall whenever hedgers are net long. This modification is sugested by both Houthakker (*4,* p. 22) and Cootner (*1,* p. 400).

The second problem concerns which weights should be used in aggregating over individual contracts and, a fortiori, commodities. There are at least three possibilities: (1) each contract may be given a weight of one; (2) each contract may be given a weight equal to the average value of the open interest in that contract (taken over all time periods during which that contract trades); and (3) each contract may be weighted by the actual open interest existing on that date. The first alternative, unity weights, gives undue importance to inactive contracts and commodities and need not be considered. The choice between alternatives two and three is more difficult. Numerous arguments can be made for either side. The most important consideration, however, would seem to be protection against misleading results caused by changing market structure. For example, although cotton at New York has the second largest average open interest value of any commodity, trading on this market is almost nonexistent by the end of the period. To weight the price performance of these last years with the large open interest that prevailed earlier could cause the same spurious results as applying a weight of one to all contracts and all time periods. Therefore, this

study measures normal backwardation as the sum of the return on the total long open interest when hedgers are net short and of the return on the total short open interest when hedgers are net long.

If this measure is to be used, what is its relation to the existing theories of normal backwardation? Normal backwardation describes the profits of marginal speculators who possess no forecasting ability. This is true whether we deal with Keynesian or Hicks-Houthakker versions. We may therefore conceive of normal bakcwardation as the return earned by a hypothetical speculator who follows a naïve strategy of being constantly long when hedgers are net short and constantly short when hedgers are net long. The naïve strategy used here requires that the hypothetical trader adjusts the size of his positions to maintain them as a constant proportion of the total open interest. In practice, the author's earlier work shows that the results of this strategy do not differ significantly from the results obtained when the trader is assumed to have positions of a fixed size (*9*, p. 114).

RETURNS TO FUTURES TRADERS

Description of the Data

Except for the "Commitments of Reporting Traders" for wheat at Chicago, Minneapolis, and Kansas City, all the data are taken from the annual U. S. Department of Agriculture Commodity Exchange Authority publication, *Commodity Futures Statistics*. Before 1962–63 *Commodity Futures Statistics* presents only aggregate commitments for all wheat markets. Professor Roger Gray, however, made available unpublished CEA statistics on wheat commitments disaggregated into the above three markets which are used in computing wheat profits. For cotton, separate New York and New Orleans prices and open interest are used, but the commitment data for both markets are combined. That is, it is assumed that the proportion of reporting speculators, hedgers, etc., for New York or New Orleans is equal to the aggregate ratio of reporting speculators or hedgers to the aggregate open interest totaled over both markets.

Only United States commodity futures markets regulated by the CEA are included in the above publication. This study therefore does not cover the unregulated markets such as tin, rubber, coffee, and cocoa which constitute approximately 20 per cent of total futures trading in the United States. Within the set of markets for which statistics are available, the only important market excluded is the one for grain sorghums. This exclusion is for computational convenience since the computer program cannot easily handle a market such as sorghums where reported positions do not continuously exist and where price units change.

The selection of the years covered is influenced by the desire to: maximize the number of postwar observations; have representative trading patterns; and have a reasonably stable general price level. All three of these criteria are satisfied by the period from July 15, 1947 to July 31, 1965. The year 1946–47 is not included because, as of July 1946, trading had not yet been resumed in some commodities. Therefore, it is not safe to assume that normal trading patterns existed during the period before July of 1947. From 1947 to 1965, the "wholesale price index for farm products" fell at an annual rate of approximately .5 per cent per year while the Dow-Jones "futures price index" fell at an annual rate of .7 per

TABLE 1.—DESCRIPTION OF DATA AND PRICE LEVELS

Commodity and markets[a]	Period of observation From	To	Number of semi-monthly observations	Change in price level of nearby contract[b] (*dollars*) Start	End	Annual percentage price change From start to end	Between maturity years
Wheat, Chicago Board of Trade	7/47	6/65	432	2.39375	1.42250	−2.3	−2.2
Wheat, Kansas City Board of Trade	7/50	6/65	360	2.30375	1.43500	−2.3	−1.6
Wheat, Minneapolis Grain Exchange	7/50	6/65	360	2.36125	1.59750	−2.2	−2.5
Corn, Chicago Board of Trade	7/47	6/65	432	2.30375	1.32250	−2.2	+1.4
Oats, Chicago Board of Trade	7/47	6/65	432	1.02000	.67750	−1.9	−5.1
Rye, Chicago Board of Trade	7/47	6/65	432	2.52000	1.15750	−3.0	−1.6
Soybeans, Chicago Board of Trade	7/47	6/65	432	2.78000	2.96000	+ .36	− .7
Soybean meal,[c] Chicago Board of Trade	7/47	6/65	432	87.50	71.10	−1.0	−12.0
Soybean oil,[d] Chicago Board of Trade	7/50	6/65	360	.1245	.1008	−1.3	−3.1
Cotton, New York Cotton Exchange	7/47	6/64	408	.3898	.3328	− .9	−2.8
Cotton, New Orleans Cotton Exchange	7/50	6/60	240	.3569	.3278	− .8	−4.3
Cottonseed meal, Memphis Merchants Exchange Clearing Association	7/47	6/60	312	79.90	54.00	−2.5	−9.4
Cottonseed oil, New York Produce Exchange	7/47	6/65	432	.2350	.1232	−2.6	− .6
Lard, Chicago Board of Trade	7/47	6/62	360	.1960	.0870	−3.7	−1.6
Flaxseed, Minneapolis Grain Exchange	7/50	6/62	288	3.7150	3.1900	−1.2	+2.0
Shell eggs, Chicago Mercantile Exchange	7/47	6/65	432	.5262	.3490	−1.9	− .1
Frozen eggs, Chicago Mercantile Exchange	7/61	6/65	96	.2635	.2687	+ .5	−4.6
Potatoes, New York Mercantile Exchange	7/47	6/65	432	2.96	2.58	− .7	+5.0
Wool tops, Wool Association of the New York Cotton Exchange	7/47	6/62	360	1.570	1.666	+ .4	−4.7
Grease wool, Wool Association of the New York Cotton Exchange	5/54	6/63	257	1.413	1.190	−1.7	− .2
Bran, Kansas City Board of Trade	7/47	6/56	216	58.50	33.20	−4.8	−7.8
Shorts, Kansas City Board of Trade	7/47	6/56	216	60.00	38.90	−3.9	−9.8
Middlings, Kansas City Board of Trade	7/55	6/56	24	37.00	35.15	−5.0	−3.4
Onions, Chicago Mercantile Exchange	9/55	6/59	91	2.10	1.30	−9.5	−1.0
Butter, Chicago Mercantile Exchange	7/47	6/53	144	.6775	.6120	−1.6	−2.4

