AARON C. JOHNSON, JR.*

WHOSE MARKETS? THE CASE FOR MAINE POTATO FUTURES

This paper presents an analysis of the open interest statistics pertaining to the trading of Maine potato futures contracts. Critics of this market have frequently argued for its demise on the assertion that it is a "speculative market." What is frequently meant by this term is seldom clear from the context in which it is used. However, a study of the Congressional hearings (*9*; *10*; *11*) which have been held from time to time reveals something like the following: price is determined by the speculators who trade on the futures market; speculators have no knowledge of or interest in the basic supply and demand conditions in the marketplace; and they have no intention of making or taking delivery of the commodity. Therefore, price is determined independently of basic market price-making forces and, moreover, it is determined by "outsiders." The following excerpt illustrates: ". . . your product is grown by hard labor and sweat and it's your living, then along comes pressure groups who speculate with your product, who have no other interest in the potato than to manipulate the market. . ." (*9*, pp. 45–46).

Earlier economic analyses have drawn the conclusion that futures speculation in such a context is beneficial to the producing group (see, e.g., *1*; *2*; *15*). However, it is not the purpose of this paper to reopen that question. Instead, the primary objective is to offer empirical evidence relating to the problem of measuring the extent of "speculative" involvement in the market with readily available statistics. It will be shown that one's conclusions are quite sensitive to the manner by which traders' positions are classified as speculative or hedging. This analysis should provide insights into the problem of appropriate definitions and should suggest the type of statistical data which should be collected if the charges leveled against futures markets are to be evaluated.

Before proceeding, it is necessary to point out two limitations of the analysis presented in this paper. First, the special surveys of the Commodity Exchange Authority (CEA) which provide the basic data set were conducted, with one exception, at the end of October for each year. This is a significant time of year since it marks the end of harvest and the beginning of the storage-marketing season. Thus, statements made concerning the distribution of open interest by type of position and by type of trader relate only to this specific period, and there is little opportunity to know whether a similar distribution may be expected to

* Associate Professor, Department of Agricultural Economics, University of Wisconsin.

hold for other periods in the storage-marketing season.[1] (Some insights into the question are provided in a later section.) Second, the analysis is conducted using open interest statistics. From the standpoint of the price-determining process this is only one part of the picture. The other is the volume of trading, which cannot be measured by open interest statistics. Thus, while open interest statistics strongly suggest that industry traders provide the major use of the potato futures market, this may be misleading to the extent that nonindustry traders may weigh heavily in the volume of trading. It is commonplace that floor traders, for example, trade in and out frequently in "making a market" for those traders whose positions are to be held over longer intervals; hence more trading volume is accounted for by speculators than hedgers. Nevertheless, the composition of the outstanding open interest at any point in time is a reliable indicator of the basic market structure. These two points should be kept in mind when assessing the results presented below.

DATA AND METHOD OF ANALYSIS

To demonstrate the sensitivity of the characterization of the market to the definition of speculation and hedging, comparisons are made using two different sources of data. One source of data is important because of its availability over time; the other because it provides relevant information not contained in the former. Each is discussed below.

Regularly Published Reports

The Commodity Exchange Authority publishes open interest statistics for all regulated commodities on a semimonthly basis (*7*). These reports are important to students of futures markets because they constitute a continuous source of information concerning the composition of the open interest between speculative and hedging positions. However, from the standpoint of assessing relative magnitude of speculative and hedging activity, these reports have a serious limitation. The published statistics are based on reports submitted pursuant to the Commodity Exchange Act (*6*, especially Pts. 18, 19). Under this act only traders holding a position in excess of those specified must report the size of their positions.[2] These are listed as "reporting positions," and the term "large traders" is often used to refer to this group of traders. The residuals obtained from subtracting the reported positions from the total open interest are listed in the annual CEA reports as "nonreporting positions." The statistics of these small traders are classi-

[1] In personal correspondence R. W. Gray suggested that the seasonal pattern of open interest in the potato futures market may have been changing over time, reflecting a shift from growing-season hedging to storage-processing hedging. It is beyond the scope of the current paper to consider this proposition in detail. However, the following simple calculations offer support for this proposition. Shown in the tabulation are end-of-month open interest statistics for specified months as a ratio to annual average end-of-month open interest—these ratios provide a crude measure of seasonality.

Time period	October	February–March
1948/49–1952/53	1.36	.80
1956/57–1960/61	1.09	1.22
1961/62–1965/66	1.17	1.30

This apparent shift in seasonality suggests the difficulty of extrapolating the October 31 composition to other periods within the storage-processing season.

[2] In the case of potatoes, a trader whose position in any one futures contract reaches 25 carlots is required to report.

fied only by long or short and are not further classified by speculative and hedging. It is difficult, therefore, to assess the relative positions of speculators and hedgers in the market. This can pose a serious problem since nonreporting traders may at times hold as much as 70 percent of the total open interest.

Special Surveys

In addition to the regular reports, a series of special surveys of the Maine potato futures market have been conducted by the Commodity Exchange Authority (*8*). These surveys are of particular relevance to the current study, since the open interest of all traders, including small traders, is classified into speculative and hedging positions. This information is used to distribute the nonreporting positions provided in the regular reports to speculative and hedging positions. In addition, the special surveys classify the open interest according to the occupation of traders. This permits a study of the composition of the open interest in terms of industry vs. nonindustry traders, rather than in terms of hedgers vs. speculators (as defined in *6*).

Ten such reports are available; each was conducted on or about October 31, with the exception of 1964 when the survey was conducted on December 31. The time span of the reports runs from 1956 to 1965. One would, of course, like to have more current data in order to detect what significant changes, if any, have taken place during recent years of trading.

Interpretation of Open Interest Classified by Type of Position

The distribution of open interest statistics by speculative and hedging positions at the end of October for the period 1958–65 is shown in Table 1. These data were obtained from annual issues of *Commodity Futures Statistics*, and the dates chosen are those which most closely correspond to the dates of the special surveys which are used in subsequent sections.

