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THE EGG FUTURES MARKET: 1940 TO 1966†

In the period since 1940 the refrigerated storage of eggs has almost disappeared. The decline in egg storage was the result of a number of innovations in the production of eggs which together were responsible for greatly reduced yearly fluctuations in supply. With more even production, fewer eggs could be stored profitably, and the egg storage industry declined to a small fraction of what it once was. The refrigerated storage egg specified on the futures contract almost disappeared from the scene, and dealers and storers who had hedged egg inventories in the past had fewer and fewer eggs to hedge.

In the same period, the futures market for storage eggs grew spasmodically until the crop year 1960/61 when the market reached its zenith. In that year the average number of open contracts on the market, 8,112, was higher than for any previous year, or for any year since. In terms of the number of transactions and the value of transactions in 1960/61, the futures market for storage eggs was exceeded only by the soybean and wheat futures markets.

The next year marked the beginning of a precipitous decline in the futures market for storage eggs, culminating in its demise in 1966 when the egg futures market changed to a fresh egg contract.¹ The new specifications allow delivery of fresh eggs only, reflecting the fact that storage eggs have become obsolete.

Thus, the discontinuance of the storage egg contract was not surprising and is easily attributable to production factors exogenous to the futures market itself. The interesting aspect of the decline in the futures market for storage eggs is that it did not more closely follow the withering of the egg storage industry. Indeed, the futures market grew phenomenally after use of the market by hedgers had begun to decline—a situation unprecedented in futures market history.

The basic questions this article explores are these: (1) why did the egg futures market grow after the use of the market by hedgers had begun to decline; and (2) what factors contributed to the delayed but precipitous decline in the market beginning in 1961? To analyze these questions two types of futures market data have been drawn upon primarily—losses and gains by classes of traders, and com-

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¹ The new futures market for fresh eggs is not simply a continuation of the old one for storage eggs; it has new contract specifications which make it useful to a different group of potential hedgers—principally producers and grocery chains.

position of trade within the market—as well as data on production and marketing changes in the spot market, which had a substantial, but less direct, bearing on the record of the futures market.

Although this evidence relates to a futures market which no longer exists, the findings are relevant to two controversies which concern all futures markets and which, as yet, are not fully resolved: (1) the theory of normal backwardation, which purports to explain profit flows between hedgers and speculators in futures markets; and (2) the hypothesis that futures markets are primarily hedging markets, meaning that their size and health are more closely related to hedging use than to speculative use. However, before exploring the findings and their relevance to these hypotheses, we will first examine the effect of the reduction in egg storage on short hedging in the egg futures market.

EGG STORAGE AND SHORT HEDGING

Most of those who hedged in the old futures market for storage eggs were the egg dealers, who handled the refrigerated storage of shell eggs and sold eggs at wholesale levels. With the reduction in egg storage, short hedging² in the egg futures market declined as well. However, egg stocks and short hedging did not decline proportionally (see Chart 1). Instead, while egg storage fell precipitously, short hedging on the futures market declined much more gradually, implying that the dwindling egg stocks were more fully hedged in recent years.

The changing proportions of stocks hedged leads to two questions: (1) why were large stocks of eggs held unhedged in the 1940s; and (2) what motivated egg storers to hedge their inventories more fully since the mid-1950s?

Regarding the first question, it should be noted that the Second World War interrupted activity on the egg futures market between 1942 and 1945, causing short hedging to drop to very low levels while egg stocks were extremely high. Although the war years account for the dip in activity on the egg futures market and thus some of the variability in proportions of stocks hedged, they do not explain the generally high level of stocks held unhedged at the beginning of the 1940s.

There are a number of reasons why potential hedgers might shun a futures market. In this particular case there is evidence that hedgers restricted their use of the market in the early 1940s because it was not sufficiently liquid at that time to provide a good market for hedging.

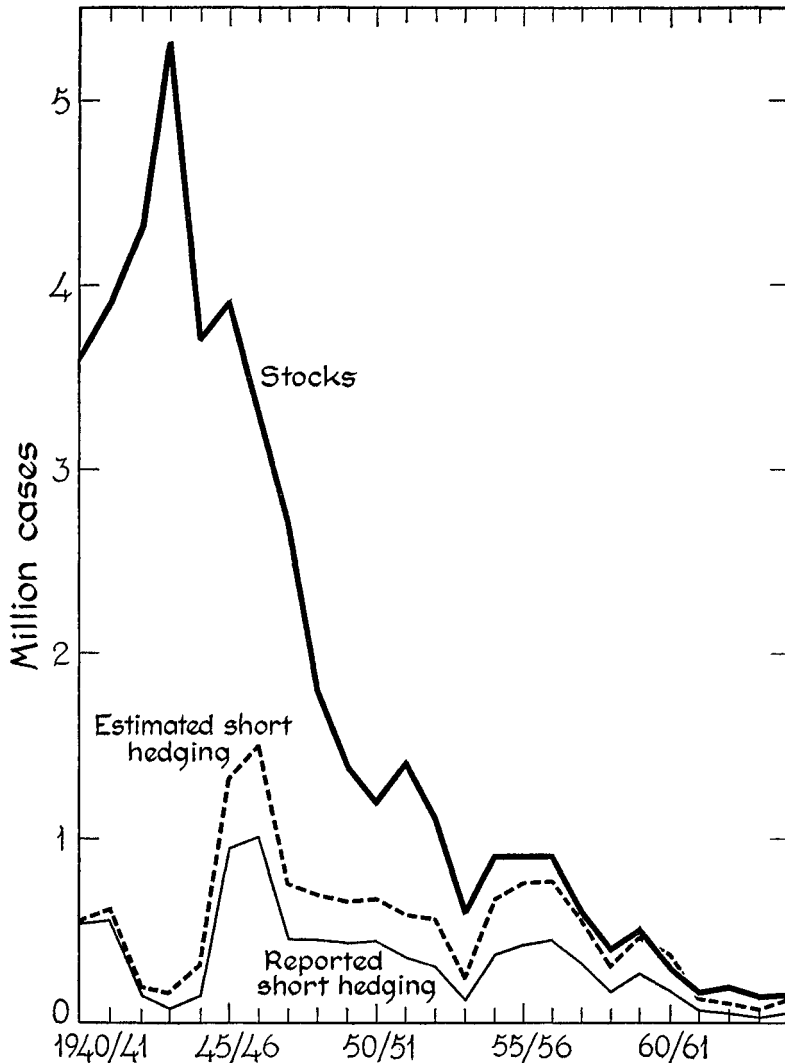
Speculation—in particular professional speculation—adds liquidity and flexibility to a market and permits the market to absorb the large buy or sell orders of hedgers with little price effect.³ Conversely, when speculation is insufficient, hedgers are penalized by the fact that in placing and lifting large orders their transactions move prices adversely. Therefore, the adequacy of speculation—or liquidity—in a futures market is reflected in the ability of the market to absorb large hedging transactions with little price effect.

² Most hedging by storers is short hedging, i.e., storers sell futures contracts (go short) when they purchase their inventory and buy futures contracts (offset their futures position) when the inventory is liquidated.

³ See discussion on page 283 regarding the liquidity provided by professional speculators.

CHART 1.—ANNUAL AVERAGES OF MONTH-END SHELL EGG STOCKS IN THE UNITED STATES, AND OF MID-MONTH AND MONTH-END REPORTED SHORT HEDGING AND OF ESTIMATES OF TOTAL SHORT HEDGING IN THE EGG FUTURES MARKET, 1940-41 TO 1964-65*

(Million cases)



* Data from Chicago Mercantile Exchange, *Year Book*, various issues; and from U.S. Dept. Agr., Commodity Exchange Authority (CEA), *Commodity Futures Statistics*, various issues.