[a] "Large Markets" are wheat at Chicago, cotton at New York, and soybeans.
[b] The nearby contract is the first contract that expires after the first observation, generally it is July.
[c] Soybean meal is for the Memphis Merchants Exchange Association until July 1953.
[d] Soybean oil is for the New York Produce Exchange until July 1950.

cent.[7] This magnitude of price changes is sufficiently small that we may neglect the influence of unanticipated changes in the general level of prices as a determinant of the returns to futures trading.

However, due to differences in coverage, references to general price indexes are not a sufficient indication that unanticipated price changes did not occur. In particular, the Dow-Jones "futures price index" includes a number of industrial commodities not covered by this study. Information on price behavior in the markets covered here is contained in columns four through seven of Table 1.

[7] The "wholesale price index" is taken from *10*. The Dow-Jones "futures price index" is from the Wall Street Journal for the trading days July 15, 1947 and June 29, 1965. (The respective values are 148.73 and 129.75.)

Columns four and five show the first and last price quotations in the "nearby contract" (that is, the first contract expiring after the first observation; generally, the July contract). Column six is the average annual percentage price change of this contract during the period of observation: that is

$$\frac{(P_{end} - P_{start}) / P_{start}}{\text{Number of years}}.$$

Since this measure shows that price *levels* fell in 22 out of the 25 markets, and many by substantial amounts, it might be argued that prices during the period under study are not sufficiently stable to support the analysis being made. Column seven is included in order to nullify that contention. This column gives the percentage change in price (of the contract quoted in columns four and five) that occurs between the time the contract matures at the end of one year and the time when it begins trading in the following year. The percentage figure is obtained by summing this difference over all years and dividing by the initial year: that is, $[\Sigma_y(P_{y+1} - P_y)] / P_{start}$ (the percentage change may be greater than 100). This is a measure of the amount of price change that took place between contract years and is therefore "forecasted" by traders in that market. For 14 out of 25 markets the "forecasted" price declines are greater than the actual declines. This means that for over half the markets prices rose, on the whole, during the periods that the contracts actually traded. These figures, of course, use only one contract in each market. A 25-market aggregate index of price changes, in this one contract, using the values of the total open interest in each market as weights, shows that the price level for the entire period falls at an average annual rate of 1.2 per cent. However, the average annual decline in the price level that occurs between the expiration date of the old contracts and the initiation of trading in the new contracts is 1.9 per cent. This evidence is consistent with the predictions of a model which assumes normal backwardation and perfect forecasting ability. While these results are not as convincing as a stable, weighted index of the contracts traded would be, they do indicate that unanticipated price change does not distort importantly the normal profit flow during this period.

Except for grease wool and onions, all markets are covered from July 15 to June 30. In these two markets, data for the first two or three months of the initial year are not available; the alternatives are either to begin with the first available observation or disregard these observations and begin on the next July 15. Since the first available observation is close to July 15, the former procedure is followed.

Estimation of Traders Commitments and Returns

One of the most important difficulties in using the CEA statistics is that they do not present data on traders' commitments cross-classified according to contract month. That is, we know what the total open interest is and we know how it is divided among trading groups and contract months, but we do not know the joint distribution.

Therefore, we follow Professor Houthakker's example (*3*, p. 144) and assume that the percentage distribution of the commitments of each trading group by

contract month is equal. This is equivalent to assuming that the distribution of the total open interest according to trading groups and according to contract month is statistically independent. To estimate profits we first estimate the mean open interest for each contract as a simple average of the initial and terminal open interest two weeks later; and second, we multiply this quantity measure by the change in price during the period ($P_{t+1} - P_t$) to obtain an estimate of profits. In addition to this measure of the dollar profits, a measure of the value of the open interest for each contract is obtained and is subsequently used to convert dollar profits into rates of return.

Distribution of the Open Interest

Table 2 exhibits the percentage distribution of the value of the total open interest aggregated over all available time periods, from 1947 to 1965 according to trading groups. Net spreaders are frequently omitted because the net positions of this group are small and not the concern of this study.