The major conclusion to draw from these data is that a substantial portion of the total open interest is held by small, or nonreporting, traders. This group has

TABLE 1.—PERCENTAGE DISTRIBUTION OF OPEN INTEREST STATISTICS FOR MAINE POTATO CONTRACTS, SPECIFIED DATES, 1958–65*

Date	Long				Short			
	Nonreporting	Long only	Matching	Hedging	Nonreporting	Short only	Matching	Hedging
October 31, 1958	72.5	11.0	3.1	13.4	46.3	10.1	3.1	40.5
October 31, 1959	52.4	30.4	7.4	9.8	32.1	4.8	7.4	55.7
October 31, 1960	47.5	15.1	12.9	24.5	40.9	13.4	12.9	32.8
October 31, 1961	54.8	15.3	20.8	9.1	28.0	6.5	20.8	44.7
October 31, 1962	53.6	20.6	17.0	8.8	34.2	4.2	17.0	44.6
October 31, 1963	60.3	12.7	14.5	12.5	26.7	7.1	14.5	51.7
December 31, 1964	42.3	32.5	11.8	13.4	40.5	5.8	11.8	41.9
October 31, 1965	61.0	19.9	11.2	7.9	38.6	23.6	11.2	26.6
Simple average	55.6	19.7	12.3	12.4	35.9	9.4	12.3	42.4

* Data from U.S. Dept. Agr., Commodity Exchange Authority, *Commodity Futures Statistics*, various issues.

held a considerable portion of the long open interest during the eight-year period, ranging from a low of 42 percent in 1964 to a high of 72 percent in 1958, with an average of 56 percent for the entire period. A similar pattern exists for the short side of the market. In 1961, 28 percent of the short side of the market was held by small traders, with a high of 46 percent in 1948. Throughout the eight-year period, 36 percent of the short side was held by small traders. It is obviously necessary to develop some method of allocating this substantial portion of the open interest appropriately to speculative and hedging positions before drawing conclusions concerning the extent of speculative involvement. Two alternatives are discussed below.

Assume Small Traders Are Speculators

A common assumption has been that the nonreported positions of small traders represent small-scale speculative contracts (*15*, p. 198). The result of using this assumption is shown in Table 2, where the nonreporting and speculative statistics presented in Table 1 have been combined and listed as speculative. The percent of the long open interest held by speculators, under this allocation procedure, ranged from a low of 63 percent in 1960 to a high of 84 percent in 1958, and averaged 75 percent for the eight-year period. Similarly, the portion of the short side held by speculators ranged from a low of 34 percent in 1963 to a high of 62 percent in 1965, and averaged 45 percent for the entire period.

If one were to use the percent of open interest classified as speculative as a measure of the degree of speculative activity, one might be tempted to conclude from the statistics presented in Table 2 that the Maine potato futures market is predominantly speculative in its composition. Indeed, just such conclusions are drawn by using precisely the type of data presented in Table 1 and by assuming that all small traders are speculators. One cannot, of course, criticize this procedure because, as was pointed out in the previous section, these are essentially the only data available which provide information on the composition of open interest. However, in the following sections of this paper evidence is presented

TABLE 2.—PERCENTAGE DISTRIBUTION OF TOTAL OPEN INTEREST AMONG SPECULATIVE, HEDGING, AND MATCHING POSITIONS, ASSUMING THAT ALL SMALL (NONREPORTING) TRADERS ARE SPECULATORS, SPECIFIED DATES, 1958–65*

Date	Long			Short		
	Speculative	Matching	Hedging	Speculative	Matching	Hedging
October 31, 1958	83.5	3.1	13.4	56.4	3.1	40.5
October 31, 1959	82.8	7.4	9.8	36.9	7.4	55.7
October 31, 1960	62.6	12.9	24.5	54.3	12.9	32.8
October 31, 1961	70.1	20.8	9.1	34.5	20.8	44.7
October 31, 1962	74.2	17.0	8.8	38.4	17.0	44.6
October 31, 1963	73.0	14.5	12.5	33.8	14.5	51.7
December 31, 1964	74.8	11.8	13.4	46.3	11.8	41.9
October 31, 1965	80.9	11.2	7.9	62.2	11.2	26.6
Simple average	75.3	12.3	12.4	45.3	12.3	42.4

* Compiled from data in Table 1.

TABLE 3.—PERCENTAGE DISTRIBUTION OF SMALL (NONREPORTING) POSITIONS BETWEEN SPECULATIVE AND HEDGING POSITIONS, MATCHING POSITIONS HELD BY SMALL TRADERS NOT CONSIDERED, SPECIFIED DATES, 1958–65*

Date	Long		Short	
	Speculative	Hedging	Speculative	Hedging
October 31, 1958	64.9	35.1	58.3	41.7
October 30, 1959	83.3	16.7	40.7	59.3
October 28, 1960	74.0	26.0	59.8	40.2
October 27, 1961	76.5	23.5	49.5	50.5
October 26, 1962	82.2	17.8	57.6	42.4
October 31, 1963	75.0	25.0	48.0	52.0
December 31, 1964	89.4	10.6	42.8	57.2
October 29, 1965	93.3	6.7	63.2	36.8
Simple average	79.8	20.2	52.5	47.5

* Data from U.S. Dept. Agr., Commodity Exchange Authority, *Trading in Maine Potato Futures* (title varies), special surveys for indicated years.

which strongly suggests that this procedure, at least for the Maine potato futures market, results in an overstatement of the extent of speculative activity.

Adjustment Using Information Provided in the Special Surveys

The data available in the special surveys make it possible to classify the nonreporting positions shown in Table 1 into speculative or hedging positions in a more nearly optimal fashion. Since these surveys allocate the open interest of the small traders between speculation and hedging, it is possible to calculate, for the dates of the special surveys, the respective percentage distributions. This may then be used to allocate the nonreporting positions of Table 1. The distribution of the small positions between speculative and hedging as reported in the special surveys is shown in Table 3. The results of using these percentages to adjust the nonreporting positions of Table 1 are shown in Table 4.