The reported short hedging figures include only the hedging of large hedgers—those who held positions of twenty-five contracts or more. (One contract equals one carlot.) In order to estimate the total amount of short hedging in a futures market it is necessary to classify in some manner the positions of nonreporting traders, since that category includes the commitments of all small traders. The formula used to estimate total short hedging in Chart 1 is:

$$\text{Log } \frac{\text{total short hedging}}{\text{reported short hedging}} = -.12 - .006 \text{ short commitments of nonreporting traders}$$

The following evidence from a full market survey of the egg futures market conducted by H. S. Irwin in 1939 (17) indicates that there probably would have been more short hedging and egg stocks would have been more fully hedged had there been more speculation in the egg futures market at the beginning of the 1940s. Irwin advanced the following evidence in support of this view: (1) among those classified as speculators on August 31, 1939, only *one* was described as a professional trader, and his holdings comprised only 1.7 percent of the long side of the market; (2) industry-oriented participation on that date comprised the entire short side of the market and about 71.5 percent of the long side of the market; (3) hedging comprised nearly all (97.5 percent) of the short side of the market; (4) although the entire long side of the market was classified as speculative, Irwin states that some traders held long positions in anticipation of future needs in the spot market.⁴ In addition to this evidence, Chart 2 indicates that in the year following the 1939 survey hedging still comprised a very large proportion of the short side of the market and short hedging moved closely with total short commitments, suggesting that very possibly hedgers were using the egg futures market as fully as feasible in view of the limited liquidity provided by speculators.

Of the evidence on hand, the fact that only one speculator was described as a professional trader is probably the most significant. Recent work by R. W. Gray (3) and Holbrook Working (14) provides evidence that professional speculators respond directly to the buying and selling decisions of hedgers, whereas avocational speculators do not. If this is the case, it is primarily the professional speculators who provide the liquidity which permits hedgers to place large orders with little price effect. With only one such trader in the market on the 1939 survey date, it is probable that the adverse price effects of hedging in this period inhibited the use of the egg futures market by hedgers.

Since a lack of speculation at the beginning of the 1940s has been deemed responsible for inhibiting the full use of the market by hedgers, one might conjecture that the inclination of storers to hedge egg stocks more fully in later years might be related to a change in the speculative interest in the futures market. And indeed, our findings indicate that this is so. As speculative interest in the market increased in the late 1940s and 1950s, potential hedgers found it advantageous to hedge their egg stocks more fully.

The proportion of stocks hedged in the futures market for storage eggs was related to costs to hedgers of using the market. These costs were directly related

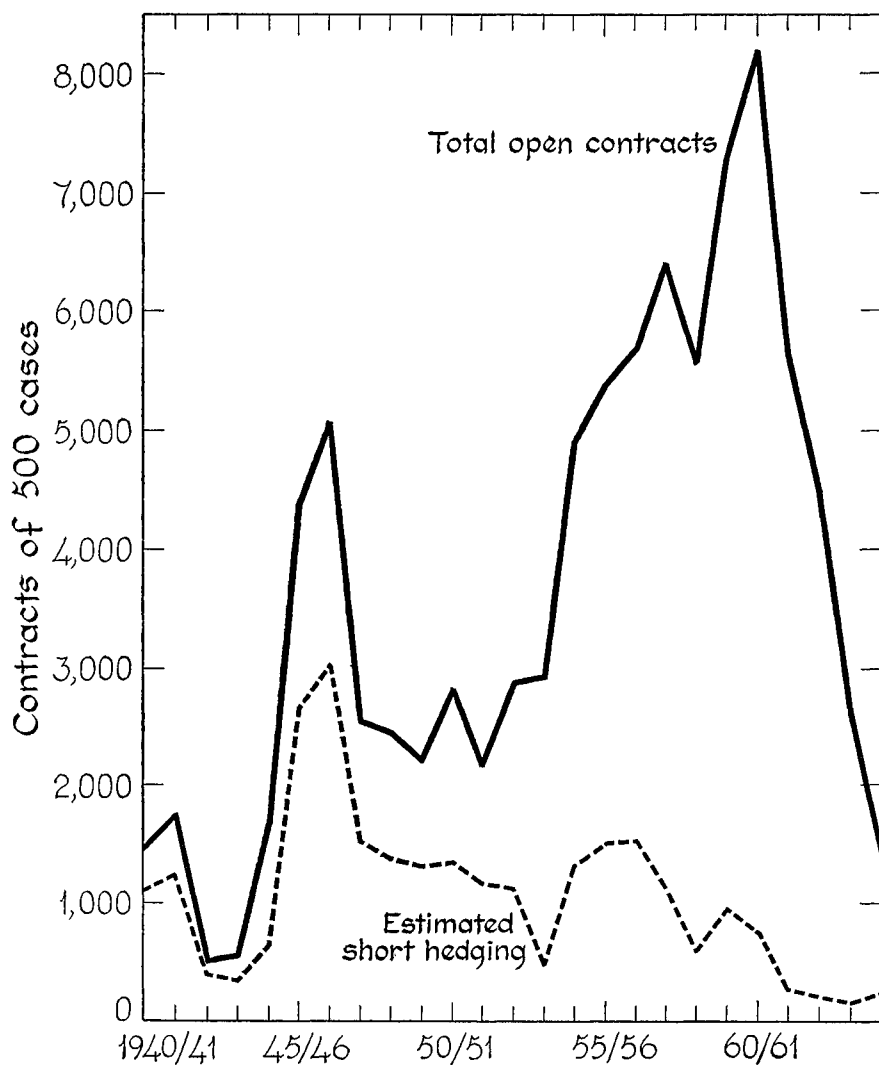
⁴ Buying futures contracts in anticipation of expected needs in the spot market is now considered anticipatory hedging in some cases. At the time of the 1939 survey, however, such transactions were classified as speculation.

Note to Chart 1 (*continued*)

The formula was developed by Arnold B. Larson who analyzed data from twenty-six full market surveys in nine futures markets, including the 1946, 1949, and 1960 surveys in the egg futures market. (See 10.)

Although there is evidence that at least one figure (for 1960/61) overestimates total short hedging (since estimated short hedging exceeds egg stocks that year), it is even more certain that using reported short hedging as a proxy for total short hedging would err on the low side every year. Full market surveys conducted in the egg futures market in 1939, 1946, 1949, and 1960 indicate that hedging by small hedgers was not an insignificant amount of the total hedging in the egg futures market on any of the survey dates.

CHART 2.—ANNUAL AVERAGE MID-MONTH AND MONTH-END OPEN CONTRACTS AND
ESTIMATED SHORT HEDGING, EGG FUTURES MARKET, 1940/41 TO 1964/65*
(Contracts of 500 cases)



* Data from or based on U.S. Dept. Agr., Commodity Exchange Authority, *Commodity Futures Statistics*, various issues. For method used to compute estimates of total short-hedging commitments, see footnote for Chart 1.

to the liquidity of the market, which in turn were largely the result of the activities of professional speculators. Because hedging costs (i.e., the amount the hedger on the average loses or might expect to lose in his hedging transactions) are closely related to the way the futures market for storage eggs was used, an understanding of the pattern of profits and losses in the market is essential to an analysis of the changing composition of trade during the period under study.