These statistics on the distribution of the open interest may be used for three purposes: first, and of greatest importance to this study, they indicate whether hedgers are net short on the average and whether large speculators tend to be on the same side of the market as hedgers or that of non-reporting traders; second, they show the balance which exists between the long and short positions of any trading group (that is, they provide a measure of the homogeneity of a group's positions); and third, they indicate the "exclusiveness" of the large speculator category. With regard to this last use, if, for example, in one market the sum of the long and short positions of large speculators is one-tenth that of non-reporting traders, it suggests that in this market the large speculators are a more elite group than they are in another market where large speculators' positions

TABLE 2.—VALUE OF GROUP COMMITMENTS AS A PERCENTAGE OF THE VALUE OF THE TOTAL OPEN INTEREST

Trading groups	All Markets	All Markets	All Markets
Non-reporting (small) traders			
Small traders, long	54	51	53
Small traders, short	42	33	39
Reporting (large) traders			
Large speculators, long	9	13	11
Large speculators, short	4	6	5
Spreaders, long	20	14	18
Spreaders, short	20	15	18
Hedgers, long	17	21	18
Hedgers, short	33	45	38
Net commitments			
Small traders	12	18	14
Large speculators	5	7	6
Hedgers	−17	−24	−19
Spreaders[a]	0.1	− 0.4	− 0.1

[a] Used only to maintain accounting balances.

are just equal to non-reporting traders' positions. This distinction is important because the CEA reporting level for traders imposes a somewhat arbitrary dichotomy of traders, and it is therefore necessary to remember that the "exclusiveness" of the large speculator category does vary from market to market and also through time. Such a reservation is not so important for hedgers, because there is evidence that most hedgers' positions are above the reporting limit so that nearly all hedging is contained in the reporting hedger category.[8] This also implies that the non-reporting trader category, for practical purposes, may be considered as a small speculator category.[9]

From the statistics presented, it can be forcefully concluded that both non-reporting traders and reporting speculators are net long, and that reporting hedgers are net short. The only important exception to this conclusion is cottonseed meal. Cottonseed meal exactly reverses the normal pattern; but this phenomenon is easily explained as the outcome of a spreading operation whereby speculators offset long positions in soybean meal with short positions in cottonseed meal. Frozen eggs also deviate from the normal pattern, but only for reporting speculators. In this case the net short position of reporting speculators may be explained in terms of the large negative value of the rate of return on the long open interest.

Although large speculators and small traders are both consistently net long, there is a clear difference between the ratio of short to long positions for non-reporting traders, and for reporting speculators. The short to long ratios for non-reporting traders in the Small, Large and All Markets aggregates are 65, 78, and 74 per cent respectively. While the corresponding ratios for large speculators are 46, 44, and 45, and for hedgers the long to short ratios are 47, 52, and 47. These results are reasonably consistent over markets.

It is to be concluded, therefore, that reporting speculators' and reporting hedgers' positions are more unbalanced than those of non-reporting traders. This, in turn, suggests that the expectations of large speculators are more homogeneous than those of small speculators.

The relatively small proportion of total commitments held by large speculators is evidence that this group is an elite subset of the speculative population. Summing both long and short commitments, large speculators' holdings are less than one-fifth of the value of small traders' holdings. Since the average size of their commitments is much larger than that of small traders (perhaps by a factor of at least 10), the proportion of speculators classified as large is apt to be less than 2 per cent of the total population of speculators.

Aggregate Profits

Table 3 presents aggregate profits for the various trading categories according to the Large, Small and All Markets categories. For the All Markets total, the long position profits of each trading group is positive. About two-fifths of the 752.9 million dollar total return on the long open interest goes to non-reporting traders, and the remainder divides rather evenly among the other three groups. The distribution of short position losses is similar to the distribution of long

[8] For a discussion of this evidence see 7.

[9] The terms "reporting speculator" and "large speculator" are used synonymously as are the terms "non-reporting trader" and "small trader." The equivalence of the category "small speculator" and "non-reporting trader" (or "small trader"), however, is only approximate.

TABLE 3.—AGGREGATE PROFITS BY TRADING GROUPS: LONG, SHORT, AND NET
(*Million dollars*)

Trading group	Large Markets		Small Markets		All Markets[a]	
	Long	Short	Long	Short	Long	Short
Small traders	369.7	−303.6	−68.1	− 1.4	301.6	−305.0
Reporting speculators	114.8	3.1	38.8	22.2	153.5	25.3
Reporting spreaders[b]	159.0	−159.6	5.5	− 3.4	164.5	−163.1
Reporting hedgers	108.1	−291.2	25.4	−18.8	133.5	−310.1
Total long open interest[a]	751.4		1.5		752.9	
Small traders, net	66.1		−69.5		− 3.4	
Reporting speculators, net	117.8		61.0		178.8	
Reporting hedgers, net	−183.2		6.5		−176.6	

[a] Due to rounding, totals are not necessarily exact sums of components shown.
[b] This category is included only for balance purposes. The sum of the net positions is not zero because of its omission.

position profits in that two-fifths is borne by small traders; it differs in that reporting speculators make profits on the short side as well as the long. Thus, short hedgers bear two-fifths of the short side losses but receive only one-fifth of the long side gains.

For the Small Markets, reporting long hedgers and speculators make about equal amounts: the total of these two groups is equal to the losses of long small traders. Given that long small traders make profits in the 25-market aggregate, it is surprising that they have losses in the 23-market aggregate. On the short side, only large speculators make money and their total is roughly equal to the losses of the short hedgers. The total return on the long open interest in the 23 small markets is essentially zero.

In the Large Markets, almost half of the long side profit goes to non-reporting traders, and the remainder splits about evenly among the other three groups. The short side loss pattern differs from the long side gain pattern in that large speculators make some positive profits and the short position losses of hedgers are more than twice their long position gains. In marked contrast to the inconsequential Small Markets return on the total long open interest, this measure for Large Markets is sizable (751 million dollars) and explains virtually all of the 753 million dollar total for the 25-market aggregate.