TABLE 4.—PERCENTAGE DISTRIBUTION OF TOTAL OPEN INTEREST AMONG SPECULATIVE HEDGING, AND MATCHING POSITIONS, ALLOCATION OF NONREPORTING POSITIONS BASED ON DATA IN SPECIAL SURVEYS, SPECIFIED DATES, 1958–65*

Date	Long			Short		
	Speculative	Matching	Hedging	Speculative	Matching	Hedging
October 31, 1958	58.1	3.1	38.8	37.1	3.1	59.8
October 31, 1959	74.0	7.4	18.6	17.9	7.4	74.7
October 31, 1960	50.2	12.9	36.9	37.9	12.9	49.2
October 31, 1961	57.2	20.8	22.0	20.4	20.8	58.8
October 31, 1962	64.7	17.0	18.3	23.9	17.0	59.1
October 31, 1963	57.9	14.5	27.6	19.9	14.5	65.6
December 31, 1964	70.3	11.8	17.9	23.1	11.8	65.1
October 31, 1965	76.8	11.2	12.0	48.0	11.2	40.8
Simple average	63.7	12.3	24.0	28.5	12.3	59.2

* Calculated from data in Tables 1 and 3.

It is clear that the assumption that all small traders are speculators is not valid. On the long side of the market, the proportion of open interest classified as hedging ranged from a low of 7 percent in 1965 to a high of 35 percent in 1958, with an average of 20 percent. The assumption is even more fallacious for the short side of the market. During the eight-year period almost half of the small positions of the short side of the market were classified as hedging positions, ranging from a low of 37 percent in 1965 to a high of 60 percent in 1959.

Using these distributions to adjust the nonreporting positions shown in the annual issues of the *Commodity Futures Statistics* (shown in Table 1) results in a different picture concerning the extent of speculation in the potato futures market (Table 4). Comparison of these statistics with those presented in Table 2 clearly demonstrates the erroneous impression one may obtain if the positions of the small traders are not properly allocated. Approximately 75 percent of the long side was classified as speculative when it was assumed that all small traders were speculators. This becomes 64 percent when the small traders' positions are properly allocated. A similar realignment occurs for the short side of the market, where the relevant statistic drops from 45 percent to 29 percent following proper adjustment.

This procedure for allocating nonreporting positions has resulted in assigning a larger role to hedgers in the potato futures market. In the first comparison, hedgers accounted for only 12 percent of the long side and 42 percent of the short side of the market, whereas in the latter comparison the statistics are 24 percent and 59 percent, respectively. These results suggest the sensitivity of such analyses to the allocation of the nonreporting positions.

In 1961, A. B. Larson published a paper in which he used regression equations to allocate the total reported open interest between speculative and hedging positions (*4*). His estimates for the potato futures markets for 1958, 1959, and 1960 are presented in Table 5. The results shown in Table 4 above are reproduced to facilitate comparisons. These independent estimates conform rather well with our own.

The discussion in this section should not be interpreted to imply that one's conclusion concerning whether or not the potato futures market is a "speculative market" should necessarily be different depending on whether it is based on Table 2 or Table 4. However, it is clear that the quantitative basis for such a conclusion is quite different between these two situations.

INTERPRETATION OF OPEN INTEREST CLASSIFIED AS INDUSTRY AND NONINDUSTRY

The previous section analyzed the composition of the open interest in terms of the conventional speculation-hedging dichotomy. The problem of relating this type of analysis to a characterization of the market depends on the criteria used to distinguish between a speculator and a hedger. As suggested in the quotation above there is apparently a tendency to associate with traders reported as speculators persons who are in no way connected with the production and marketing of the physical commodity; hence the notion of an "outsider" involved in the price-making process. But how does one know that traders reported as speculators are not associated with the handling of the physical commodity? This is an

TABLE 5.—A COMPARISON OF THE RESULTS OF ALLOCATING TOTAL REPORTED OPEN INTEREST BY REGRESSION EQUATIONS AND BY USE OF SPECIAL SURVEYS OF THE POTATO FUTURES MARKET, AS OF OCTOBER 31, 1958–60*

(*Percent*)

	Long positions				Short positions				Matching positions	
	Speculative		Hedging		Speculative		Hedging			
October 31	Regression equations	Special surveys	Regression equations	Special surveys	Regression equations	Special surveys	Regression equations	Special surveys	Regression equations	Special surveys
1958	55	58	34	39	31	37	58	60	11	3
1959	69	74	16	19	19	18	66	75	15	7
1960	44	50	35	37	35	38	44	49	21	13

* Results of regression equations from A. B. Larson, "Estimation of Hedging and Speculative Positions in Futures Markets," *Food Res. Inst. Studies*, II, 3, 1960; results of special surveys from Table 4 above.

empirical question presumably capable of being answered by resort to empirical data. Unfortunately, the necessary data are not available. However, in the special surveys of the potato futures market conducted by the CEA, the open interest statistics are reported by the occupational categories of the traders holding the open interest. Consequently it is possible to examine its structure in terms of whether it is held by persons involved in handling the physical commodity (industry traders) or by those who are not (nonindustry traders). Classification of traders in this fashion has implications for the conventional definitions of hedging and speculation. As Holbrook Working has pointed out (*14*, p. 442):

> All the uses of futures that are commonly called "hedging" will be comprised, and all other uses excluded if we characterize hedging as the use of futures contracts as a temporary substitute for a merchandising contract that is to be made later. . . . Inclusion as hedging of the practices characterized . . . as selective hedging as anticipatory hedging requires either regarding hedging as sometimes closely akin to speculation, or defining speculation otherwise than has been usual in economics texts. In ordinary usage and in much economic discussion the word "speculation" refers to buying and selling (or, more accurately, hedging) property purely for the sake of gain from price change, and not merely as an incident to the normal conduct of a producing or merchandising business or of investment.

This line of reasoning also has strong implications for the interpretation of open interest statistics since it "raises the question whether a considerable part of the contract holdings that have been classed as 'speculative' might not more properly be treated as anticipatory hedging" (*14*, p. 452).

Finally, accepting this alternative definition of hedging and speculation provides the beginning of a counterargument to the charge that "outsiders" determine the price without any regard to the basic supply and demand conditions in the market. To the extent that trading reported as speculative is, in fact, being conducted by persons in the industry, this criticism loses much of its validity. As Working argues, "futures markets have served . . . to allow dealers in the commodity to exercise their price-forming function more freely than they otherwise would" (*14*, p. 452).