PROFIT FLOWS

The Theory of Normal Backwardation

The notion that hedgers pay for the privilege of hedging is the essence of the theory of normal backwardation first advanced by J. M. Keynes in a 1923 article in *The Manchester Guardian Commercial* (9) and later elaborated in a chapter in his *Treatise on Money* (8). Keynes's major conclusion was simply that there is a flow of money from hedgers to speculators in a futures market. Since it is a zero-sum situation in which the losses of one class of traders must equal the gains of the other, it was his opinion, given certain assumptions, that when profits and losses were averaged out, the speculators in a futures market consistently gained at the expense of the hedgers.

The critical assumptions in Keynes's argument were: (1) that speculators prefer the long side of the market while hedgers are generally net short; and (2) that futures prices have a downward bias (meaning that they are systematically underestimated and tend to rise from the inception to the maturity date of a contract). Thus, it was his supposition that speculators, merely by being long in a futures market, would gain because of the rising futures prices.

Keynes termed the downward bias, which he thought he observed, "normal backwardation," and therefore the entire rationale he developed to explain the bias has been termed the "theory of normal backwardation." The theory has also been called the "risk premium theory" because it explains profit flows by an insurance rationale—with hedgers the insured, with speculators the insurers, and with profit flows between them (the major component of hedging costs) the risk premiums.

Keynes's arguments for a price bias admitted the superior judgment of hedgers while predicting that on the average they lost money in a futures market. This he assumed to be so because hedgers viewed the futures market as an institution through which they could insure against the risk of loss from adverse price movements in the spot market. Hedgers were willing to hold short positions in a futures market—even when they expected the futures price would rise—because the benefits in the form of reduced price risks outweighed the probable losses in the futures transactions.

Therefore, according to Keynes, a downward bias in futures prices is *tolerated* by hedgers and *demand*ed by speculators. As he portrayed the situation, speculators would continue to speculate only if on the average they earned profits; and since they did not possess acumen superior to that of the hedgers, speculators could earn profits only if futures prices were sufficiently biased in their favor. Thus, downward price biases were treated as a normal, indeed a necessary, phenomenon, in futures markets.

H. S. Houthakker introduced a modification of Keynes's original assumptions (7). He recognized that Keynes's assumptions that there is a downward bias in futures prices and that speculators typically take net long positions were insufficient to prove the existence or generality of speculative profits in futures markets. Unless futures prices rise monotonically over the period of the contract, and unless speculators, as a group, are *always* net long, there remains the possibility that occasional reversals in the upward trend of futures prices or in the net position

of speculators could outweigh the effect of the general tendencies assumed by Keynes.

Thus, to balance out the risk premium rationale, Houthakker's amendment predicts upward biases (overestimated futures prices) when hedgers are net long as well as downward biases (underestimated futures prices) when hedgers are net short. Thus the normal backwardation theory with its appendage assumes, *not* that prices are biased downward, but that they are biased *against* the net position of the hedging group, upward or downward as the case may be.

Although evidence of anti-hedger price biases has been found in a number of futures markets for varying periods of time, the following evidence from the old egg futures market indicates a *pro-hedger* bias for one period as well as a probable anti-hedger bias for another. Therefore, the normalcy of anti-hedger price biases is questioned, as well as the risk premium (or insurance) rationale for their existence.

Profits in the Egg Futures Market

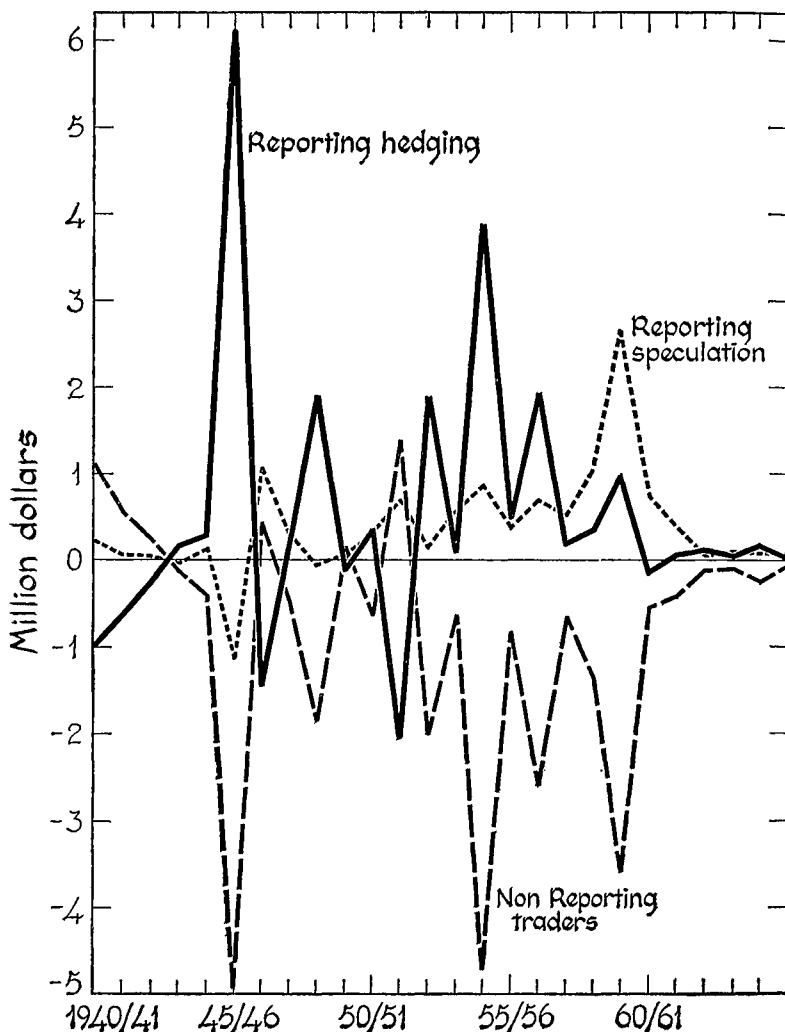
The method used in this study to estimate profits is similar to the direct but approximate measurement of profits and losses by classes of traders used by Houthakker (7) and by C. S. Rockwell (12). (See below.) Since it is a zero-sum profit situation in futures markets, the net gains and the net losses of the three classes of traders (reporting hedgers, reporting speculators, and nonreporting traders) must total zero for each semimonthly subperiod and for each crop year as well.

The classification of market traders follows that used in the CEA annual bulletin, *Commodity Futures Statistics*, from which the data are derived. Reporting (large) traders who hold positions in any one future in an amount no less than a limit specified by the Secretary of Agriculture must daily report their futures transactions in that commodity to the CEA and must classify their positions as speculative or as hedging. (The reporting limit for storage eggs was twenty-five contracts of one carlot each.) Traders who hold less than the reporting limit are not required to report their transactions; however, full market survey data which include comprehensive classification of all traders indicate that a large majority of the small, nonreporting traders held speculative positions on egg futures market survey dates.

Chart 3 illustrates the profit and loss record in the egg futures market, 1940/41 to 1965/66. Even a cursory perusal indicates that reporting hedgers had some extremely profitable years and that they managed to remain on the net profit side of the chart (upper half) most of the years studied, a finding which directly refutes a major premise of the theory of normal backwardation.

However, some qualifications must be noted. The egg economy underwent rather specialized developments in the marketing of cash eggs, and the futures market itself had to respond to these unusual exogenous changes. Thus the futures market for storage eggs cannot be claimed to be typical of futures markets in general or of any group of futures markets in particular. What can be argued, however, is that the theory of normal backwardation is completely incapable of explaining a profit record such as that found for the futures market for storage eggs.