Turning now to the net returns presented in the bottom three rows of Table 3, the most striking feature of the All Markets column is that the short side losses of small traders more than offset their long side gains causing this group to show a small net loss. The gains of large speculators are won, therefore, almost entirely from hedgers. In the 23 small markets, however, this result is reversed. Hedgers show a small net profit and the sizable gains of the large speculators are made from the small traders.[10]

[10] Statistical significance tests performed on the first differences of the annual net profit flows by trading groups from 1947 to 1963 reveal that only the net profits of large speculators are significant at the .05 level. This result holds for both the Large and All Market series. The only other potentially significant figure is the amount of the losses of small traders in the Large Markets, and it is only significant at the .20 level. For more detail see C. S. Rockwell (*9*, p. 84).

TABLE 4.—ANNUAL PROFITS FOR ALL MARKETS
(*Million dollars*)

Year	Small traders, net	Large speculators, net	Hedgers, net	Total
1947/48	16.2	19.5	−34.2	115.9
1948/49	−13.5	− .5	13.8	− 48.2
1949/50	7.9	17.0	−24.9	153.3
1950/51	47.5	28.9	−76.1	229.5
1951/52	−10.5	7.8	2.7	126.2
1952/53	−44.3	− 4.3	46.4	−171.9
1953/54	12.8	16.3	−29.7	113.4
1954/55	−17.0	5.1	12.0	− 27.7
1955/56	2.5	12.7	−15.5	73.9
1956/57	− 6.4	6.5	− .1	5.8
1957/58	− 9.4	.9	8.4	− 27.4
1958/59	− 3.6	1.4	2.5	− 3.7
1959/60	−14.6	4.5	10.2	− 38.3
1960/61	63.3	35.2	−98.6	217.8
1961/62	−19.4	− 5.4	24.8	− 95.9
1962/63	− 3.6	2.1	1.6	50.5
1963/64	−24.1	10.0	14.1	− 75.0
1964/65	13.0	21.2	−34.1	155.0
Total	− 3.4	178.8	−176.6	752.9

Consequently, we note again that it is the profit flow in the three large markets that determines the behavior of the 25-market aggregate. In particular, the losses of hedgers in these three markets are large enough not only to provide profits to large speculators, but also to provide profits to small traders sufficient to offset their losses in the remaining 23 markets.

The temporal consistency of the profit flows may be judged from Tables 4 and 5. These two tables present annual profits on the total long open interest and for net trading groups for the All Markets and Small Markets aggregates respectively. For the 18 years, the All Markets results show negative profits for small traders in 11 years, positive profits for large speculators in 15 years, and negative profits for hedgers in 8 years. The consistency of large speculators' profits and small speculators' losses is notable. The same characteristics hold for the 23 small markets.

Rates of Return

An economically more meaningful description of the profit flow may be made in terms of the average annual rate of return earned by traders on their invested capital. Ideally, profits should be stated net of commissions and taxes, and invested capital should include "safety reserves" as well as margin requirements. As a proxy for this true rate of return, we use the ratio of gross profits to the dollar value of the contracts held.[11] Omission of commissions causes a serious

[11] The dollar value of a contract is obtained from the product of three factors: price per unit, units per futures contract, and the number of futures contracts held. This value is imperfectly linked to total marginal requirements which the exchanges alter only at discreet intervals to reflect major changes in price levels, price volatility, and, at times, trading activity.

TABLE 5.—ANNUAL PROFITS FOR SMALL MARKETS
(*Million dollars*)

Year	Small traders, net	Large speculators, net	Hedgers, net	Total
1947/48	− 3.3	7.1	− 3.8	46.6
1948/49	−12.5	− 1.2	13.8	−53.7
1949/50	6.7	6.0	−12.8	32.3
1950/51	25.4	13.3	−37.4	73.2
1951/52	−10.6	2.2	8.0	27.1
1952/53	−27.3	− .9	26.2	−78.5
1953/54	− 2.3	5.2	− 3.7	14.0
1954/55	−11.4	1.6	9.8	−18.5
1955/56	− .3	5.6	− 5.2	7.5
1956/57	− 8.3	1.3	6.9	−24.2
1957/58	− 5.0	.4	4.3	−10.3
1958/59	− 1.6	1.8	.4	3.2
1959/60	− 6.2	4.6	1.7	−21.8
1960/61	7.3	3.1	−10.4	39.3
1961/62	−16.8	− 4.8	21.7	−63.8
1962/63	.9	2.4	− 3.2	23.1
1963/64	−11.2	1.9	9.1	−47.0
1964/65	7.3	11.6	−18.8	53.1
Total	−69.5	61.0	6.5	1.5

upward bias in the results for all groups. This bias is apt to be strongest for nonreporting traders who have the greatest relative overlap of long and short positions and who are least likely to own a seat on the exchange. However, the use of the value of the contract in the denominator introduces a gross understatement of the true return. Actual margin requirements are only 5 or 10 per cent of the contract value and, even after allowing for a one-to-one "safety reserve," the true rate of return would be five to ten times larger than that measured here.

Therefore, the principal use of the rate of return variables defined here must be in comparing the relative profits of different trading groups and not in making judgments about absolute values. If, however, large speculators (who generally may be presumed to have a seat on the exchange and a consequent low commission rate) show a rate of return over, say, 5 per cent, it does suggest their true rate may be 25 per cent a year or more. A figure of this size does indicate a large absolute return. Moreover, we may also say something about the absolute size of hedging costs. Since hedgers are offsetting existing or planned positions in the cash market (which are presumed equal to the dollar value of their futures holding), our rate of return is a direct measure of the gross cost of placing a year-long hedge. It is a gross cost because commissions and the bid-ask differential are omitted. This rate may be compared with the merchandising margins of hedgers to indicate the extent to which the futures cost of placing a hedge is a deterrent to hedging. Rate of return data for trading groups and the three different market aggregates are presented in Table 6.

