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PRICE EFFECTS OF A LACK OF SPECULATION

ABSTRACT

The theoretical proposition that profitable speculation is price-stabilizing is not subject to *direct* empirical testing in the context of commodity futures markets. The reasons for this are twofold: (1) if all commodity futures trading is viewed as speculation, then this is a zero-sum game which moots the question of profitability; yet (2) if only that trading which is classified as speculation, in contradistinction to hedging, be considered, then the stabilizing effect is seen to be *indirect,* since it is the hedgers who perform the relevant temporal reallocation of stocks.

Evidence of the price effects of speculation in commodity futures contracts is therefore sought in terms of the facilitation of hedging. A convenient and important case is provided by the three active American wheat futures markets—at Chicago, Kansas City, and Minneapolis. It is demonstrated here that the two latter markets, with low levels of speculation, are able to absorb the hedging positions which come to them only because substantial speculation is transfused from Chicago, through spreading. Evidence is also adduced to show that this spreading responds directly to hedging pressures, instead of reflecting price forecasts. Vocational speculation, by floor members of the commodity exchanges, also reflects the anticipation of hedging requirements.

Although the data do not allow direct estimates of hedging costs, they strongly support the conclusion that these costs are lower on those markets having more speculation. The conclusion as to the price effects of speculation in commodity futures is then that with ample speculation there is no price effect, whereas the price effect of speculative deficiency is substantial.

INTRODUCTION: THEORETICAL CONSIDERATIONS

While this theory has posted some seemingly clear guidelines, the evidence for the price effects of speculation in real markets is rather limited. This situation may owe something to the very plausibility of certain theoretical propositions—the need for empirical verification is obviated by intuition. Thus if one accepts Friedman's proposition, that profitable speculation necessarily stabilizes

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prices (*3*, pp. 157ff.), as having a high degree of generality, then it would "only" require a demonstration that certain speculative activity is indeed profitable to establish this salutary price effect; whereupon interest in the problem may flag owing to an intuitive trust in the market to guarantee this contingency. Unfortunately for this comforting conclusion, the theoretical proposition is at best not all embracing; "speculation" is not as easy to identify in given institutional settings as it is to define in the abstract; "stabilizing" may have different meanings, and there is a widely held belief, perhaps itself intuitive, that "speculation" (whatever that means) must be "destabilizing" (whatever that means). It is not altogether clear whether Chamberlin, for example, had in mind different concepts of "speculation" and "stabilization," or simply a divergent intuitive grasp of the situation from Friedman's, when he wrote that "Although speculation *may* actually stabilize prices, the writer is at a loss to find any a priori reason why it should do so, or why it should lead to the ultimate establishment of the equilibrium price.... Indeed, it seems more likely that speculation would cause more and greater fluctuations" (*1*, p. 29). It seems clear, however, that a recent influential empirical test in one institutional setting took a Chamberlinian interpretation as its point of departure in arriving at the conclusion that "floor traders (in the stock market) are generally buyers in rising markets and sellers in declining markets ... their trading, as a result, is inimical to the orderly functioning of the market, tending to accentuate rather than stabilize price movements" (*9*, p. 24). Yet buyers in rising markets (and sellers in declining markets) can either make or lose money, depending upon whether they are buyers in low markets and sellers in high markets, which question is of course begged (*11*). And even had the right question been asked in terms of price *variability*, its conclusion would not have been rigorously established if it is also true, as Farrell has recently argued, that the "basic proposition (that profitable speculation stabilizes) is too strong to hold with any great generality" (*2*, p. 192).

The authors of the study which included the above test were evidently disposed to abolish floor trading on the stock exchanges quite apart from its price effects.

> That any individual who purchases a seat thereby becomes entitled to do his personal trading on the floor of an exchange without having any special function or undertaking any obligation in relation to the operations of the market raises, in itself, a fundamental question of public policy as to the extent to which a public market may be permitted to maintain this vestigial "private club" aspect, even apart from very serious questions as to the net impact of floor trading on the orderly functioning of the market (*9*, p. 24).

Thus it appears quite dubious, on practical as well as theoretical grounds, that the profitability of speculation will be taken to warrant its presence or form in real markets. Profitability may be construed to manifest unfair advantage in particular institutional arrangements; meanwhile eliding any question of price effects, as in the aforementioned test. And there are practical obstacles to the measurement of speculative results, as well as qualifications to the basic theoretical proposition.

If there is a strong possibility that error has been committed in reaching the

aforementioned conclusion that floor trading in stocks was "inimical to the orderly functioning of the market," there is danger that the error may be compounded in any replication of such analysis in other situations. The Comptroller General, in a recent report to the Congress, adopted the findings of the Securities Exchange Commission concerning floor trading in stocks, and urged that a similar analysis be conducted in commodity futures markets, with an ultimate view toward "taking the necessary action to have such trading abolished" (*10,* p. 26). If floor trading in stocks and commodity futures contracts was entirely comparable in scope and function, this would still be a tenuous recommendation. Given the superficial similarities between the two concepts of floor trading (including certain privileges and lower commission costs accorded floor traders in both settings) the questionable validity of the Securities Exchange Commission findings, the probability that similar tests would yield similar results for futures traders; given these factors *plus* the fact that floor trading in stocks was not at all comparable in scope and function with that in futures, the likelihood of compound error looms rather large. The problem of evaluating the price effects of speculation, of course, transcends the question of speculation in commodity futures, which in turn includes floor trading as only a part. It is likely, however, that as much as two-thirds of the trading volume on the Chicago Board of Trade is accounted for by floor members trading for their own accounts. It is also true that this represents a leading form of organized speculation in the economy. Hence the Comptroller General's recommendation invokes the possibility of throwing out the baby with the bathwater in one institutional setting, at the same time that it challenges economists to provide new insights into the effects of speculation.

It seems desirable then to undertake some further explication of the nature of commodity futures markets as vehicles for speculation and in the light of the theoretical discussions. This should set the stage for consideration of some of the kinds of evidence pertaining to the price effects of speculation which are available from earlier studies of futures markets. Finally, some evidence will be shown which bears upon the question of excessive speculation.