CHART 3.—ESTIMATED NET PROFITS AND LOSSES OF REPORTING HEDGERS,
REPORTING SPECULATORS, AND NONREPORTING TRADERS,
EGG FUTURES MARKET, 1940/41 TO 1965/66*
(Million dollars)



* Basic data are from U.S. Dept. Agr., Commodity Exchange Authority, *Commodity Futures Statistics*, various issues.

No exact compilation of profits and losses of trading groups is possible from the statistical data which is available. However, it is possible to develop approximate profit records using the trading categories—reporting hedgers, reporting speculators, and nonreporting traders—for which semimonthly statistics are published in the CEA bulletin, *Commodity Futures Statistics*. (Prior to the 1947/48 crop year only monthly statistics were published.)

In this annual publication a number of series are given covering the end-of-the-day mid-month and month-end statistics. The prices and open interest are given for each contract month. (Contracts matured in September, October, November, December, and January in the futures market for storage eggs.) There is also a series which gives the long and short commitments held by reporting hedgers, reporting speculators, and nonreporting traders.

Utilizing these statistical series in the following procedure I estimated the profits and losses by trading groups for each semimonthly interval: the initial open interest in each contract was multiplied by the change in price over the interval for each contract, the products were added and then divided by the total open interest in all contracts open to obtain a weighted average price change. The weighted average price change was then multiplied by the mean net positions of each class of traders.

The significant features of the estimated profit and loss record in the egg futures market are as follows:

1. The reporting hedgers by a considerable margin made the largest total profits for the twenty-six-year period studied—almost 13 million dollars; their net profits exceeded their net losses on the average by about \$500,000 each year. In only seven of the twenty-six years did their net losses exceed their net profits.

2. The reporting speculators made small total profits—about 9.7 million dollars—but made the most consistent profits. In only three of the twenty-six years did their net losses exceed their net gains.

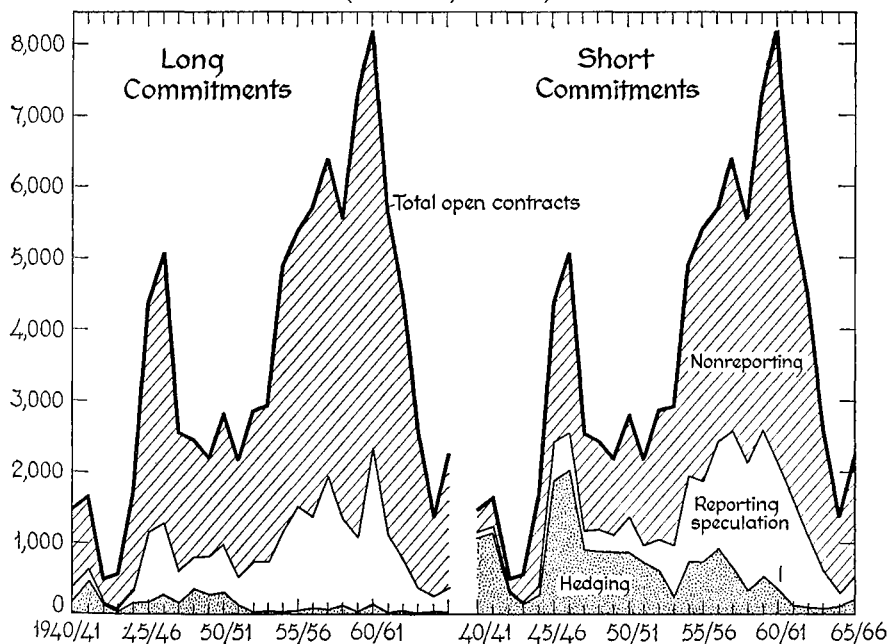
3. The nonreporting traders lost very heavily—nearly 23 million dollars in the twenty-six-year period. In only six of the years studied did their net profits exceed their net losses, and all six of their profitable years occurred during the first half of the period studied.

4. Although available statistics do not permit one to separate the small speculative transactions from the small hedging transactions, the evidence indicates that the fairly consistent losses of nonreporting traders were borne very largely by small speculators rather than by small hedgers, and indeed that the losses of small speculators probably exceeded the estimates of losses for the entire nonreporting group. This is so for the following reasons:

a) Although reported hedging was declining, nonreported trading was growing between 1946 and 1961 at such a rate that the average number of open contracts in the market increased during most years, in some years by a sizable amount (see Chart 4). It is reasonable to assume that the growth in nonreported

CHART 4.—ANNUAL AVERAGES OF MID-MONTH AND MONTH-END COMMITMENTS OF TRADERS, EGG FUTURES MARKET, 1940/41 TO 1965/66*

(Contracts of 500 cases)



* Based on data from U.S. Dept. Agr., Commodity Exchange Authority, *Commodity Futures Statistics*, various issues.

trading was principally a growth in small speculative commitments, since the hedging need as indicated by the amount of eggs stored could in no way account for anything but a decline in hedging participation.

b) During the latter half of the period studied egg futures prices had tended to be overestimated, favoring traders with short positions (see below). Evidence from the full market surveys indicates that small hedgers were net short on the survey dates.⁵ Therefore, it is not only possible, but probable, that small, net-short hedgers profited on the average over the period studied just as large hedgers did, but on a smaller scale. If that is so, the fairly consistent losses of the nonreporting traders are actually an underestimate of net losses incurred by small speculators.

The estimated profit and loss record in the egg futures market offers little support for the theory of normal backwardation, a theory which assumes that hedgers lose money to speculators in futures markets. The only point of partial agreement between this evidence and the theory of normal backwardation is the fact that the large reporting speculators made profits with some consistency. As will be recalled, an important premise of the theory is that speculators (without qualification as to size of commitments) must make profits, not with perfect consistency, but at least on the average. Our data would support the premise if restated as follows: On the average those holding *large* speculative commitments, i.e., reporting speculators, profit from their futures market transactions. We shall present evidence that traders with large speculative commitments will abandon a market if the opportunity for profit disappears. In other words our *reporting* speculators may demand profits to induce them to stay in the market—just as does the entire class of speculators in Keynes's theory.

In defining his terms Keynes did not distinguish between large speculators or those who earn their livelihood primarily by speculating in commodity markets and those speculators with other occupations who only dabble in the market. Thus it was his contention that speculators as a group, be their commitments large, small, or medium-sized, did on the average profit from their transactions in a futures market; and furthermore, that if this were not so, speculators would no longer speculate.

The data from the egg futures market (Chart 3) clearly refutes the premise as stated by Keynes. Although large speculators have profited quite consistently, their commitments have represented only a relatively small fraction of the total speculative commitments in the market. Shortcomings in the data prevent one from estimating the magnitude of the small speculative losses, but the evidence clearly indicates that on the average the net losses of small speculators significantly outweighed the net gains of the large reporting speculators. Thus those with hedging contracts gained at the expense of those with speculative contracts, in direct opposition to the principal hypothesis of the theory of normal backwardation.

⁵ There is a possibility that total short hedging exceeds total long hedging by a greater amount during the season when the surveys were conducted than it may at some other season of the year. These surveys were all conducted during July, August, September, and October when egg stocks and short hedging are at maximums—coinciding also with the peak in total open interest in the market. Processor hedging probably peaks earlier in the year and is more likely to be net long—but since it is considerably less important than the hedging by dealers, the validity of the argument is not seriously weakened by the fact that we have surveys only for July, August, September, and October.