For All Markets, the rate of return on the long open interest is 4.0 per cent

TABLE 6.—AGGREGATE RATES OF RETURN BY TRADING GROUPS
(*Per cent*)

Groups and positions	Large Markets	Small Markets	All Markets
Total positions			
All groups	6.1	0.0	4.0
Small traders, long	5.6	−2.0	3.0
Small traders, short	− 5.8	−0.0	−4.1
Large speculators, long	10.1	4.3	7.6
Large speculators, short	0.5	5.0	2.7
Hedgers, long	5.3	1.7	3.8
Hedgers, short	− 7.1	− .6	−4.3
Net positions			
Small traders, net	0.6	−1.2	−0.0
Large speculators, net	7.2	4.6	6.1
Hedgers, net	− 3.0	0.1	−1.7

per year, a fairly substantial magnitude. Looking at the long positions of the three trading groups, it is notable that hedgers have virtually the same rate on their long positions, 3.8 per cent, as is earned on the total open interest. Consequently, since the large speculators' return of 7.6 per cent is greater than the return on the total open interest of 4.0 per cent, non-reporting traders receive less than that, 3.0 per cent. On short positions, both hedgers and non-reporting traders do slightly worse than the average, enabling large speculators to actually earn a positive rate of profit of 2.7 per cent, even though the trend in prices is against them.

The rates of return on net positions are quite diverse.[12] We noted earlier that: (1) non-reporting traders are consistently net long; (2) prices rise on the average; (3) and, paradoxically, the absolute profits of non-reporting traders are, nevertheless, essentially zero. The answer, of course, must be that their rate of loss on short positions is sufficiently larger than their rate of gain on long positions to nullify any benefit they receive from being net long. In a similar fashion, hedgers do slightly worse on both long and short positions than do traders as a whole. This factor is not as important a contributor to their net rate of loss of 1.7 per cent as is the simple fact that they are net short by a two-to-one margin. The size of hedging cost suggested by a rate of return of −1.7 per cent is not inconsequential, but it is substantially less than many experts have suggested. The most striking feature of the net rates of return is the absolute magnitude of large speculators' returns, 6.1 per cent. Recalling that a multiplier of from five to ten is required to obtain a true rate of return on investment, this suggests that the true rate may be as high as 25 to 50 per cent. This large return is a consequence of two facts: large speculators tend to have high rates of return for both long and short positions; and their ratio of long to short positions is large.

The most significant feature of the rates of return for Large Markets and Small Markets separately is that in total the positive rate of return for All Mar-

[12] The rate of return on net positions is defined as the sum of aggregate profits on long positions divided by the total value of long and short positions.

kets is due solely to conditions in the three large markets where it reaches 6.1 per cent. In the 23 smaller markets it is essentially zero. This, of course, results in there being a nearly zero cost of hedging in the Small Markets but a 3 per cent cost in Large Markets. Other features for these two sets of markets are similar to those found for All Markets: non-reporting traders do worse on their long positions than average traders; hedgers do worse on their short positions than average traders; and large speculators do substantially better than average on both their long and short positions.

The final evidence on rates of return is given in Chart 1. These four scatter diagrams plot the rate of return for each of the 25 markets and for the All Markets total as a function of the average value of open interest in those markets. The abscissa values are, therefore, identical for all charts. There are separate plots for the total long open interest, and the net rate of return for small traders, speculators, and hedgers.

Chart 1A shows the scatter for long open interest. If the three largest markets are excluded, the rates of return are seen to be distributed around zero with considerable symmetry. The symmetry between positive and negative rates of return is broken when the three largest markets are included: all three have positive values, and the magnitudes for soybeans and cotton at New York are substantial. Thus, different hypotheses may be needed to explain the rate of return in the three largest markets and the 22 smaller markets.