In light of the above discussion, the open interest was classified by the occupation of the traders. The results are presented in Table 6 for the period 1955 through 1965. Note that only ten years are available for this analysis since the special survey in 1957 did not report the open interest by occupation.

Industry traders participated to a considerable extent in futures trading. For the ten-year period, handlers of potatoes accounted for 49 percent of the long side of the market and 70 percent of the short side, leaving 51 percent of the long side and 30 percent of the short side for nonindustry traders. Considerable year-to-year variation has existed, however. For example, in 1955, 1956, and 1958 industry traders held over 60 percent of the long side, and in addition over 50 percent in the years 1960, 1961, and 1963. Thus, in six of the ten years industry traders held in excess of one-half of the long side of the market. The lowest share held by this group was 38 percent in 1965. On the short side, in two years industry traders held over 80 percent of the open interest, and in four additional years this group held over 70 percent. The lowest proportion of the short side held by industry traders was 62 percent in 1965.

TABLE 6.—PERCENTAGE DISTRIBUTION OF OPEN INTEREST IN MAINE POTATO FUTURES BY TYPE OF TRADER, SPECIFIED DATES, 1955–65*

Type of trader	Oct. 31, 1955		Oct. 31, 1956		Oct. 31, 1958		Oct. 30, 1959		Oct. 28, 1960		Oct. 27, 1961	
	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
Potato industry:												
Growers	17.8	21.0	17.5	7.8	10.7	6.7	7.3	8.3	4.5	5.6	4.7	6.3
Shippers[a]	19.3	36.5	17.5	38.1	22.0	49.4	15.4	51.1	13.4	37.3	19.9	49.9
Merchants[b]	24.4	25.6	26.0	21.9	14.8	14.8	16.9	22.7	14.4	18.8	20.1	15.4
Processors	3.0	1.1	2.7	2.7	15.2	3.5	7.6	0.7	23.1	2.8	7.4	3.0
Total	64.5	84.2	63.7	70.5	62.7	74.4	47.2	82.8	55.5	64.5	52.1	74.6
Nonindustry:												
Speculators												
Professional[c]	4.0	5.4	5.6	10.7	7.5	6.6	6.7	3.8	7.0	9.3	4.1	3.2
Other	31.5	10.4	30.7	18.8	29.8	19.0	46.1	13.4	37.5	26.2	43.8	22.2
Total	35.5	15.8	36.3	29.5	37.3	25.6	52.8	17.2	44.5	35.5	47.9	25.4
Grand Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Type of trader	Oct. 26, 1962		Oct. 31, 1963		Dec. 31, 1964		Oct. 29, 1965		Ten-year Average	
	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
Potato industry:										
Growers	4.4	7.2	5.7	7.0	4.2	16.3	8.5	13.0	7.0	10.7
Shippers[a]	17.2	49.6	18.9	51.3	25.9	41.4	11.0	32.8	18.1	42.6
Merchants[b]	17.5	9.3	18.2	13.1	11.2	8.5	12.8	15.0	15.8	14.6
Processors	4.7	1.3	10.2	2.2	5.8	2.6	5.2	0.9	7.7	2.0
Total	43.8	67.4	53.0	73.6	47.1	68.8	37.5	61.7	48.6	69.9
Nonindustry:										
Speculators										
Professional[c]	8.9	6.1	4.3	5.9	6.0	4.9	3.8	3.6	5.6	5.3
Other	47.3	26.5	42.7	20.5	46.9	26.3	58.7	34.7	45.8	24.8
Total	56.2	32.6	47.0	26.4	52.9	31.2	62.5	38.3	51.4	30.1
Grand Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

* Calculated from U.S. Dept. Agr., Commodity Exchange Authority, *Trading in Maine Potato Futures* (title varies), special studies for indicated years. The survey for 1957 did not report open interest by occupational category of the trader.

[a] Shippers who are not growers, grower-shippers, fertilizer dealers, cooperatives; mostly shippers.

[b] Receivers, merchants, jobbers, grocers, chain store organizations; mostly receivers, merchants, jobbers.

[c] Floor traders, professional speculators; 1955, 1956, 1958 include brokerage firms and employees.

Within the industry category, potato growers have not held a particularly large portion of the total open interest, accounting on the average for only 7 percent of the long side and about 11 percent of the short side. These results may reflect the fact that a very large percentage of potato growers are also grower-shippers and are classified under the general heading "shippers."

Shippers, which includes those growers who ship, constituted the major type of industry trader, accounting for 18 percent of the long side and 43 percent of the short side during the ten-year period. This category of trader held almost 50 percent of the total open interest on the short side in 1958, 1959, 1961, 1962, and 1963. In 1964, shippers held approximately 26 percent of the total open interest on the long side.

Merchants, which includes receivers, merchants, and jobbers, play a rather minor role in the total open interest, averaging 16 percent of the long side and 15 percent of the short side during the period of investigation. Potato processors averaged only 7.7 percent of the long side and 2 percent of the short side.

Nonindustry traders are reported in two categories: professional speculators, which includes floor traders; and all other speculators. The group of professional speculators has never comprised a particularly large portion of the total open interest. The ten-year average was 5.6 percent of the long side and 5.3 percent of the short side. The comparable statistics for the category called other speculators are 45.8 percent and 24.8 percent. As a group the nonindustry traders have constituted about 51 percent of the long side of the market and about 30 percent of the short side of the market. The largest proportion which this group has held on the long side was 62 percent in 1965, and the largest it reached on the short side was 38 percent in 1965.

If one were willing to argue that professional speculators are also knowledgeable concerning basic supply and demand conditions in the industry, a presumption which seems reasonable since their livelihood depends upon making proper price forecasts, we can conclude about 55 percent of the long side of the open interest and about 75 percent of the short side are held by knowledgeable traders. Alternatively, "outsiders" (i.e., other speculators) held, on the average, 45 percent of the long side and 25 percent of the short side of the market during the 1955–65 period. In four years this group held less than 40 percent of the long side of the market; the lowest was about 30 percent in 1955, 1956, and 1958 and the highest was 59 percent in 1965, the only year when this group held over one-half of the long open interest. In 1955, 1956, 1958, 1959, and 1963, outsiders held 20 percent or less of the short side of the market. The lowest percent held was 10 percent in 1955 and the highest was 35 percent in 1965, the only year in which this group held over one-fourth of the short open interest.