In theory it is of course possible—and convenient as well—to distinguish sharply between speculative and nonspeculative trading. For a discrete time period a single equilibrium price may be postulated which is not influenced by considerations of prospective supply and demand at a subsequent period, for which a different nonspeculative equilibrium price is postulated. Speculative buying or selling may then be introduced into this "comparative statics" model to enable some conclusions to be drawn regarding the effect of speculation upon prices.

Real markets in general, and futures markets in particular, do not lend themselves to analysis according to this simple model. To the extent that traders in ordinary spot markets take any account of future prospects, the resultant equilibrium price is not purely nonspeculative. Indeed it is not inconceivable that the ideal allocation of supplies through time could be achieved without any trading for deferred delivery, as this would require only that traders in spot markets make correct appraisals of present and prospective supply and demand. Their buying and selling being in part speculative (or more accurately, being

in part deferred out of speculative considerations), that part would have the same price effect as though transactions had been undertaken for deferred delivery, but without affording the possibility of segregating speculative and nonspeculative trading for empirical analysis. Moreover, to the extent that speculation takes the form of forward trading between "regular" buyers and sellers, the profits of one are offset by the losses of the other.

Futures markets provide for transactions for deferred delivery only[1] and thus might be thought of (in combination with spot markets) as effecting a separation between speculative and nonspeculative trading. This apparent cleavage turns out to be of no help in terms of the theory relating price effects to profitability of speculation, however, because "speculation" in this context is a zero-sum game. Instead of equating a futures-nonfutures with a speculative-nonspeculative dichotomy, therefore, it is common, in studies of futures markets, to focus upon speculative and nonspeculative futures trading. This latter is the trading of hedgers, who are arbitragers between spot and futures prices. The distinction between speculative and hedging trading on futures markets is important, but it is also important that it not be equated with the general distinction between speculative and nonspeculative trading. Hedging partakes of the essence of speculation in several respects: it is trading for deferred delivery; it entails arbitrage with its incumbent uncertainty; and in some instances, as for example the "anticipatory" hedging practiced by processors, it is essentially speculation upon the price level.

We have not yet reconciled futures trading to the speculative–nonspeculative dichotomy of the theoretical model. In order to accomplish this, it is desirable to return briefly to the model. In the situation where no speculative trading occurs, mere wagering upon price change would have no effect upon prices. Speculative trading affects price by altering the actual supply and demand. The model assumes that the speculative buyer acquires stocks and holds them off the market for later resale, or symmetrically, assuming the continuous existence of stocks, sells from current stocks with the view of subsequent replacement at a lower price. It is the temporal reallocation of supplies, rather than the reduction of price variability through which this is accomplished, which is the speculator's economic function. The reason for restating this elementary proposition is to call attention to the fact that the speculator in commodity futures does not perform this function *directly*. The buyer of a futures contract does not acquire title, nor any right to the use or enjoyment of the commodity traded in. He does incur the obligation to received delivery in a later cash transaction, *unless* he offsets his futures position in the pit. In order for futures speculation to effect a temporal reallocation of supplies, it is necessary that it facilitate the allocation decisions taken by another group—the hedgers. If those responsible for the accumulation, holding, or release of commodity stocks gear this activity to the futures market through hedging, then the speculative role of temporal reallocation is actually performed by hedgers, at prices agreed upon between hedgers, or between hedgers and speculators.

The simplest form of speculation occurs when any good is purchased and

[1] Excepting that transactions during the delivery or "spot" month are similar to spot transactions, which is an unimportant exception in view of the small proportion of such trades culminating in delivery.

held for later resale in anticipation of a rise in its price. Its effect is of course to reduce currently available supplies and enhance the subsequent supply. The purchase of a commodity futures contract has the same effect in principle, but not necessarily in fact. It creates an obligation of later delivery and hence the presumption that current supplies are being withheld; but the validity of this presumption depends upon hedgers' response to price relationships. If hedgers accumulate stocks and sell futures contracts to the speculative buyers, the supply effect is exactly as though nonfutures speculators were to withhold stocks for later sale. On the other hand, if short futures speculators sell to the speculative buyers, without commercial firms responding to the price relationships thus established, supplies will not be temporally reallocated and the speculative prices will be proved wrong—not because the indicated reallocation was incorrect but because it did not occur. In the context of an organized futures market, then, it is seen that (1) the price effect of speculation postulated in economic theory occurs only through hedgers' responses, and (2) these responses are necessarily predicated upon price judgments, and are of course an important price-determining influence, since they are registered through the sale and purchase of futures contracts and actual commodities. It therefore behooves us, in attempting to assess the price effects of *futures* speculation, to focus upon the level of hedging use and the accommodation of hedging transactions. If the demand and supply functions of all potential hedgers—whether producers, merchants, processors, or consumers—can be reflected, over the appropriate time interval, in the marketplace, this will embrace the relevant "speculative" demand and supply. The role of the futures speculator, then, is to attempt to profit from skillful appraisal and accommodation of futures hedgers' demand and supply. If hedgers can buy and sell futures contracts without substantial transactions price effect, and without encountering substantial anticipatory bias in prices, futures speculation may be said to be adequate. The ideal futures market would entail no price effect from transactions and no anticipatory bias, hence no net profit to futures speculators. Hedgers value futures markets chiefly for their convenience, however, and are undoubtedly willing to pay something over the mere cost of market operation, which is presumably included in commission fees, in order to have this convenience. This would suggest that speculators are entitled to a return for their skillful appraisal and accommodation of hedgers' requirements.