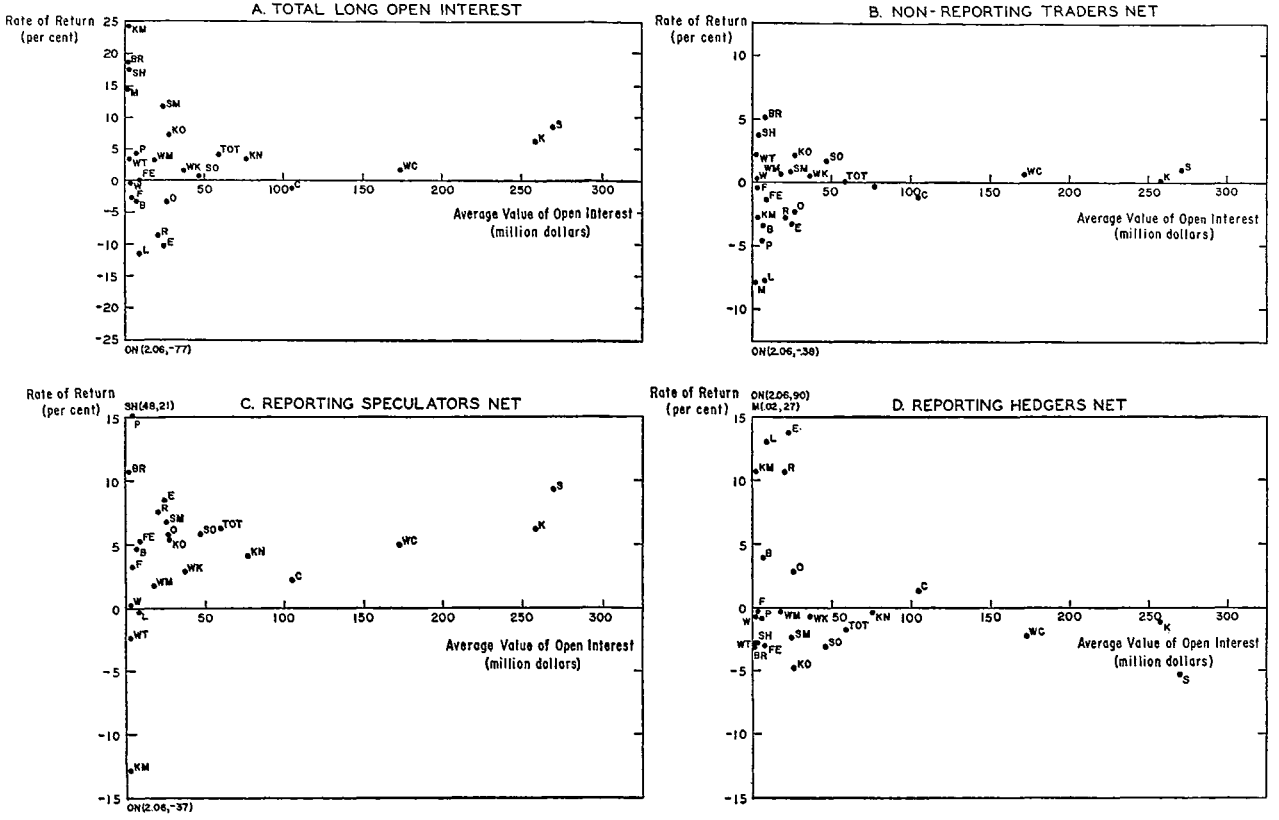
As expected, Chart 1B, showing the scatter for the net rates of non-reporting traders, is a "squashed" version of Chart 1A. The rates of return in All Markets tend to be reduced because of the offsetting long and short positions and because of the relatively low rate of return on long positions.[18] Chart 1B also tends to be more symmetrical than Chart 1A and much less distorted by the effect of the three large markets. This symmetry around zero offers convincing evidence that the lack of profits of small traders cannot be explained by an atypically poor performance in a few markets offsetting satisfactory profits in most markets.

The scatter for reporting speculators, Chart 1C, is quite different from either of the preceding two scatters. The rate of return for the three largest markets has improved; but what really attracts attention is the lack of markets with significant negative rates of return. Only cottonseed meal and onions are exceptions, and the peculiarities of each of these markets have already been discussed. Thus, positive rates for large speculators are as consistently reflected when we disaggregate over markets as they are when we disaggregate over time.

Chart 1D exhibits the results for hedgers. It is essentially a mirror image of Chart 1A. This is a consequence of hedgers being net short and earning a rate of return on long and short positions approximately equal to that on the total open interest. However, this mirror image characteristic is not satisfied for hedgers' extreme negative returns, although it is well satisfied for extreme positive values. That is, for the four markets with the largest negative rates of return on the total open interest (onions, lard, shell eggs, and rye), the positive rates of return of net hedgers are almost equally as large as the return for all trading groups. On the other hand, for the five markets with the largest positive rates

[18] To provide partial visual compensation for the effect of offsetting long and short positions, Charts 1B–D are plotted with ordinate units one-half of those used in Chart 1A.

Chart 1.—Net Rate of Return Compared with Average Value of Open Interest, for Selected Trading Groups on Specified Markets*



* Market symbols:

WC—Wheat, Chicago	O—Oats	SO—Soybean oil	L—Lard	P—Potatoes	SH—Shorts
WK—Wheat, Kansas City	R—Rye	K—Cotton, New York	F—Flax	WT—Wool tops	M—Middlings
WM—Wheat, Minneapolis	S—Soybeans	KN—Cotton, New Orleans	E—Eggs, shell	W—Grease wool	ON—Onions
C—Corn	SM—Soybean meal	KM—Cotton meal	FE—Eggs, frozen	BR—Bran	B—Butter
		KO—Cotton oil			TOT—All market total

of return on the total open interest (cottonseed meal, bran, shorts, middlings, and soybean meal), the negative rates of return of net hedgers are less than one-fourth of the return for all trading groups. The cause of this can be determined from an inspection of the distribution of long and short positions by markets. For the four markets where prices fell more rapidly, hedgers' net positions are highly unbalanced in favor of the short side. In contrast, for the four markets where prices rose most rapidly, their net positions are highly unbalanced in favor of the long side. This suggests that, although hedgers do no better than average on the whole, they do have a knack for forecasting and profiting from extreme moves in prices.

The results presented in this section may be summarized by two conclusions. First, reporting speculators make significant profits on their long and their short positions. Their net profits are significant both from the point of view of consistency from year to year and market to market, and from the point of view of the magnitude of the rate of return. This cannot be said for small traders, whose returns are essentially zero and are negative if transaction costs are considered. The net costs of hedging are negative, but not large, and the important losses are concentrated in one market, soybeans.

Second, excluding the three largest markets, the rates of return on the total open interest are symmetrically distributed around zero. For the three large markets, however, there is a tendency toward positive returns on the total long open interest. In these large markets there is a 6 per cent average return on the total open interest.