These statistics raise a serious question concerning the validity of the charge that prices in futures markets are determined primarily by outsiders who know nothing of basic supply and demand considerations. The results of this section support the hypothesis that the potato futures market is a hedger's, or more accurately, an industry market.

SPECULATOR-HEDGER INTERDEPENDENCE

Several writers have considered, on both theoretical and empirical grounds, the nature of the interdependence between speculators and hedgers in futures

markets (*2*; *3*; *5*; *13*). The basic question is whether speculators attract hedgers or whether the converse is the case. The main conclusion of the studies cited is that the viability of a futures market depends on providing a service which offers benefits to hedgers, or more generally, to the industry involved. When this group engages in active trading, nonindustry traders will enter the market and, similarly, when the industry can no longer make use of the market, nonindustry traders will abandon it. It is not possible to test this hypothesis directly with the data available in the special surveys. However, by analyzing the data in a slightly different way, insights into the speculator-hedger interdependence may be obtained. More specifically, it is possible to determine the extent to which the industry depends on nonindustry traders to serve as a source of supply of or demand for futures contracts.

Net Positions Held by Classes of Traders

To evaluate the extent to which the industry relies on nonindustry traders to carry a portion of the open interest, the net position was calculated for each type of trader by subtracting the smaller position from the large position and showing the result as either a net long or a net short position.[8] The results of these calculations are shown in Table 7.

In general, potato growers and potato shippers had a net short position during the ten-year period. This would be expected since the special surveys were taken at the end of October, a period near the end of the harvest season when supplies have been placed in storage for shipment throughout this marketing season. Since growers and shippers own the major portion of the crop at this time of the year, this net short position reflects hedges put out against the stored commodity. There is some interesting variation, however. For example, in both 1956 and 1958 potato growers as a group were net long. While there is no way to ascertain with the data available why this result should be observed, there are several plausible explanations. One possibility would be that in these two years the growers decided as a group to sell the major portion of their crop directly out of the field and simultaneously take a long position in the futures market. This type of behavior has the net effect of transferring ownership early in the season and permits growers to store potatoes in the form of futures contracts rather than in the form of actual potatoes. Secondly, these could have been years in which growers were extremely bullish in their price expectations and they acted on these expectations by taking long positions in anticipation of subsequent price rises. Finally, since cash potato prices have a tendency to rise during the marketing season, growers may, in the fall, purchase futures contracts as a long hedge against the seed potatoes which they plan to purchase at planting time the following spring, a form of anticipatory hedging (*14*). The logic of these procedures, however, may be fallacious, since there is some evidence to indicate that historically potato *futures* prices have not risen seasonally (*2*).

Merchants as a group over the ten-year period were net long. However, in 1955, 1959, 1960, and 1965 they held net short positions. One would expect that merchants in the fall of the year would be net long as a form of anticipatory hedging, since they know that later in the season they will need to purchase potatoes for resale (*12*, pp. 30–33). There are at least two possibilities which might

[8] This procedure was first suggested to me by Working in personal correspondence.

TABLE 7.—NET POSITIONS IN MAINE POTATO FUTURES, OPEN INTEREST BY TYPE OF TRADER, SPECIFIED DATES, 1955–65*

(*Carlots*)

Type of trader	Oct. 31, 1955[a]		Oct. 31, 1956		Oct. 31, 1958		Oct. 30, 1959		Oct. 28, 1960		Oct. 27, 1961[a]	
	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
Potato industry:												
Growers	—	88	470	—	137	—	—	73	—	70	—	175
Shippers[b]	—	490	—	1,007	—	952	—	2,603	—	1,695	—	3,239
Merchants[c]	—	31	202	—	1	—	—	425	—	311	500	—
Processors	54	—	2	—	405	—	502	—	1,438	—	469	—
Total	—	555	—	333	—	409	—	2,599	—	638	—	2,445
Nonindustry:												
Speculators												
Professional[d]	—	38	—	246	31	—	210	—	—	163	93	—
Other	605	—	579	—	378	—	2,389	—	801	—	2,291	—
Total	567	—	333	—	409	—	2,599	—	638	—	2,384	—

Type of trader	Oct. 26, 1962[a]		Oct. 31, 1963		Dec. 31, 1964		Oct. 29, 1965[a]		Ten-year Average	
	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
Potato industry:										
Growers	—	240	—	83	—	2,336	—	821	—	328
Shippers[b]	—	2,816	—	1,989	—	2,987	—	3,983	—	2,176
Merchants[c]	721	—	312	—	519	—	—	389	110	—
Processors	302	—	488	—	620	—	771	—	505	—
Total	—	2,033	—	1,272	—	4,184	—	4,422	—	1,889
Nonindustry:										
Speculators										
Professional[d]	256	—	—	101	214	—	39	—	30	—
Other	1,849	—	1,373	—	3,970	—	4,318	—	1,855	—
Total	2,105	—	1,272	—	4,184	—	4,357	—	1,885	—

* Calculated from U.S. Dept. Agr., Commodity Exchange Authority, *Trading in Maine Potato Futures* (title varies), special surveys for indicated years. The survey for 1957 did not report open interest by occupational categories.

[a] Some of the special surveys included positions as of some date other than the date of the survey which results in an inequality between total long and short positions.

[b] Shippers who are not growers, grower-shippers, fertilizer dealers, cooperatives; mostly shippers.

[c] Receivers, merchants, jobbers, grocers, chain store organizations; mostly receivers, merchants, jobbers.

[d] Floor traders, professional speculators; 1955, 1956, 1958 include brokerage firms and employees.

explain the net short positions in the four years. First they may have purchased physical supplies for inventory at harvest time and then put out short sales against them to protect their inventory. Secondly, at harvest time their expectations may have been for declining prices throughout the season and, consequently, they sold short in the market in anticipation of the subsequent price decline. Finally, the fact that they were net short in some years and net long in others may be some sort of a mixture of operational and anticipatory hedging reflecting changing price expectations and the difficulty of always being able to match up purchases and sales of cash potatoes (*12*, p. 33).