It is my belief, based upon casual observation and discussions with users of futures markets, that successful speculation tends to be closely oriented toward hedgers' usage and requirements, in contrast to unsuccessful speculation which tends rather to simulate the hedgers' approach to the markets with rather poorer results than those achieved by hedgers. Most of the evidence (*6, 7,* and *8*), indicates that the large speculators, who would be mostly vocational traders operating at the marketplace, earn profits, whereas the smaller traders, operating chiefly through commission firms as avocational speculators, incur losses. Much of this latter trading would be based upon attempted fundamental analysis of supply and demand factors, patterned after that done by hedgers, who undoubtedly do it more skillfully. Large professional speculators are more likely, in my view, to attempt to gauge the hedgers' needs directly. If this is true, it helps to

explain the otherwise anomalous fact that speculation in commodity futures conforms so closely as it does to hedging use. The period of greatest price uncertainty and consequent difference of opinion, for an annual crop, occurs prior to its harvest. Yet the greatest amount of speculation in futures occurs after the harvest, when hedging firms begin acquiring stocks and taking up futures positions. Apart from this characteristic seasonal phenomenon, other situations which give rise to hedging are frequently observed to elicit the facilitating speculation.

SPREADING IN COMMODITY FUTURES

The foregoing discussion has suggested that the commodity futures speculator does not fit the conventional stereotype of the speculator as price forecaster and temporal reallocator. Extension of the argument to include arbitrage would suggest that arbitragers (spreaders) in commodity futures might similarly gear their trading to their assessment of hedging usage and needs, instead of relying upon outright analysis of the price relationship between two markets. The so-called inter-option spreader, who buys one delivery month and sells another in the same commodity and market, would base his trading not so much upon a fundamental analysis of price relationships as upon the actual and emergent positions of others in those contracts. In this case the "others" would again be chiefly the hedgers, but would also, for special reasons, include speculators. Part of the spreader's role is to link up the hedging and the speculation.

Consider first the case in which merchants may wish to take short positions in remote futures while processors may wish to take long positions in nearby futures. Obviously, long speculators could offset the merchants' positions while short speculators offset the processors' positions—in line with our previous argument. The vocational speculator who seeks to profit from selling convenience to hedgers is unlikely to have a bias toward either the long or short side, however, with the result that these "long" and "short" speculators could well be one and the same person with a spread between nearby and distant futures months.

Historically there has been a marked reversal in the preference of some speculators and some hedgers for nearby or distant futures, with the result that spreading of this sort has grown to very significant proportions. Prior to World War II it was characteristic of the grain futures markets, at least, that short hedging positions, on an average, would be in more distant futures than either long hedging positions or long speculative positions. This of course occasioned some spreading, but the reversal of this situation has occasioned much more. Long-term capital gains considerations impart a pronounced preference for distant futures to the long speculator, whereas the functioning of the price support programs has caused short hedgers to make more use of nearby futures. Spreading has grown apace, and is sometimes the largest of the reported categories of open contracts.

A much smaller quantity of spreading is that done between separate contract markets for the same commodity, in either the same or different delivery months.[2] The tendency for futures trading in one commodity to concentrate

[2] Arbitrage is practiced, of course, between futures for different commodities, such as wheat and corn, or soybeans and their derivatives, but this cannot be considered spreading in an empirical study, because it is not classified as such by the Commodity Exchange Authority, hence no evidence is available.

in one market precludes much opportunity for this type of spreading, but it has arisen, for example, between the New York and New Orleans cotton markets, as well as between pairs of markets in different countries; e.g., Chicago and Winnipeg oats, New York and London sugar, Sydney and New York (or London) wool, etc. By far the best available evidence on intermarket spreading comes from the Chicago, Kansas City, and Minneapolis wheat futures markets; first, because these markets all report to the Commodity Exchange Authority which publishes statistics not available in or from other countries, and secondly because the Commodity Exchange Authority has recently made available data from these three markets separately which was hitherto available only in aggregated form. It is to this evidence that we next turn for confirmation of the foregoing interpretation, and for a rather specialized indication of the price effects of speculation, after first describing the three markets in general terms.[3]

GENERAL CHARACTERISTICS OF THE THREE WHEAT FUTURES MARKETS

Minneapolis and Kansas City are far more important wheat markets than Chicago. Not only do they mill substantially greater volumes of wheat, but much larger quantities are marketed through them, and the areas tributary to Minneapolis and Kansas City produce considerably more wheat than is grown tributary to Chicago. Yet Chicago has by far the largest wheat *futures* market, accounting for some 80 per cent of the average open interest and some 83 per cent of the volume of trading in wheat futures in the United States in recent years. Chicago's futures market developed when it was an important wheat center, and has remained the major market while first Minneapolis and later Kansas City (and still later Buffalo) became the primary milling centers, and as wheat production spread throughout the Great Plains.

The Kansas City futures contract calls for delivery of the hard winter wheat grown throughout the southern Great Plains and used for standard bread flours.[4] The Minneapolis contract calls for delivery of the higher protein hard spring wheats grown throughout the northern Great Plains and used for higher patent flours which go into the soft breads which account for most United States consumption. The Chicago contract calls for delivery at par of either of the above classes of wheat, plus the soft red winter wheats grown mostly east of the Mississippi which are used for cookie and cracker flour. Typically, in the postwar period, the class most likely to be delivered at Chicago has been soft red winter, hence its futures contract is often interpreted as a reflection of soft wheat values. The three classes of wheat are substitutable over wide margins, and are blended one with another, so that their prices tend to be highly correlated. Chicago and Kansas City prices of cash and futures have been especially highly correlated in much of the postwar period as the export market makes little distinction between soft and hard wheats.

Other things remaining equal, soft wheats would be hedged at Chicago, hard

[3] Some further background, as well as the anticipation of the present argument, is found in *4*, published several years before the Commodity Exchange Authority released the evidence adduced here.