DETERMINANTS OF THE RETURNS TO FUTURES TRADERS

The Role of Normal Backwardation

If normal backwardation is defined as the returns which a naïve speculator earns by keeping his commitments long, in proportion to the total open interest when hedgers are net short, and short, in proportion to the total open interest when hedgers are net long, then the rate of return on the total long open interest, presented above, is closely related to the rate of normal backwardation. However, it is necessary to multiply profits in a given market by minus one for each period that hedgers are net long in that market.

Table 7 presents a comparison of profits on the long open interest, for all periods with profits on the long open interest when hedgers are net long. As explained previously, profits which accrue while hedgers are net long are subtracted from total profits to obtain the measure of profits used in computing the rate of normal backwardation (or more exactly, twice the profit for periods hedgers are net long must be subtracted from the profit for all periods). The theory of normal backwardation predicts that the subtrahend will be negative so that profits after the subtraction will be larger than they were before. Line four of Table 7, "Dollar profits on long positions when hedgers net long," shows with great force that the theory of normal backwardation is not supported by the data. The profits for both large and small markets are positive, not negative. Given that hedgers are net long only 15 per cent of the time, the magnitude of the profits is sizable. Indeed, not only is the sign of profits inconsistent with the theory of normal backwardation, but also the rates of return for all three aggregations are

TABLE 7.—COMPARISON OF TOTAL RETURNS AND RETURNS WHEN HEDGERS ARE NET SHORT AND NET LONG

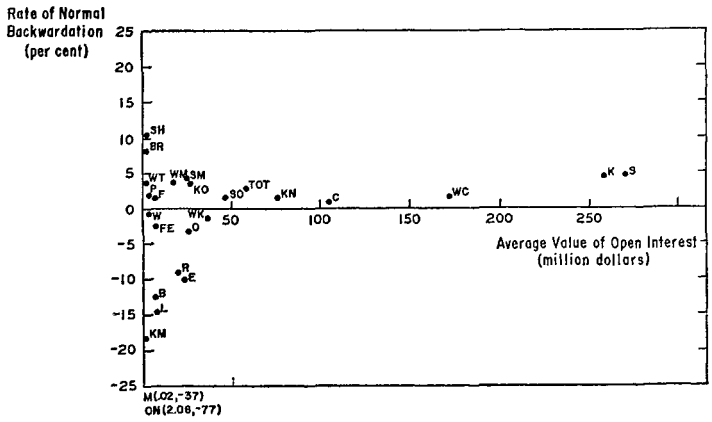
Item	Large Markets	Small Markets	All Markets
Percentage of periods hedgers net long	25.2	13.5	15.4
Dollar profits on long positions (*Million dollars*)			
Total	751.4	1.5	752.9
When hedgers net short	619.5	−25.6	593.9
When hedgers net long	132.0	27.0	159.0
Profits due to normal backwardation	487.5	−52.6	434.9
Percentage return on long positions			
When hedgers net short	6.1	− 0.4	3.7
When hedgers net long	6.3	4.0	5.7
Rate of normal backwardation	4.0	− 0.8	2.3

greater when hedgers are net long than when they are net short! Thus, an adjustment for the sign of net hedging results in a reduction in the rate of normal backwardation for Large, Small and All Markets to 4.0, −0.8, and 2.3 per cent respectively.[14]

Although we must reject the prediction that prices fall when hedgers are net long, it is still possible that the theory of normal backwardation is supported when we aggregate over all time periods. Since hedgers are net long only 15 per cent of the time, the successful performance of the theory of the remaining 85 per cent could easily lead to a correct overall prediction. Chart 2 plots the rate of normal backwardation against the average value of the open interest for each market. The scatter is similar to Chart 1 except that the mean for All Markets is reduced from 4.0 to 2.3 per cent, and a negative skew is introduced. Although the mean is still positive, both its small magnitude and the fact that normal backwardation is negative for 11 out of 25 markets must lead to the conclusion that a tendency toward normal backwardation is neither a consistent nor an important general characteristic of futures markets. In fact, only one of the 14 markets with positive measures of normal backwardation (shorts at 10.1) has a return in the 10 per cent or more range postulated by Keynes (6, p. 143). In contrast, there are six markets with negative returns of an absolute magnitude greater than 10 per cent.

[14] The sign of net hedging used in all of the above computations is the signs of the difference of the average size of hedgers' long positions less the average size of their short positions for each period and market. That is, $\frac{Q_2^L + Q_1^L}{2} - \frac{Q_2^S + Q_1^S}{2}$. This is consistent with the general definition of profits as $\Delta P \left(\frac{Q_2 + Q_1}{2} \right)$. However, to test the sensitivity of our conclusions against alternative definitions of what constitutes "when hedgers are net short," we also computed dollar profits according to whether hedgers are net long or short at the beginning of the period. That is, according to the sign of $Q_1^L - Q_1^S$, the results are that the total long open interest profits are 488 million dollars when hedgers are net short, and 284.9 million dollars when hedgers are net long. Consequently the profits attributable to normal backwardation are 203.1 million dollars. The results are sensitive, but even more unfavorable to the theory of normal backwardation.

CHART 2.—RATE OF NORMAL BACKWARDATION COMPARED WITH AVERAGE VALUE OF OPEN INTEREST, FOR SPECIFIED MARKETS*



* For definitions of market symbols, see note on Chart 1.

The conclusion of this section is that: normal backwardation is not characteristic of the 23 smaller markets either when hedgers are net long or net short; and it is characteristic of the three larger markets only when hedgers are net short. The theory clearly does not have general applicability for all futures markets and it is questionable whether an analysis of variance performed over the 25 markets would indicate a single market with a positive return significantly greater than zero.

The Role of Basic and Special Forecasting Skills

In this section the rates of return of net trading groups are partitioned into two components: one, a reward defined as Basic Forecasting Skill; and the other, a residual component defined as Special Forecasting Skill.