It is argued, then, that the criterion for the backwardation situation proposed by Keynes was not extant in the egg futures market during most of the period studied. Although large speculators made profits, our record implies that in many instances their profits may have been gained at the expense of small speculators, not at the expense of hedgers. And hedgers, who according to the theory of normal backwardation must pay for the opportunity to hedge, instead were able to earn significant profits in the futures market while hedging their dwindling egg stocks.

Conclusions Concerning Price Biases

To refute entirely the theory of normal backwardation on the basis of the record of the egg futures market would imply a greater generality for our data than is justified. Instead it is argued that evidence from the futures market for storage eggs coupled with recent empirical work of Gray (2) and Rockwell (12) are sufficient to deny the Keynesian implication that price biases in futures markets are a normal concomitant of the so-called risk transferral function performed in these markets, and to deny as well that the term "risk premium" is an appropriate appellation for any speculative profits.

Keynes's assumption of a downward bias in *all* futures market prices may reflect his observation of an atypical sample of futures markets. What he proposed as a typical condition in futures markets is apparently not nearly as general as he had assumed.

That price biases are not a normal condition in futures markets has been suggested by Gray (4), Working (15), Telser (13), and Rockwell (12). Gray has most extensively pursued topics concerning the causes for futures price biases, rejecting the assumption that risk transferral is the proper explanation, and suggesting instead that special conditions of market structure underlie most chronic price biases.

Gray designates markets with price biases as "lopsided markets"—in contradistinction to "balanced markets" which display no biases—and notes that thin markets, with a dearth of speculation (such as the now defunct coffee, bran, and shorts markets), were generally lopsided. Two formerly thin and lopsided markets, soybeans and cocoa, are no longer so, and Gray observes that when these markets outgrew their thinness, they outgrew their price biases as well—giving evidence that the biases were directly related to the level of speculative use of the markets. Another of his studies (5) has illustrated how the government loan program has induced a seasonal underestimation of prices in the large, well-used wheat futures market.

Both Gray and Working have provided evidence that futures price biases may also be a reflection of price trends in the spot market—price trends which are not fully anticipated or compensated for by futures traders. They contend that rising spot prices, rather than hedgers' aversion to risk, were primarily responsible for the downward price biases in the corn futures market in 1904/5 to 1936/37 (15) and in 1946 to 1952 (4).

The most comprehensive evidence that downward biases are not normal phenomena in futures markets is given by Rockwell (12). On the basis of his twenty-five-market study he concluded that futures prices are, on the average, unbiased

estimates of ultimate spot prices. He does qualify his statement by saying that this result does not hold "for all markets or for all time periods within a market," noting that there are examples of "temporary price bias conditional upon special conditions of time and market structure. . . ." Thus he endorses Gray's concept of price biases, attributing them to abnormal conditions in a market.

Support for this concept of price biases is also found in the record of the futures market for storage eggs, a market which tended initially to underestimate prices in the earlier years studied, but to overestimate prices in the years after the mid-1950s. Evidence for the underestimation of prices in the earlier years is not as complete as that for the overestimation in more recent years. Activity on the egg futures market was interrupted several times during World War II years, and a continuous price series cannot be constructed for the entire earlier period. However, a continuous daily price series was constructed by Arnold Larson (11) for the period 1955 to 1965, and he noted a distinct downward drift in egg futures prices, most pronounced in the latter 1950s.

Although no similar series has been constructed for the 1940s and early 1950s, the opening and closing prices and ranges of prices for contracts give some indication that prices for the most important contract months were initially underestimated (often by a substantial amount) in all but two of the first thirteen years studied, and that prices were, on the average, initially overestimated in the years since (see Table 1).

The most probable explanation for the tendency of the market to underestimate prices initially in the earlier years studied is suggested by the rising spot prices during the war years and the latter part of the 1940s coupled with the dearth of speculation in the egg futures market at that time. The 1939 full market survey indicates that speculation by the public and by professional traders at that time was very likely inadequate to facilitate full hedging use. In other words, the pressure of large hedging orders meeting insufficient resistance from speculators undoubtedly contributed to the tendency to underestimate prices in the egg futures market, but *only* in the years when there was a dearth of speculation.

The linkage between the approach of Gray and the theory of Keynes becomes apparent. Keynes implied that futures price biases are generated primarily by the needs of hedgers to reduce risks and the relative inflexibility in the timing of their transactions. Gray questioned the universality of the market situation proposed by Keynes and suggested instead that biases generally reflected a thinness of use such as found in developing markets or in "unhealthy" markets which for any of a number of reasons were not receiving normal use.

Although we concluded that the thin speculative use in earlier years contributed to a downward bias (underestimating of prices), the upward bias in the egg futures market in more recent years reflects more than just the change in use. Falling spot prices for eggs combined with ample speculative interest in the market probably did underlie the more recent trend to overestimate futures prices. However, these factors cannot be held fully accountable. While egg spot prices fell, the downward drift in egg futures prices was even more pronounced.

What appears probable is that the rapid changes in the egg economy were not fully anticipated by traders in the futures market. Improvements in production of eggs greatly increased efficiency, perhaps more than futures traders calculated,

TABLE 1.—PRICE RANGES ON THE SHELL EGG FUTURES MARKET,
OCTOBER CONTRACT 1941-51, SEPTEMBER CONTRACT 1952-65*
(U.S. cents per dozen)

Year of contract	Open	Close	Net change	High	Low	Range
OCTOBER CONTRACT						
1941	20.25	29.80	+ 9.55	30.75	18.65	12.10
1942	32.25	37.65	+ 5.40	37.65	31.30	6.35
1943	40.00	43.40	+ 3.40	44.50	40.00	4.50
1944	39.50	37.30	- 2.20	42.00	33.50	8.50
1945	36.00	47.20	+11.20	47.20	34.10	13.10
1946	35.00	37.50	+ 2.50	46.40	35.00	11.40
1947	38.00	49.00	+11.00	58.55	36.75	21.80
1948	43.00	48.35	+ 5.35	53.70	43.00	10.70
1949	44.90	54.45	+ 9.55	56.75	44.80	11.95
1950	37.75	35.50	- 2.25	40.65	32.25	8.40
1951	38.00	47.40	+ 9.40	54.70	36.60	18.10
SEPTEMBER CONTRACT						
1952	43.05	43.40	+ .35	50.35	41.45	8.90
1953	45.50	52.55	+ 7.05	54.85	43.50	11.35
1954	45.00	29.45	-15.55	47.80	26.75	21.05
1955	36.00	40.40	+ 4.40	47.90	34.95	12.95
1956	41.50	34.65	- 6.85	46.90	29.75	17.15
1957	38.00	33.00	- 5.00	40.60	30.85	9.75
1958	39.00	41.20	+ 2.20	43.30	30.80	12.50
1959	35.50	27.30	- 8.20	37.80	24.75	13.05
1960	33.75	34.75	+ 1.00	38.60	29.25	9.35
1961	37.50	35.55	- 1.95	38.70	32.70	6.00
1962	35.00	38.55	+ 3.55	39.00	30.10	8.90
1963	34.00	34.30	+ .30	36.10	32.25	3.85
1964	33.10	33.35	+ .25	37.25	32.00	5.25
1965	33.00	28.95	- 4.05	35.75	28.50	7.25

* Data from Chicago Mercantile Exchange, *Year Book*, 1965-66. Before 1952 there was no September contract. The first contract of the season is used for all the years, since generally there is open interest in this contract for a longer time period than in other contract months, and frequently it is the most heavily traded contract.

so that in some years their predictions may have underestimated future supplies. Developments on the other side of the market in all probability led to an overestimation of future demands, thus compounding the problem. The gradual population growth was undoubtedly foreseen, but it appears likely that a continued decline in the per capita consumption of eggs was not fully anticipated.