[4] A contract allowing delivery of soft wheats in Kansas City fell into disuse in 1953, since which time only the hard wheat contract has attracted significant usage. See *12* for an account of this episode which also provides evidence for the interpretation that futures markets are hedgers' markets.

winter wheats at Kansas City, and hard spring wheats at Minneapolis. Hedgers prefer to trade a contract which specifies the class and location in which their actual transactions occur. Kansas City would rank first, Minneapolis second, and Chicago a poor third among wheat futures markets according to this principle. Chicago's predominant position, with Kansas City a very poor second and Minneapolis a still poorer third, requires explanation on other grounds, not far to seek. Most of the commodity futures business in the world is conducted on the floor of the Chicago Board of Trade because its large complement of floor traders (vocational traders who, as members, trade for their own accounts on the exchange floor) attracts most of the hedging business in the commodities there traded. Minneapolis has no floor traders as such; i.e., no floor member who speculates exclusively or even primarily for his own account. Kansas City has a few floor brokers who speculate occasionally for their own accounts. The amounts of speculation coming through commission houses are similarly distributed—heavy at Chicago, light at Kansas City, virtually nonexistent at Minneapolis. The bearing which these comparisons have upon hedging use, and the reflection of this in the intermarket spreading provide clear evidence of the price effects of speculation in commodity futures.

THE HEDGING-SPREADING RELATIONSHIPS

Spreading positions of large traders on the three wheat futures markets were published separately for the period 1939–46, during most of which time trading was at a low ebb and the figures could not be taken as representative. Beginning in 1963, the Commodity Exchange Authority has published these figures regularly; and at that time they also made available the data for the 1947–63 period. Thus, whereas previously the figures for the three markets were combined, resulting in a *net* reported spreading of zero because long and short spreading must be equal in the aggregate, the newly available data by markets reveal at least the net intermarket spreading in the inequalities between long and short spreading at individual markets. The aggregate net spreading should in principle be zero, and in fact is zero for most of the semimonthly reporting dates. The mechanical process of matching up long and short speculative positions, since spreading positions are not reported as such, results in occasional discrepancies from the net zero aggregate, but these are not large enough to lead to any misinterpretation. It will be assumed that all of the intermarket spreading involves Chicago—that there is no spreading between Kansas City and Minneapolis. This is probably not literally true, but it is a justifiable assumption on three grounds. I have discussed it with knowledgeable traders who themselves engage in intermarket spreading and who doubt the existence of any significant amount of spreading between the smaller markets. It is also confirmed in the observed relationships—there is no correlation between the net spreading figures for Kansas City and Minneapolis, yet each is inversely correlated with Chicago. Finally, we shall focus upon Kansas City net spreading, which is typically so large a figure relative to the Minneapolis spreading that only a small proportion of it could be spread to Minneapolis.

For convenience, the positions of traders in this analysis may be thought of as hedging, spreading, and "all other." "All other," will then include the re-

ported positions of large speculators, which for Kansas City are quite unimportant and for Minneapolis almost nominal; together with the residual positions of small (nonreporting) traders, not classified as to type. At Kansas City more than 70 per cent of the total open interest is reported by large traders, mostly hedgers, and just under 30 per cent is unreported. No doubt the unreported category contains both hedging and speculation, as well as some spreading. For purposes of this analysis, however, in which only the net positions are considered, the "all other" category may be considered predominantly speculative. Its net position will usually be the opposite of the net position of reported hedgers, whereas there is no reason to think that smaller hedgers would usually hold net positions opposite those of the larger hedgers.

Between two markets of approximately equal stature and similar composition, the net intermarket spreading might be expected to vary randomly over a substantial time interval, not differing significantly from zero on an average. Nor would taking account of the relative thinness of the smaller of two markets as disparate in size as the Chicago and Kansas City wheat futures markets provide any change in this a priori expectation, unless some bias factor were adduced. A thin market, on a priori grounds, would be equally likely to get out of line on either the high or the low side. When account is taken of the much larger volume of speculation at Chicago and the much higher proportion of hedging in the Kansas City open interest, however, factors suggestive of price bias are introduced. (Reported speculation at Chicago exclusive of spreading, has averaged about four times that at Kansas City in the past decade; whereas 54 per cent of the open interest at Kansas City has been reported hedging, compared to 25 per cent at Chicago.) If it is naïvely supposed, for example, that speculators are buyers and hedgers are sellers of futures contracts; then the different size and composition of the Chicago and Kansas City markets would suggest that Chicago might tend to be overpriced and Kansas City underpriced. This would suggest in turn that intermarket spreading would tend to be short at Chicago and long at Kansas City. In fact the opposite is true, which may seem anomalous until the market compositions and interrelationships are examined further.

At Kansas City, out of 408 semimonthly reporting intervals covering 17 consecutive crop years from 1946 to 1963, the net reported spreading was long 102 times. Since it was zero only four times, this means that it was short virtually 75 per cent of the time. Moreover, the size of the average net short position was somewhat more than double that of the average net long position. Yet the net reported hedging was also predominantly short, having been net long only 125 times, and zero four times. Similarly, the average net short position was considerably larger than the average net long position. It would scarcely seem that hedging pressure gives rise to spreading to Chicago, yet a closer view of the evidence reveals that it does. If we note that the 125 instances of net long hedging were associated with net short spreading 121 times; whereas the 279 instances of net short hedging were associated with net long spreading 101 times, the possibility occurs of a close inverse relationship which is partially obscured by other variables.

The unadjusted relationship between net hedging and net spreading (annual

averages) is shown in Charts 1 and 2. The reflection of hedging pressure is clearer in Charts 3 and 4, which show peak and trough net hedging and the associated spreading.