The decomposition is performed in the following manner. Let V_m^L and V_m^S be the total value of a trading group's long and short commitments, in a single market m, aggregated over all time periods, and let R_m be the rate of return on the long open interest in that market. Then, any net trading group's rate of profit attributable to Basic Forecasting Skill is given by

$$R_m^B = \frac{R_m(V_m^L - V_m^S)}{V_m^L + V_m^S}.$$

Denoting the group's actual rate of return by R_m^A, we then obtain the measure of Special Forecasting Skill as a residual of $R_m^F = R_m^A - R_m^B$.

Aggregation over any set of markets is accomplished by computing

$$R^B = \frac{\sum_m R_m(V^L - V^S)}{\sum_m (V_m^L + V_m^S)} \text{ and } R^F = R^A - R^B.$$

The measure R_m^B will be positive when R_m is positive and the group is net long on the average $(V_m^L - V_m^S > 0)$, or when R_m is negative and the group is net short on the average $(V_m^L - V_m^S < 0)$. Thus, this measure of Basic Skill is dif-

ferent from that proposed by Professor Houthakker (*3*, pp. 148–49). He measures the presence of Basic Skill in terms of the intercept coefficient of a regression of the quantity of commitments upon the change in price. If the intercept is positive, that is, if the expected value of a group's commitments is positive when price change is zero, then a trading group is said to exhibit positive Basic Skill. This, of course, is only proper if the theory of normal backwardation is correct in that prices do rise on the average. However, the conclusion reached in this paper is that there is no important tendency for prices to rise, and, consequently, such a definition of Basic Skill is misleading. The measure used here defines Basic Skill as the ability to be net long on the average in markets where prices rise on the average, and to be net short on the average in markets where prices fall on the average. This measures the long run ability of a trading group to stay on the profitable side of the market. Special Forecasting Skill, defined as a residual, measures the success with which a trading group varies its position, from year to year and period to period, to profit from short run price trends (that is, from price trends whose duration is shorter than the total period of observation).

We may conclude this discussion of definitions by noting that both Houthakker's measure of Basic Skill and the one employed here seek to measure the extent to which traders' returns can be adequately described by a simple naïve strategy of being constantly on one side of a market. The remaining profits may then be interpreted as reflecting the traders' ability to forecast shorter price trends, and this is defined as Special Forecasting Skill. The definitions of Basic Skill differ because this study finds that normal backwardation is not a general characteristic of futures markets: therefore, it is more useful to use the actual trend in prices in defining the naïve trading strategy than to use the hypothetical returns that are predicted by a theory of normal backwardation, a theory which is not consistent with the data.

Table 8 shows that small traders exhibit a consistent negative value for Special Forecasting Skill, R^F. This measure is negative for both the Large and Small Markets aggregates and for 18 out of the 25 individual markets. While the absolute negative magnitude of R^F appears small, this is partially due to the fact that the positions of this group are almost balanced and consequently the denominator term $V_m^L + V_m^S$ is large. The only important profits for small traders occur in the three large markets where rising prices reward them for being net long so that Basic Skill R^B, is positive.[15]

For large speculators, the situation is quite different. They have positive values of R^B and R^F for all three market aggregates. Nearly four-fifths (79 per cent) of their total profits, however, are due to Special Skill and only one-fifth to Basic Skill. The conclusion must be that the substantial profits of large speculators are not an automatic return for simply being on the correct side of the market, but instead a reward for forecasting. This is confirmed on an individual market basis where the R^F variable for reporting speculators is positive for 22 out of the 24 markets.

[15] This return occurs in the manner predicted by the theory of normal backwardation; but the variable R^B cannot properly be construed as the rate of normal backwardation since it contains long position profits earned while hedgers are net long.

TABLE 8.—DIVISION OF RATE OF RETURN ACCORDING TO BASIC AND SPECIAL FORECASTING SKILLS BY NET TRADING GROUPS

(*Per cent*)

Trading and skill groups	Large Markets	Small Markets	All Markets
Small traders net			
R^F	− .1	−1.2	− .4
R^B	.7	.0	.4
R^A	.6	−1.2	− .0
Large speculators net			
R^F	5.0	3.9	4.8
R^B	2.2	.7	1.3
R^A	7.2	4.6	6.1
Hedgers net			
R^F	− .9	.8	− .6
R^B	−2.1	− .7	−1.0
R^A	−3.0	.1	−1.7

The profit dichotomy for hedgers is not of great interest due to their offsetting commitments in the cash market. However, the positive value of .8 for R^F is consistent with our observation on page 126 that hedgers are able to adjust the balance of their positions in response to major price movements in order to reduce their losses.[16]

CITATIONS

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6 ———, *A Treatise on Money,* Vol. II (New York, 1930).

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[16] The sum of a group's long and short commitments is used as divisor in Table 8 to obtain the rate of return on net positions. This makes cross-group comparisons of R^B and cross-group comparisons of R^F misleading because of differences in the short to long ratio among groups. Calculations based on the rate of return to the "marginal" traders in each group (using the denominator $/V_m^L - V_m^S/$) yield the following percentage results for all markets:

Trading group	R^A	R^B	R^F
Small traders, net	− .1	2.1	− 2.2
Large speculators, net	12.9	2.8	10.1
Hedgers, net	− 4.2	−2.6	− 1.6

8 Lester Telser, "Returns to Speculators: Telser versus Keynes: Reply, *The Journal of Political Economy,* August 1960.

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10 U. S. President, *Economic Report of the President: 1966* (Washington, D.C., 1966).