In addition to the influences encouraging both the underestimation of future supplies and the overestimation of future demands, there is evidence that egg prices have become less elastic since World War II. The estimate of the price elasticity of demand for eggs for the 1957-59 period was low indeed, $-.30$ (1), indicating that when gluts developed in the egg economy, prices had to fall significantly in order to clear the market, especially since the perishability of eggs made carryovers not a feasible option.

Although the egg futures market displayed evidence of both a downward and

an upward bias during the period studied, neither of these biases could be justly attributed to a "normal risk reduction function" of the market.

"Risk premium" appears to be an inappropriate label for any speculative profits primarily for reasons set forth in the preceding section. Keynes proposed that price biases—which offered opportunity for speculative profits—were a normal phenomenon of futures markets. However, recent evidence indicates that biases are generally not found when a market is receiving "normal" use, and that when biases are found in futures prices they are only indirectly, if at all, related to risks. Therefore, referring to any profits partially attributable to price biases as "risk premiums" is questionable.

Indeed, when considering the results of his twenty-five-market study, Rockwell indicated that profits attributable to price biases made a negligible contribution. He concluded that "all important profit flows are to be explained in terms of forecasting ability. That is, the proportion of profits attributable to normal backwardation is zero" (12, p. 109).

As we have seen, evidence from the egg futures market, a somewhat atypical market, indicates that hedging needs may have helped to generate biases which influenced profits, but *only* in the period when speculative interest in the market was low. Production and demand developments in the larger egg economy coupled with changes in the composition of trade in the futures market itself were more important factors influencing the flows of profits for the entire period.

The sizable hedging profits are probably unparalleled in futures market literature. The fairly consistent losses of small speculators are not so unusual, though this possibility was not recognized by proponents of the theory of normal backwardation, except for Houthakker.

A continual drain on the resources of small speculators was possible in the egg futures market and has been found in some other markets as well because such traders generally constitute a fairly transient group. Small traders who are highly successful in their speculations are encouraged by their success to make larger commitments and thus may graduate to the reporting speculative category. And if the losses of small traders become burdensome, they may decide not to trade in the market any longer. In a market with an active speculative following, the frequent exodus of small losers may have little effect on the total trade, since the market may attract new speculation to more than compensate for those who leave. The large reporting speculators, however, are not such a fluid group. Evidence from this study as well as from others indicates that they generally do profit from their futures transactions and in addition would not be willing to continue trading otherwise.

The unusual profit patterns in the egg futures market affected its use. The interdependence of use and profits are analyzed once again in the following section, but with accent on the exceptional use of the market rather than on the profit opportunities such patterns of use may engender.

THE USE OF THE EGG FUTURES MARKET

As a percentage of total open contracts, hedging had a downward trend throughout the period studied although the average number of open contracts held by hedgers declined only beginning in the late 1940s. For about fourteen

years, from 1947 to 1961, there were divergent trends in use; total activity in the market was increasing while hedging use was declining. This fact appears to be a direct refutation of the well-supported hypothesis that the size of a futures market is related to the amount of hedging business that it attracts.

As stated earlier, the egg futures market was influenced by exogenous factors. The decline of storage forced the reduction of hedging while other outside factors (soon to be discussed) encouraged the growth of avocational speculation. Thus conditions outside the market underlay basic changes in the composition of trade. Only an understanding of the response of regular trading groups within the market, however, can elucidate the pattern fully. Recent studies which differentiate the methods and activities of speculative trading groups are helpful in this analysis.

Differentiating Trading Methods of Speculative Groups

The role of the speculator is usually described as that of assuming risks of price fluctuations with the hope of profiting thereby. When the theory of normal backwardation was first postulated by Keynes, it described the speculator as one who needed no talent in order to profit in commodity futures markets, so long as he possessed financial assets sufficient to carry him through short-term losses, and so long as he was willing to remain on the long side of the market (this argument assumed that hedgers are net short). Later, J. R. Hicks (6, pp. 137-39) and others who perhaps knew of speculators who remained on the long side in a futures market and who did not succeed were ready to acknowledge that successful speculators generally possess some skill in forecasting prices.

Controversy over the theory of normal backwardation led to a closer scrutiny of biases in futures prices and of the consequent opportunities for speculative profits. Even those who found biases concluded that profits were one means of measuring the skill possessed by any speculator (cf. 7), and thus in some degree equated skill with success.

The more recent trend in research has been to differentiate subgroups within the heterogeneous speculative category. The subgrouping has been on the basis of skill, size, or professionalism, or some combination of these groupings, since professional speculators generally hold larger commitments and display more skill in profit-making than traders who speculate as a sideline.

Recent research into the trading methods of professional speculators indicates that skill may indeed be important in determining profits, but what is more significant about the new findings is that the ability to forecast price trends may *not* be the skill employed by an important portion of the professional speculators.

Gray (3) and Working (14) have done recent research on the trading methods of spreaders and floor traders,⁹ which implies that the level of prices in a futures market is probably influenced more by the judgments of hedgers than had heretofore been assumed. It has been common in the literature on futures trading to characterize the influence of hedgers upon futures prices as inadvertent or incidental, with speculators the important price-setters. However, Working gives detailed evidence that floor traders are primarily scalpers who earn profits by trading on the dips and bulges in prices rather than by accurately predicting

⁹ Spreaders and floor traders are overlapping categories. Probably most spreaders are floor traders.

price trends, and Gray postulates that a sophisticated subgroup of speculators, the spreaders, "undertake to anticipate hedgers, instead of attempting direct and 'original' price forecasts" (3, p. 191).

Gray also suggests that avocational speculators (who usually comprise most of the nonreporting group) are *not* hedge-anticipators; they attempt to forecast price trends using techniques similar to but less sophisticated than those of the hedgers. Thus the sizable influx of small speculators into the egg futures market affected profit opportunities in that market and consequently had unusual repercussions on the use patterns of hedgers and reporting speculators as well.

The Rise in Speculative Interest

It was previously mentioned that before World War II hedging was restricted in the egg futures market because of a dearth of professional speculation and a consequent lack of liquidity; for this reason about three-fourths of the eggs stored were not hedged. This situation was soon to change, however.

Incomes rose rapidly in the United States during World War II; unemployment was at a minimum, and the mid-1940s found an increasing portion of the United States population with investable funds, some looking for profit opportunities to enhance their savings. Brokerage firms undoubtedly were instrumental in introducing clients to the commodity markets and perhaps in steering them to the egg futures market in particular. In any case, there was a general expansion of interest by the public in speculation in futures markets, and the egg futures market received a generous share of the influx of new speculative interest.