CHART 1.—HEDGING-SPREADING RELATIONSHIP IN KANSAS CITY WHEAT FUTURES, ANNUAL AVERAGES, 1947–63

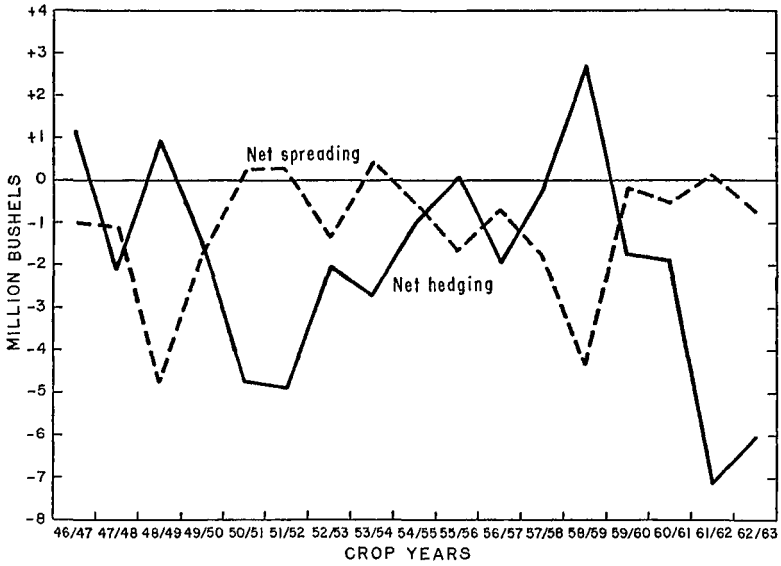


CHART 2.—HEDGING-SPREADING RELATIONSHIP IN MINNEAPOLIS WHEAT FUTURES, ANNUAL AVERAGES, 1947–63

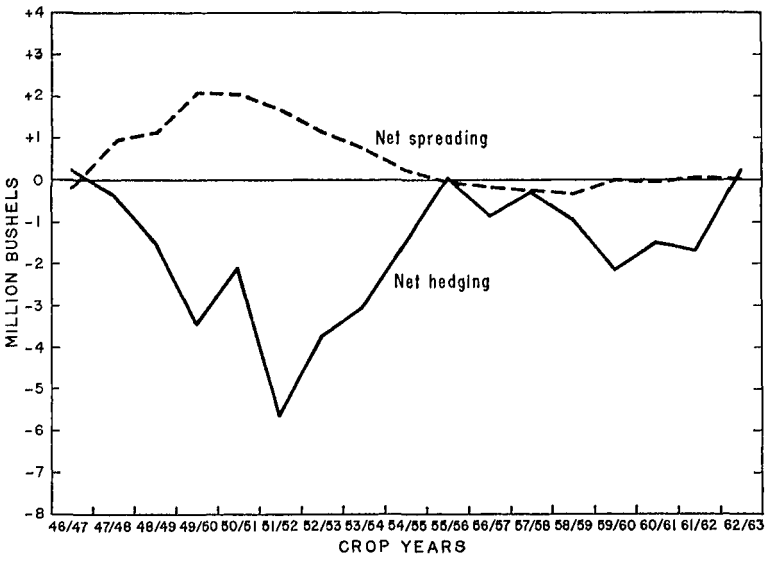
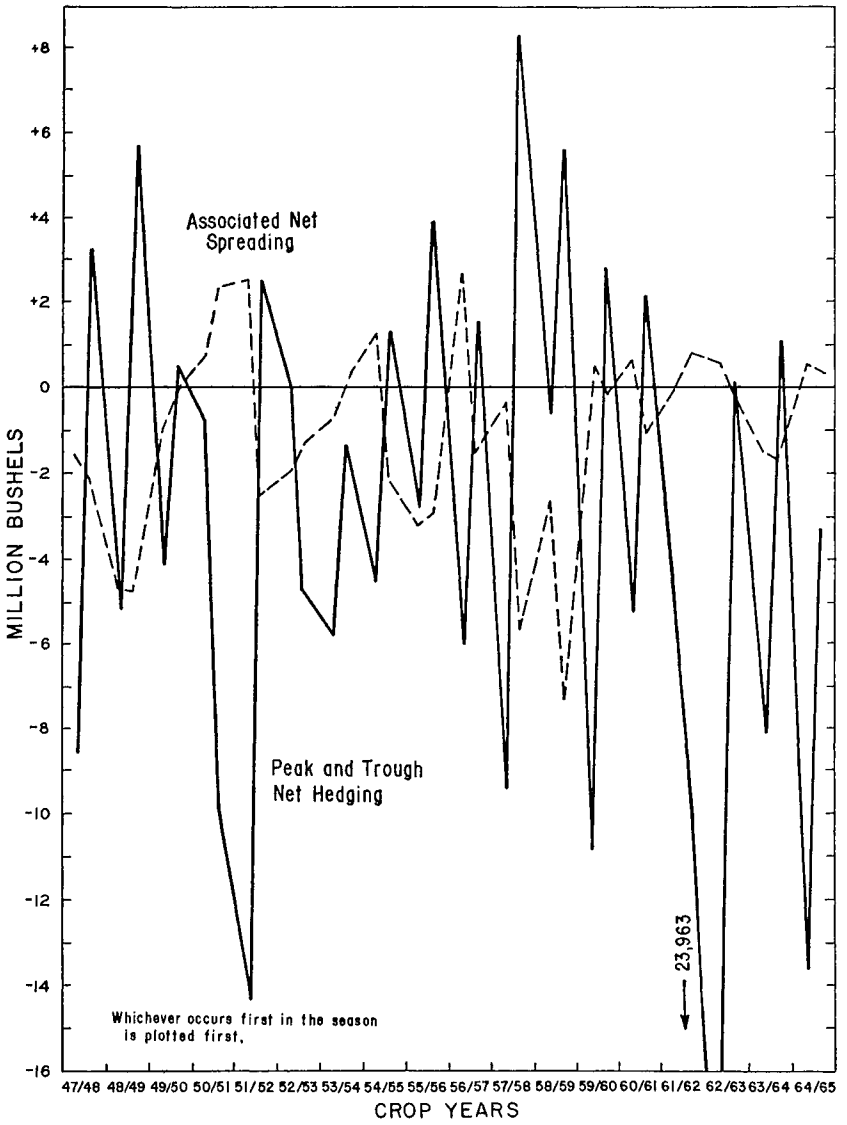