In all ten years, potato processors, as a group, had a net long position. This, of course, is as would be expected, again reflecting anticipatory hedging to cover their processing requirements at prices which they deem advantageous (*12*, p. 30).

The net position of the nonindustry traders is rather interesting. During the ten-year period, these traders were as a group necessarily net long as the industry group was net short. However, within the two categories of nonindustry traders shown, there are some interesting variations. The small, or "other speculators," each year were net long for each survey, while the professional speculators, whose net position was never very large relative to the total open interest, tended to vary from long to short positions from one year to the next. For six years they held net long positions, and for the remaining four they were net short. This observed pattern presumably reflects the price expectation of these traders, who would be net short in the case of expected price declines and net long in case of expected price increases.

Proportion of Short Open Interest Carried by Industry Traders

Attention now turns to a consideration of the proportion of the industry short open interest which is offset by long positions held by industry traders and by long positions held by nonindustry traders. Since the industry, as a group, has been net short, this comparison suggests the dependency which the industry has upon nonindustry traders for carrying their short positions. These comparisons are shown in Table 8, where the first column shows the proportion of the industry's short open interest offset by long positions in the industry and the second column shows the proportion offset by nonindustry traders. There has been considerable variation in the proportion of the short open interest which has been offset by long positions held by industry traders. The low was in 1955 when the industry was able to carry only about 8 percent of its short hedging. On the other hand, in both 1956 and 1960, over 65 percent of the net short open interest by the industry was carried by industry long positions. During the entire period about one-third of the industry's short open interest was carried by industry members and the remaining two-thirds was carried by nonindustry traders.

It is rather interesting to note the responsiveness of nonindustry traders to industry needs when the industry itself cannot carry its short open interest. For example, in 1959 and 1960 the total open interest was approximately the same in both years; yet in 1959 the industry could carry only about 16 percent of its short open interest, with the remaining 84 percent being carried by nonindustry traders. In 1960, the comparable figures were 69 percent carried by the industry and 31 percent by nonindustry. While these statistics are far from conclusive, they

TABLE 8.—PROPORTION OF INDUSTRY SHORT OPEN INTEREST OFFSET BY INDUSTRY AND NONINDUSTRY LONG POSITIONS, ADJUSTED FOR NET SHORT POSITIONS OF PROFESSIONAL SPECULATORS WHERE APPLICABLE, MAINE POTATO FUTURES, SPECIFIED DATES, 1955–65*

Date	Percent offset by		Total open interest (*carlots*)
	Industry	Nonindustry	
October 31, 1955[a]	8.7[b]	91.3[b]	2,863
October 31, 1956	66.9	33.1	4,876
October 31, 1958	57.0	43.0	3,474
October 30, 1959	16.2	83.8	7,315
October 28, 1960	69.3	30.7	7,103
October 27, 1961[a]	28.9[b]	71.1[b]	10,692
October 26, 1962[a]	32.7[b]	67.3[b]	8,761
October 31, 1963	38.6	61.4	6,161
December 31, 1964	21.4	78.6	19,282
October 29, 1965[a]	15.0[b]	85.0[b]	18,128
Simple average	35.5	64.5	8,866
Weighted average[c]	24.6	75.4	...

* Calculated from Table 7 and U.S. Dept. Agr., Commodity Exchange Authority, *Trading in Maine Potato Futures* (title varies), special surveys for indicated years. The survey for 1957 did not report open interest by occupational categories.

[a] Some of the special surveys included positions as of some date other than the date of the survey which results in an inequality between total long and short positions. In these cases an average of the two is used.

[b] Because of inequality between total long and short positions for these years the percentage distribution is based on the total of industry long positions and net long positions of nonindustry traders.

[c] This average was calculated by using the ten-year average net positions. It differs from the simple average because some types of traders were net long in some years and net short in others.

clearly suggest the contribution which nonindustry traders can make in the functioning of the futures market.

ANALYSIS OF ADDITIONAL INFORMATION

A concern expressed above pertained to the fact that the basic data set available consisted of observations available only in October of each crop year. This may limit generalization of results to the extent that the structure of the open interest differs during the storage-marketing season. Some insight into this problem is presented in this section. In addition to the annual October surveys used in previous sections, the CEA conducted additional special surveys on June 25, 1956, March 31, 1958, and April 25, 1958. While comparison of these surveys with the October surveys cannot provide definitive conclusions, it may suggest the changing structure of open interest. For expositional purposes, March and April will be referred to collectively as "mid-season," since these tend to be the months of heaviest potato shipments out of Maine. June is also of particular interest, since it is about the last month for shipment of old crop supplies. More importantly, since the May contract is the last contract for old crop potatoes, the open interest

TABLE 9.—PERCENTAGE DISTRIBUTION OF OPEN INTEREST BY TYPE OF TRADER IN SPECIAL SURVEYS OF JUNE 1956, MARCH 1958, AND APRIL 1958, COMPARED WITH TEN-YEAR AVERAGE DISTRIBUTION FOR OCTOBER*

Type of trader	June 25, 1956		March 31, 1958		April 25, 1958		Ten-year average for October[a]	
	Long	Short	Long	Short	Long	Short	Long	Short
Potato industry:								
Growers	15.6	26.7	10.5	16.9	9.4	13.8	7.0	10.7
Shippers	24.4	41.3	13.6	20.5	17.2	18.1	18.1	42.6
Merchants	16.1	16.7	21.4	24.0	11.1	39.1	15.8	14.6
Processors	5.3	.0	.7	2.1	39.1	2.6	7.7	2.0
Total	61.4	84.7	46.2	63.5	37.9	73.6	48.6	69.9
Nonindustry:								
Speculators								
Professional	12.9	5.7	8.2	8.9	10.3	11.6	5.6	5.3
Other	25.7	9.6	45.6	27.6	51.8	14.8	45.8	24.8
Total	38.6	15.3	53.8	36.5	62.1	26.4	51.4	30.1
Grand Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

* Calculated from U.S. Dept. Agr., Commodity Exchange Authority, *Trading in Maine Potato Futures* (title varies), special surveys for indicated dates.
[a] From Table 6.

in June is held in the contract pertaining to the crop which has just been planted and which will not be available for sale until about the following October.