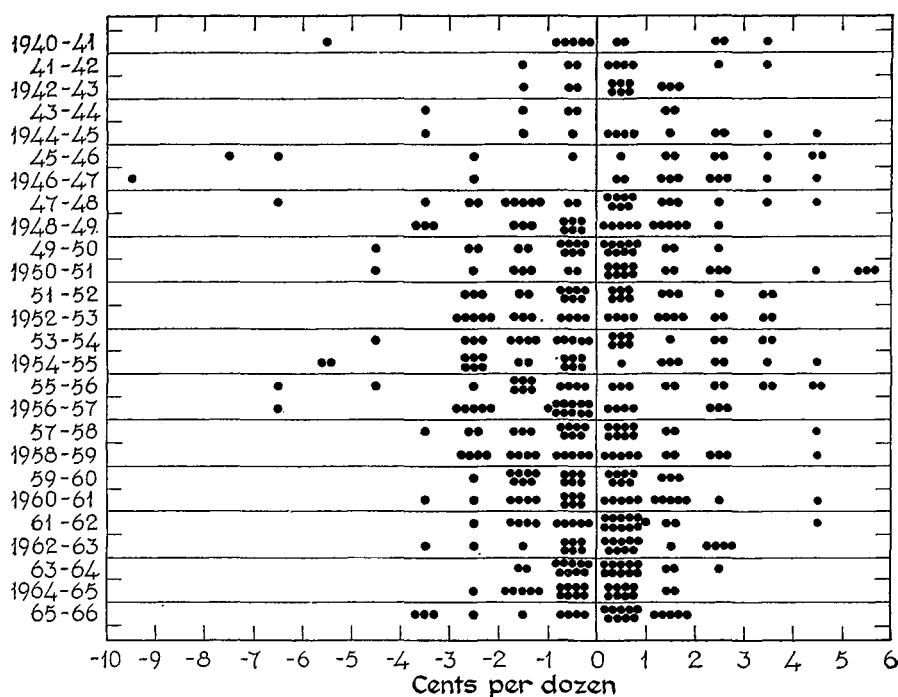
People new to commodity speculation might have been attracted to the egg futures market rather than to one of the other futures markets for several reasons. Perhaps more than any other commodity traded on the exchanges, eggs were a familiar product to a large portion of the population; not only did Americans regularly buy and consume eggs, but many had some knowledge of egg production as well. Backyard flocks were still prevalent on United States farms in the 1930s and 1940s, and many Americans had some understanding of the egg economy from their own experience or from that of family members or friends involved in poultry and egg enterprises.

For investors ignorant of foreign markets, eggs also had the advantage of being almost entirely a domestic commodity. United States exports and imports of eggs have been a negligible portion of either demand or supply. In addition, our government has had relatively little influence on the egg market, so that speculators did not have to anticipate the impact of the actions of government agencies on the egg economy. However, perhaps the factor most responsible for the popularity of the egg futures market was the fact that prices in the egg economy were volatile, offering opportunities for exciting profits through speculation.

The first big influx of small speculators occurred immediately after World War II. (See nonreporting category on Chart 4.) The new speculation was predominantly long, tending to bid up futures prices. Egg dealers and storers promptly responded by increasing their short hedging, holding their stocks more fully hedged than before. Reporting speculation increased as well, and undoubtedly partially in response to the increased hedging use.

After the surge in speculation in 1945 and 1946 the size of the market dropped

CHART 5.—MAGNITUDE OF SEMIMONTHLY WEIGHTED AVERAGE PRICE CHANGES,
EGG FUTURES MARKET, 1940/41 TO 1965/66*
(Cents per dozen)



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

The weighted average price changes were calculated according to the method described in the footnote for Chart 3.

For the first seven years only monthly data were available. Several years indicate one less observation (eleven or twenty-three) because the weighted average of price changes for one period during the year was zero. The years 1942/43 and 1943/44 were war years and trading was not continuous; therefore, there were only nine and six observations, respectively.

back almost to prewar levels, and for the next seven years it grew only slowly and spasmodically. It is argued here that a high rate of market use was not sustained in the late 1940s because the response of regular market traders to the influx of speculation was not sufficient, that indeed, although hedgers, professional speculators, and other regular users of the egg futures market did adapt somewhat to the changed market situation, they were not fully prepared for the sudden growth in public speculation which occurred and did not respond adequately.

The evidence to support this argument is as follows. There were several sharp price declines in the egg futures market during 1945 and 1946 (see Chart 5). Although uncertain economic conditions in the United States immediately following World War II may have contributed to the price gyrations, it appears probable that the fluctuations were partially a reflection of the entrance into the market of predominantly long avocational speculators who faced only weak price defense from the regular market traders. Thus the egg futures prices were bid up considerably above the prices expected by the egg industry; and as the time ap-

proached when the major contracts (October and November) would mature, the prices in the egg futures market had to reflect more closely the conditions in the spot market. Thus the market experienced some sharp price declines. During the month of September 1946 the October contract dropped 7.55 cents per dozen and the November contract (with by far the most open interest) dropped 9.75 cents per dozen.⁷

The sharp price declines were reflected in the profit record (see Chart 3) and give an obvious clue to the dampened speculative fever. The year 1946 was one of enormous losses for small traders. And the record of price changes (Chart 5) indicates that the great losses were not the accumulation of little losses of many small traders over a gradual price decline. Instead they were primarily the result of the sharp price drops which probably wiped out, rather than disappointed, a number of the longs in the market.

The discouragement of speculative interest, however, was clearly not in the interest of the regular market traders, and after the Korean War, when the egg futures market received another influx of speculators, the expansion was sustained (Chart 4). It appears that regular market traders responded more adequately to this second wave of public interest. Indeed, *how* the market traders responded is a question relevant to the controversies discussed earlier.

The egg futures market is not the only market which has had to respond to changes in the speculative interest of the public. It is not uncommon for hedging firms to adjust their level and mode of use to the conditions of liquidity in a futures market. What appears unique in this instance, however, is that the onslaught of public speculation in the egg futures market occurred at a time when the needs for hedging were diminishing rapidly. The influx of small speculation—predominantly long—created excess hedging capacity in the market; in other words, there was pressure on the long side of the market which in this instance could not be adequately met by hedging, since it far exceeded the level of egg stocks. Thus the hedgers could not sufficiently increase their hedging commitments to meet the upward pressure on prices created by the small speculative longs.

Reporting speculation, however, did expand (see Chart 4) and increasingly sided with hedging on the short side of the market (see Chart 6). Thus it was large speculators who provided the price defense which helped protect the market from the price gyrations of 1945 and 1946 and thus permitted the market growth of the 1950s.