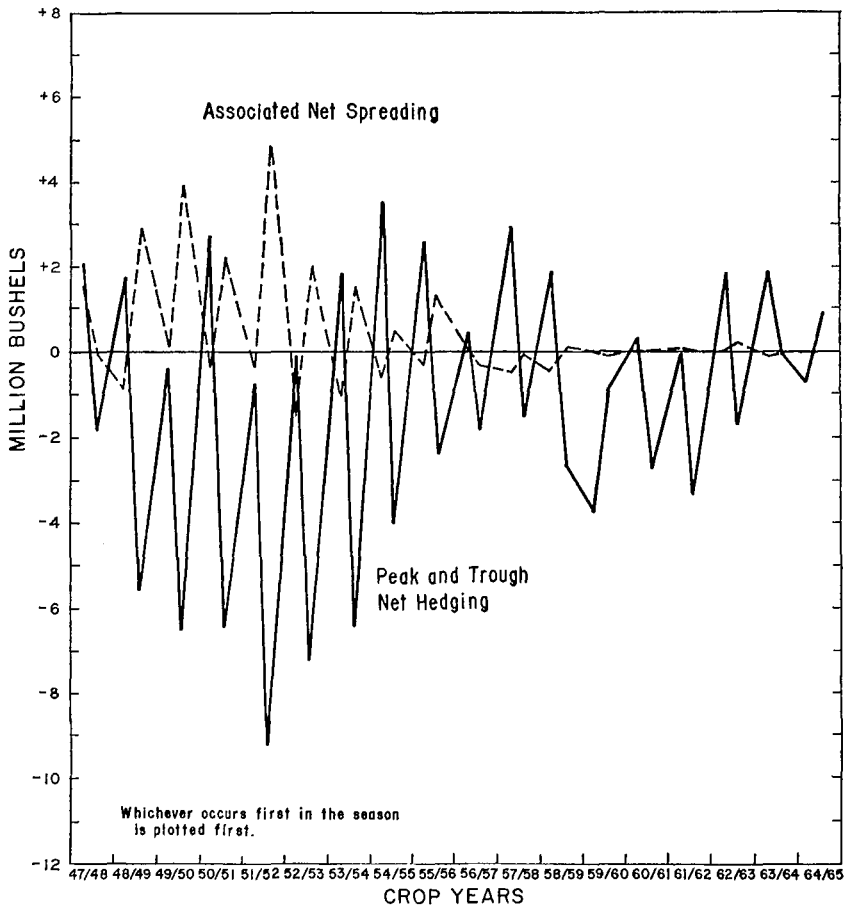
CHART 3.—HEDGING-SPREADING RELATIONSHIP IN KANSAS CITY WHEAT FUTURES, AT SEMIMONTHLY PEAK AND TROUGH* OF NET HEDGING EACH YEAR, 1947–63



* Whichever occurs first in the season is plotted first.

Before formulating a more precise relationship for Kansas City, certain general characteristics of that market which influence the formulation need to be considered. First, the hedging at Kansas City, while it is predominantly short, includes a larger proportion of long hedging than at Chicago. (At Kansas City, during the past decade, 49 per cent of the long and 59 per cent of the short open interest was reported hedging; at Chicago, 12 per cent of the long and 39 per cent of the short.) Flour mills, for example, are especially reluctant to hedge

CHART 4.—HEDGING-SPREADING RELATIONSHIP IN MINNEAPOLIS WHEAT FUTURES, AT SEMIMONTHLY PEAK AND TROUGH* OF NET HEDGING EACH YEAR, 1947–63



* Whichever occurs first in the season is plotted first.

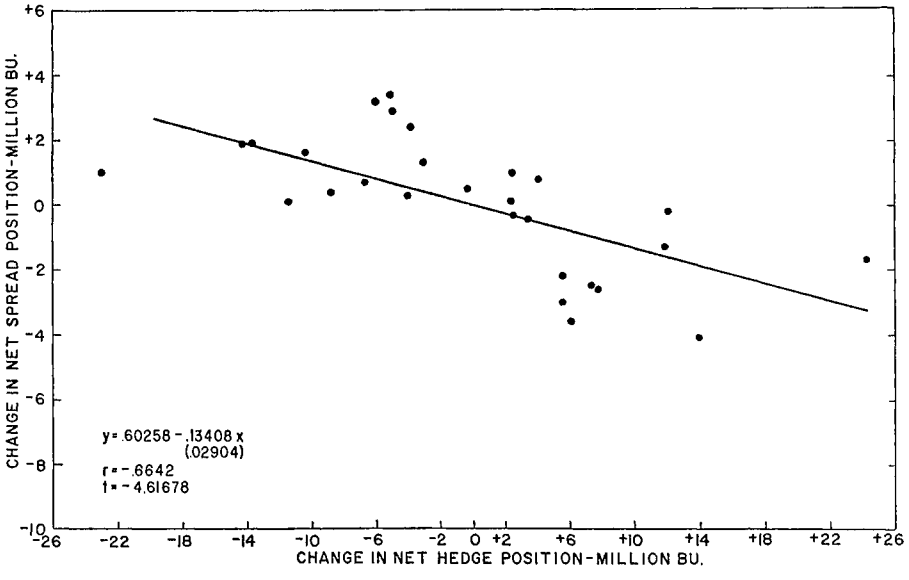
their hard wheat requirements (as reflected in forward sales of flour) in a market which is apt to attract soft wheat deliveries. Export sales of hard wheats are similarly better protected in a hard wheat futures contract. Hence, while the harvest of hard winter wheats is typically shortly followed by a buildup in short hedging positions at Kansas City, this is accompanied by a lesser but substantial buildup in long hedging. Further, as the season progresses, the long hedging commonly comes to exceed the short hedging, as the seasonal decline in the latter is much sharper than that in the former. Secondly, recalling that the large member speculators who, it was earlier argued, respond to hedging requirements quite directly, are quite indifferent between long and short positions, whereas small speculators typically exhibit a pronounced bias in favor of the buying side (*6*), Kansas City's hedge-carrying capacity is especially limited on one side. In general, the combination of a larger than usual proportion of long hedging plus a long-biased contingent of small speculators provides good short hedging capac-

ity at Kansas City, particularly during the post-harvest movement. In some years the hedging at Kansas City has been so heavily net short early in the crop year as to strain market capacity and elicit net long spreading at Kansas City. More commonly, during this period, short hedging has not placed a strain upon Kansas City, partly because carrying charges have been more attractive at Chicago and much short hedging goes there by choice which might otherwise be placed in Kansas City. When the pressure is reversed, however, such that the hedging is net long at Kansas City, it invariably elicits spreading to Chicago because Kansas City speculation is predominantly of the avocational variety, which does not respond to hedging needs. Moreover, an equivalent amount of short hedging later in the season elicits more long spreading, or less short spreading, because the avocational speculation is highly seasonal. This may result partly from tradition, in that harvest pressures on futures prices are sometimes thought to warrant buying at that time; but it may also result from "trading the loan"; i.e., purchasing futures in the expectation of a price rise as wheat moves into the government loan program, which rise cannot occur, however, until the movement into loan occurs (5).