The percentage distribution of open interest by type of trader for the three specific surveys and the October surveys is presented in Table 9. A comparison of the June and October statistics reveals little similarity in the structure of the open interest. In June 1956 the industry held 61 percent of the long side and 85 percent of the short side, while the respective statistics for October were 49 percent and 70 percent on the average. This lack of comparability should not, of course, be surprising, since one data set relates to a crop which has just been planted while the other set refers to a crop which has just been harvested and put in storage. It is of interest, however, to observe from Table 6 that the distribution of open interest on October 31, 1956, shows the industry holding 64 percent of the long side and 70 percent of the short side, comparable to the distribution in the preceding June.

A comparison of the October and mid-season statistics reveals a high degree of correspondence in terms of the percent of the total open interest held by the industry. Rather than compare mid-season with the average October data it would be more meaningful to make the comparison with October of 1957 to see if structural changes occurred as the marketing season progressed. Unfortunately, that special survey did not report the open interest holdings by type of trader; thus, the comparison cannot be made.

Information relating to the net positions of traders is presented in Tables 10 and 11, with actual net positions shown in the first table and the percent of the industry short positions carried by industry and nonindustry long positions in the latter. There is little correspondence of the June and mid-season statistics with October; quite the contrary, two distinct differences emerge. In June 1956,

TABLE 10.—NET POSITIONS IN MAINE POTATO FUTURES, OPEN INTEREST BY TYPE OF TRADER, SPECIAL SURVEYS, JUNE 1956, MARCH 1958, AND APRIL 1958*

Type of trader	June 29, 1956		March 31, 1958		April 25, 1958		Ten-year average for October[a]	
	Long	Short	Long	Short	Long	Short	Long	Short
Potato industry:								
Growers	—	329	—	482	—	136	—	328
Shippers	—	496	—	526	—	31	—	2,176
Merchants	—	18	—	199	—	845	110	—
Processors	156	—	—	106	—	71	505	—
Total	—	687	—	1,313	—	1,083	—	1,889
Nonindustry:								
Speculators								
Professional	211	—	—	63	—	42	30	—
Other	476	—	1,285	—	1,086	—	1,855	—
Total	687	—	1,222	—	1,044	—	1,885	—

* Calculated from U.S. Dept. Agr., Commodity Exchange Authority, *Trading in Maine Potato Futures* (title varies), special surveys for indicated dates.
[a] From Table 7.

TABLE 11.—PROPORTION OF INDUSTRY SHORT OPEN INTEREST OFFSET BY INDUSTRY AND NONINDUSTRY LONG POSITIONS, MAINE POTATO FUTURES SPECIAL SURVEYS, JUNE 1956, MARCH 1958, AND APRIL 1958*

Date	Percent offset by		Total open interest (*carlots*)
	Industry	Nonindustry	
June 29, 1956	18.5	81.5	2,958
March 31, 1958	0	100.0	7,318
April 25, 1958	0	100.0	2,978
Ten-year average for October[a]	35.5	64.5	8,866

* Calculated from U.S. Dept. Agr., Commodity Exchange Authority, *Trading in Maine Potato Futures* (title varies), special surveys for indicated dates.
[a] The simple average from Table 8.

about 18 percent of the industry net short position was offset by industry long positions, with the balance held by nonindustry traders. By October of 1956 (see Table 8), this industry was carrying about 67 percent of the industry short open interest, up from 18 percent in June. This one observation leads to an interesting hypothesis, the testing of which must be left until such time as relevant data become available, namely, that early in the season (four to five months prior to harvest) speculators stand ready and willing to offset whatever hedging the industry may want to offer. But as the marketing storage season approaches and plans for the year become finalized the industry assumes a larger role in carrying the open interest.

The second major observation pertains to Table 11, which shows that in midseason of the 1957–58 crop year the industry did not carry any of its short position,

a situation not characteristic of October in any year. There is no way of explaining this with the available data. As mentioned above, the relevant data for October 1957 were not available so it is not possible to determine whether this simply reflects a year in which, even in October, the industry relied heavily on non-industry traders to carry its short open interest, as seemed to be the case in 1955, 1959, and 1965 (see Table 8). There is no mid-season data available for any other year.

Given the concerns and problems mentioned above, the data in the three specific surveys do not seem to differ substantially from the October data. This is, of course, sufficiently tenuous to preclude generalizing to the structure of the open interest over the storage season on the basis of the situation in October. On the other hand, the fact that extreme and unexplainable differences failed to emerge lends support to the use of the October data as suggestive of the structure of the open interest. This is the best that can be done until more data become available.

AN OVERALL SUMMARY

By way of summary, results from earlier sections are reproduced in Tables 12 and 13. In Table 12 the matching positions are shown, while Table 13 presents the distribution ignoring the matching position. As can be readily seen, quantitative measures of speculative activity are quite different depending upon the definitions of speculation and hedging used. For example, on the long side of the market, looking at distribution by type of position, approximately 73 percent of the contracts were held by speculators and about 27 percent by hedgers. On the naive assumption that speculators are not knowledgeable in the price-making forces for the commodity, one's conclusion would be that these markets are, indeed, highly speculative, with outsiders playing perhaps a disproportionate role in the price-making process. However, if one classifies contracts by type of trader, using the assumption that industry people, regardless of whether they are speculators or hedgers, are knowledgeable concerning basic market forces, about half of the long positions were held by knowledgeable traders and about half held by nonindustry traders. Keeping in mind from an earlier analysis the portion of the nonindustry positions that are held by professional speculators, who might be assumed to be knowledgeable, one would conclude that the role of uninformed traders is minor in the total process. A similar comparison may be made for the short side of the market. In terms of position analysis about 33 percent was held by speculators and about 67 percent by hedgers. On the basis of type of trader, about 29 percent was held by nonindustry and about 70 percent by industry sources.