A KINKED DEMAND CURVE

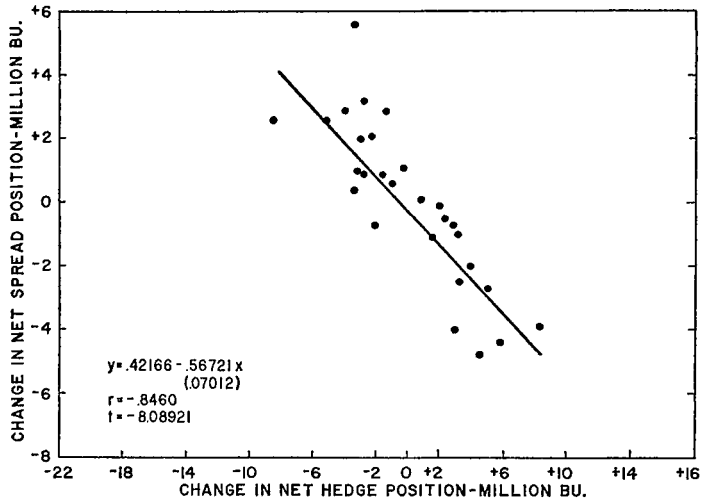
The foregoing account of the composition of trading at Kansas City suggests the possibility of a kinked demand function for hedging at Kansas City, more elastic for short hedging positions than for long hedging positions. In order to examine this possibility more closely, the data have been formulated into a somewhat closer reflection of the hedging variations. Starting from an extreme net short hedging position, the next observation is taken as close as possible to zero net hedging, then to the subsequent extreme in net long hedging, back to zero,

CHART 5.—RELATION BETWEEN NET SHORT HEDGING AND NET SPREADING, KANSAS CITY WHEAT FUTURES, 1946–63*



* See text for explanation.

CHART 6.—RELATION BETWEEN NET LONG HEDGING AND NET SPREADING, KANSAS CITY WHEAT FUTURES, 1946–63*



* See text for explanation.

etc. The data lend themselves to this "two-way-stretch" hypothesis fairly readily. On only a few occasions the zero bench mark observation is unavailable because successive reporting dates go from long to short extremes, or because the extreme net long position, for example, is the closest to zero between two extreme net short positions. Chart 5 portrays the relationship between first differences in net short hedging as it goes from near zero to its maximum and back near zero and the associate net spreading. Chart 6 shows the relationship between spreading and net long hedging, formulated in the same manner.

Intermarket spreading in this context is in effect a transfusion of speculation from the larger to the smaller market, arising out of the strains which hedging places upon the smaller market. The price effects of speculative inadequacy are implicit in this process. No direct estimate of these price effects has been undertaken here for two reasons. (1) Estimation of spreading profits, which is quite feasible along lines pioneered by Houthakker for other classes of traders, is deemed too unreliable in the existing state of the data. Spreaders very often spread markets and delivery months at the same time, for example, but published data do not reveal this. Until better data become available, it seems preferable to simply assume that spreading is profitable. (2) Even if spreading profits could be accurately measured, only a partial assessment of the price effects of speculative inadequacy would be obtained. Hedgers recognize these price effects, and rather than create further spreading opportunities than they already do, they place their hedges directly in Chicago. The full price effect, which must be very substantial, would be that of placing all the hedging in Kansas City which goes to Chicago because of its greater hedging capacity.

It is perhaps well to remember that the Chicago speculator who backstops this spreading trade may often alternatively participate in it. Put in terms of a numerical example, a short hedge that might move Kansas City prices 1/2 cent

might move Chicago prices 1/8 cent. The Chicago speculator who would go long Chicago for that 1/8 cent would clearly prefer to go long Kansas City and short Chicago for the difference of 3/8 cent. Until accurate measurements become available we will not know how realistic this example is. These price effects are of the order of magnitude that concern the merchants I have talked to in hedging firms, however; and whatever the proper magnitudes, the evidence shown here allows the inference that speculation at Chicago not only makes Chicago a better market than Kansas City, but also makes Kansas City a better market than it could otherwise be.

SPREADING AND PRICE RELATIONSHIPS

After developing the hypothesis that vocational speculators undertake to anticipate hedgers, instead of attempting direct and "original" price forecasts, the argument was extended to include intermarket spreaders, as a perhaps especially sophisticated class of "hedge anticipators." This strains the traditional concept of arbitrage which envisions the forecasting of price relationships in the same light as the traditional theory of speculation envisions price forecasting. Positive evidence that this spreading responds to hedging has been offered without direct reference to price effects. If it is true, as all of this implies, that futures markets are really hedging markets, where vocational "speculators" and "spreaders" undertake to anticipate and facilitate the buying and selling decisions of hedgers; then our positive evidence of the hedging-spreading relationship should find support in the absence of indications that spreaders forecast price relationships. Excepting insofar as such price relationships are augured by hedging positions, we should expect that spreaders would miss them. At such times, in the present context, as Kansas City and Chicago prices are "out of line," we should not expect spreading to reflect this unless the hedging positions imply such reflections; i.e., unless the misalignment is in a sense brought about by hedging.

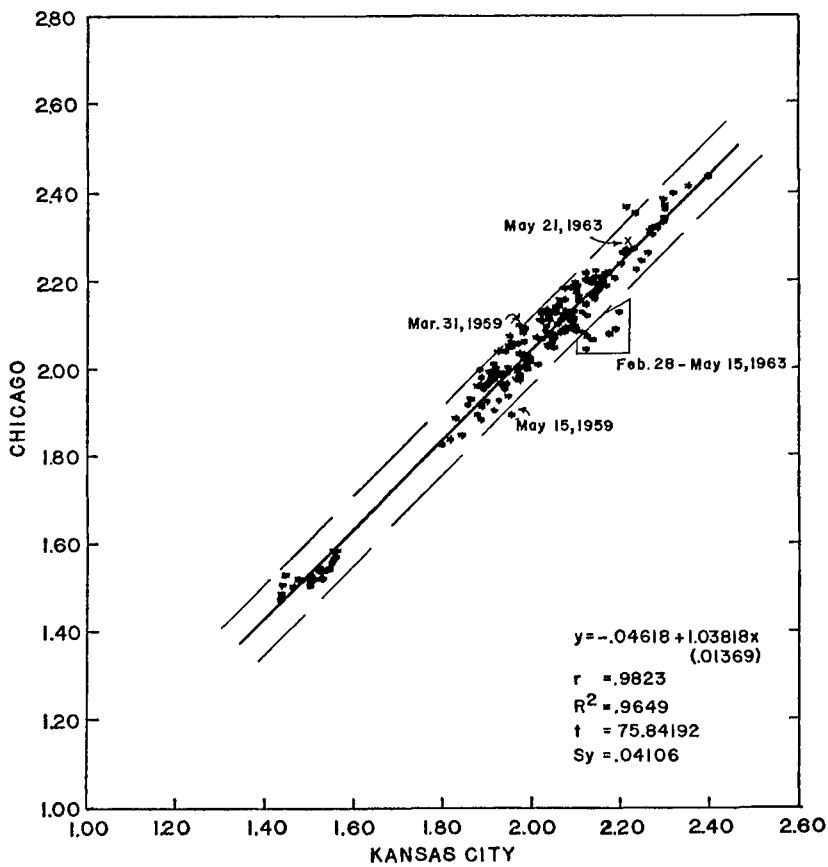
It is possible to identify at least two episodes in recent years wherein the Chicago-Kansas City price relationship departed from the norm without a hedging explanation. In one instance the explanation is readily identified; in the other case it is fairly evident that, whatever the explanation, it was not hedging. These two episodes stand out in the relationship between Kansas City and Chicago May futures prices, at semimonthly intervals, between January 15, 1956, and May 15, 1965. This extraordinarily close relationship ($R^2 = .9649$) was marred by only two substantial departures, one in which the Chicago price was clearly too high and was subsequently over-corrected, and another in which the Chicago price was too low and belatedly corrected.

Only twice out of 211 observations was the Chicago price more than two standard errors above the estimate. One of these occasions, March 31, 1959, occurred just prior to the breaking of a Chicago manipulation attempt (subsequently leading to a consent decree and penalties) which had been under observation by the hedgers for some time. (I was told about it in February 1959 by the trading director of an integrated milling and elevator firm, who then named the participants ultimately charged with the violation.) Hedging firms sold Chicago futures as the manipulative position was built up, meanwhile moving wheat to Chicago. In consequence, the collapse of the manipulation attempt found ex-

cess wheat in Chicago, causing prices to be over-corrected, such that the May 15 observation, just prior to the expiration of the May contract, found the Chicago price more than two standard errors *below* the estimated price. The observations are designated on Chart 7, which also shows the only other observations of Chicago prices more than two standard errors below the estimated prices (the light diagonal lines are drawn two standard errors above and below the heavier regression line).

These latter were six successive observations from February 28 to May 15, 1963. Chicago prices became too low during that interval as witnessed by such facts as the shipment of much "bargain" Chicago wheat to Texas for milling purposes (which is about as normal as for salmon to swim *downstream* for spawning), and the failure of Chicago to attract its normal receipts. The heavy open interest and large amount of nonreporting short positions suggests that the mistaken ideas of avocational speculators caused this distortion, possibly under the influence of official statements regarding the forthcoming wheat referendum, the failure of which the Secretary of Agriculture said would lead to a collapse

CHART 7.—RELATION BETWEEN MAY WHEAT FUTURES CLOSING PRICES, KANSAS CITY AND CHICAGO SEMIMONTHLY, JANUARY 15, 1956–JUNE 15, 1965



in wheat prices. The low Chicago price level was finally corrected on the last day of trading in May futures, as shown in the observation for May 21, 1963.

In both of the above instances, spreaders, if they make direct judgments regarding the appropriateness of the Chicago-Kansas City price relationship, might have been expected to hold large net positions, long at Kansas City in 1959 and short in 1963. In fact, however, the hedgers' adaptation to these circumstances appears to have been much more appropriate than the spreaders; particularly in 1959, with the result that spreaders, in responding to hedgers' position requirements, lost heavily in 1959 and missed a good profit opportunity in 1963. Spreading became heavily net short at Kansas City in 1959, as short hedging went to Chicago and long hedging to Kansas City. The major price correction, and overcorrection, were very costly to them. In 1963 the usual tendency for Kansas City hedging to become net long toward the end of the crop year was evidently deterred by the price relationship, hence the opportunity for spreading profits was again missed, as spreaders were approximately even during the period of price distortion.

CONCLUDING REMARKS

Prices, as many economists have long suspected, are determined by sellers and buyers. The largest buyers of wheat in the free world—Cargill, Continental Grain, Bunge, Dreyfus, etc.—are also the largest sellers. Almost without exception, they and the milling firms and their hundreds of competitors buy and sell futures contracts as temporary substitutes for later merchandising contracts. Without this fact the futures markets would lose meaning and would cease to exist. The futures markets provide a convenient device through which their price judgments (which are the sole basis for their profits) are expressed. Without these markets, similar price judgments would be expressed in more cumbersome, less reliable, and more obscure arrangements.

It is in no way surprising that other sophisticated participants in futures trading should gear their actions to this so-called "hedging" of the major users. Nor is it surprising that the best such market, in the view of the major users as expressed in their use, should be that market with the largest complement (indeed virtually the only significant complement) of floor traders.

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