CONCLUSIONS AND IMPLICATIONS

Two major conclusions may be made on the basis of the analyses presented in this paper. The first relates to the problem of measurement. It has been shown that the quantitative measure of "speculative" activity is, as would be expected, quite sensitive to the classification of traders. These results add further substantiation to the conclusions drawn by Larson (*4*). It is clear that further theoretical and empirical work is needed concerning the development of appropriate defini-

TABLE 12.—PERCENTAGE DISTRIBUTION OF OPEN INTEREST BY TYPE OF POSITION AND BY TYPE OF TRADER, MATCHING INCLUDED, MAINE POTATO FUTURES, SPECIFIED DATES, 1955–65*

Date	Long positions					Short positions				
	Type of position			Type of trader		Type of position			Type of trader	
	Speculative	Hedging	Matching	Nonindustry	Industry	Speculative	Hedging	Matching	Nonindustry	Industry
October 31, 1955	...	...	...	35.5	64.5	...	...	...	15.8	84.2
October 31, 1956	...	...	...	36.3	63.7	...	...	...	29.5	70.5
October 31, 1958	58.1	38.8	3.1	37.3	62.7	37.1	59.8	3.1	25.6	74.4
October 30, 1959	74.0	18.6	7.4	52.8	47.2	17.9	74.7	7.4	17.2	82.8
October 28, 1960	50.2	36.9	12.9	44.5	55.5	37.9	49.2	12.9	35.5	64.5
October 27, 1961	57.2	22.0	20.8	47.9	52.1	20.4	58.8	20.8	25.4	74.6
October 26, 1962	64.7	18.3	17.0	56.2	43.8	23.9	59.1	17.0	32.6	67.4
October 31, 1963	57.9	27.6	14.5	47.0	53.0	19.9	65.6	14.5	26.4	73.6
October 31, 1964	70.3	17.9	11.8	52.9	47.1	23.1	65.1	11.8	31.2	68.8
October 29, 1965	76.8	12.0	11.2	62.5	37.5	48.0	40.8	11.2	38.3	61.7
Eight-year simple average	63.7	24.0	12.3	50.1	49.9	28.5	59.2	12.3	29.0	71.0

* Data from Tables 4 and 6.

TABLE 13.—PERCENTAGE DISTRIBUTION OF OPEN INTEREST BY TYPE OF POSITION (MATCHING EXCLUDED) AND BY TYPE OF TRADER, MAINE POTATO FUTURES, SPECIFIED DATES, 1955–65*

Date	Long positions				Short positions			
	Type of position		Type of trader		Type of position		Type of trader	
	Speculative	Hedging	Nonindustry	Industry	Speculative	Hedging	Nonindustry	Industry
October 31, 1955	...	...	35.5	64.5	...	...	15.8	84.2
October 31, 1956	...	...	36.3	63.7	...	...	29.5	70.5
October 31, 1958	60.0	40.0	37.3	62.7	38.3	61.7	25.6	74.4
October 30, 1959	79.9	20.1	52.8	47.2	19.3	80.7	17.2	82.8
October 28, 1960	57.6	42.4	44.5	55.5	43.5	56.5	35.5	64.5
October 27, 1961	72.2	27.8	47.9	52.1	25.8	74.2	25.4	74.6
October 26, 1962	78.0	22.0	56.2	43.8	28.8	71.2	32.6	67.4
October 31, 1963	67.7	32.3	47.0	53.0	23.3	76.7	26.4	73.6
October 31, 1964	79.7	20.3	52.9	47.1	26.2	73.8	31.2	68.8
October 29, 1965	86.5	13.5	62.5	37.5	54.0	46.0	38.3	61.7
Eight-year simple average	72.7	27.3	50.1	49.9	32.4	67.6	29.0	71.0

* Data calculated from Tables 4 and 6.

tions of hedging and speculation. In particular, studies of the type reported on here need to be conducted for other commodity futures markets in order to accumulate a body of empirical knowledge pertaining to the extent of industry involvement in these markets. Unfortunately, the data for such studies are not available. Thus, the real contribution of this paper may be to have pointed out the relevance of such data and, consequently, to argue for its collection. Such information and the studies it would permit would provide the basis for the development of rational public policy concerning the role which futures markets can and should play in a viable marketing system.

Second, while the thrust of the paper has been on measurement, many of the analyses are suggestive of the economic performance of the potato futures market. Gray has convincingly argued that this has been a particularly viable market which has worked to the definite advantage of Maine potato growers in that it has demonstrated a capacity for handling efficiently the hedging needs of the potato industry (*2*). Many of the analyses presented above, using more current data than were available to Gray at the time of his analysis, lend strong support to his conclusions.

CITATIONS

1 R. W. Gray, "Onions Revisited," *J. Farm Econ.*, May 1963.

2 ———, "The Attack Upon Potato Futures Trading in the United States," *Food Res. Inst. Studies*, IV, 2, 1964.

3 ———, "The Relationship Among Three Futures Markets," *Food Res. Inst. Studies*, II, 1, 1961.

4 A. B. Larson, "Estimation of Hedging and Speculative Positions in Futures Markets," *Food Res. Inst. Studies*, II, 3, 1961.

5 M. J. Powers and A. C. Johnson, Jr., "The Frozen Pork Belly Futures Market: An Analysis of Contract Specifications and Contract Viability," *Agr. Econ.*, Feb. 1968.

6 U.S. Dept. Agr., Commodity Exchange Authority, *Commodity Exchange Act as Amended*, revised Feb. 1970.

7 ———, ———, *Commodity Futures Statistics*, annual issues.

8 ———, ———, *Trading in Maine Potato Futures*, special surveys, 1958–65.

9 U.S. 85th Cong., 1st Sess., House, *Hearings Before the Committee on Agriculture*, May 1–3, 1957.

10 ———, 2d Sess., Senate, *Hearings Before the Committee on Agriculture and Forestry*, Mar. 22–26, 1958.

11 ———, 88th Cong., 1st Sess., House, "Prohibit Trading in Irish Potato Futures on Commodity Exchanges," *Hearings Before the Subcommittee on Agriculture*, Apr. 8–10, 1963.

12 W. T. Wesson, *The Economic Importance of Futures Trading in Potatoes* (U.S. Dept. Agr. Mktg. Res. Rept. 241, June 1958).

13 Holbrook Working, "Futures Markets Under Renewed Attack," *Food Res. Inst. Studies*, IV, 1, 1963.

14 ———, "New Concepts Concerning Futures Markets and Prices," *Amer. Econ. Rev.*, June 1962.

15 ———, "Speculation on Hedging Markets," *Food Res. Inst. Studies*, I, 2, 1960.