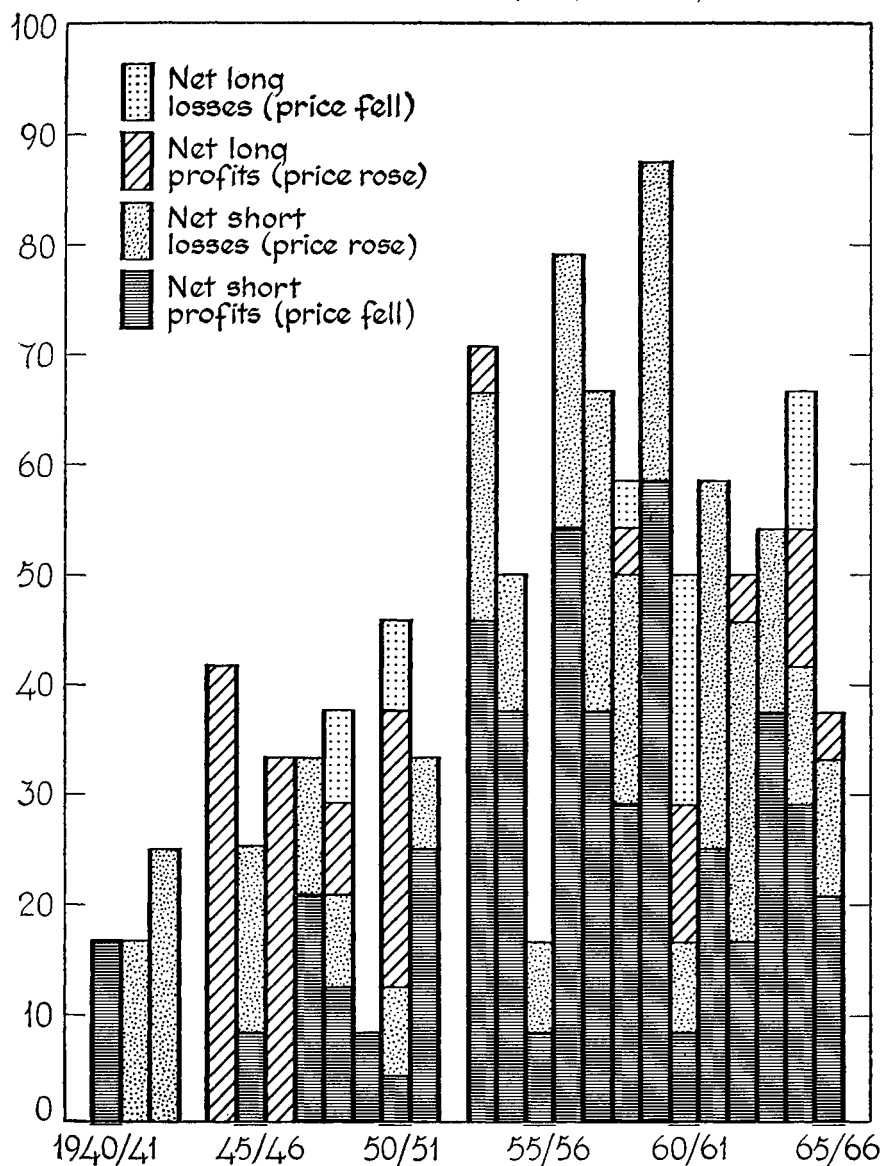
A portion of the reporting speculative group was comprised of the professional speculators.⁸ Undoubtedly some (if not all) of the speculators who were accustomed to providing the immediate liquidity needed by hedgers became “market makers” in a broader sense—making a market for the public speculators rather than the hedgers as hedging waned and speculation by the public thrived.

However, the evidence does not indicate that the reporting speculative group was primarily comprised of floor traders and other professional speculators. Instead our findings suggest that, although on the average the largest commitments

⁷ A price drop of similar magnitude occurred in the market in September and October 1955 and, as following paragraphs show, probably reflected a similar market situation.

⁸ Professional speculators generally hold large reporting positions in a futures market. Although they may hold a major portion of the reported speculative positions, this is not necessarily the case.

CHART 6.—PERCENTAGE OF SEMIMONTHLY STATISTICS WHICH SHOW NET POSITIONS OF REPORTING SPECULATORS AND REPORTING HEDGERS ON THE SAME SIDE OF THE MARKET, EGG FUTURES MARKET, 1940/41 TO 1965/66*



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

held by reporting speculators were those of professional speculators, as an occupational group they held a relatively small portion (less than 20 percent) of the total commitments in this category. The major response to the influx of small speculators came from "hedgers-turned-large-speculators."

The full market survey of 1960 indicates that the commitments of reporting

TABLE 2.—PERCENTAGE OF TOTAL COMMITMENTS HELD, ACCORDING TO OCCUPATIONAL CLASSIFICATION*

Occupational classification	Average number of contracts held per		Percentage of total commitments held by					
			Speculators		Hedgers		Total	
	Speculator	Hedger	Long	Short	Long	Short	Long	Short
1939 FULL MARKET SURVEY								
Egg dealers	4.0	65.5	60.0	2.5	0.0	50.6	60.0	53.1
Related industries ^a	4.6	151.3	11.5	.1	0.0	46.8	11.5	46.9
Subtotal			71.5	2.6	0.0	97.4	71.5	100.0
Professional trader	66.0	0.0	1.7	0.0	0.0	0.0	1.7	0.0
All remaining	2.2	0.0	26.8	0.0	0.0	0.0	26.8	0.0
Totals			100.0	2.6	0.0	97.4	100.0	100.0
1946 FULL MARKET SURVEY								
Egg dealers and distributors	0.0	36.1	0.0	0.0	12.8	79.4	12.8	79.4
Egg processors	0.0	44.1	0.0	0.0	1.4	5.8	1.4	5.8
Distributors of agricultural products ^b	5.2	0.0	13.6	5.4	0.0	0.0	13.6	5.4
Farmers and hatcheries	2.7	0.0	8.4	.7	0.0	0.0	8.4	.7
Subtotals			22.0	6.1	14.2	85.2	36.2	91.3
All remaining ^c	3.5	0.0	63.8	8.7	0.0	0.0	63.8	8.7
Totals			85.8	14.8	14.2	85.2	100.0	100.0
1960 FULL MARKET SURVEY								
Egg producers and hatcheries	9.0	7.1	3.4	3.4	.1	.3	3.5	3.7
Egg dealers and handlers	14.1	27.5	8.6	25.8	2.9	9.9	11.4	35.7
Egg processors	13.4	18.7	1.3	1.2	.4	.7	1.7	1.9
Feed dealers, manufacturers and suppliers	4.8	12.0	1.9	.6	.1	0.0	2.0	.6
Subtotals			15.2	31.0	3.5	10.0	18.7	41.9
Floor traders	18.6	0.0	2.7	5.4	0.0	0.0	2.7	5.4
Professional speculators	26.8	0.0	1.9	1.6	0.0	0.0	1.9	1.6
Subtotals			4.6	7.0	0.0	0.0	4.6	7.0
All remaining ^d	5.0	35.5	75.0	50.3	0.0	.7	75.0	51.0
Totals			94.8	88.3	3.5	11.6	98.3	99.9

* Based on U.S. Dept. Agr., Commodity Exchange Authority, special surveys for the indicated years.

^a This classification included produce dealers, cold storage warehouses and warehousemen, egg processors, bakers, cheese dealers and dairymen, meat packers.

^b In the 1946 survey the occupational classes of speculators were separated from those of hedgers. Therefore, it is not known to what extent "Distributors of Agricultural Products" overlapped the category "Egg Dealers and Distributors."

^c Professional speculators were not given a separate classification in the 1946 survey.

^d Two hedgers were classified outside of the egg industries grouping; one was classified under "farmers and farm managers"; the other was classified under "dealers in farm commodities other than eggs."

speculators were increasingly those of men in the egg industry, traders who had always traded on the fundamentals of supply and demand in the spot market and in the futures market. They were the traders who recognized the need for price defense in the market, or more bluntly, the opportunities for profits. (See Table 2.)

Table 2 indicates that on all survey dates^e egg dealers and handlers held a sizable portion of the short side of the market. In 1939 and 1946 their short commitments were listed entirely as hedging, but in 1960 their short commitments were mostly speculative. They held 25.8 percent of the short side as speculators

^e The 1949 survey did not contain occupational data on traders and therefore was not included in Table 2.

and 9.9 percent as hedgers for a total of 35.7 percent of the short side of the market.

The 1960 survey did not cross-classify occupational data with information on the size of commitments. Therefore, it is not possible to know what portion of the commitments of any occupational group were reported. However, it is possible to ascertain the average size of commitments per occupation from data on the number of traders and the total commitments for each occupational group. It is apparent that the speculative holdings of the traders in egg industry occupations averaged considerably larger than commitments of other speculative groups (with the exception of the floor traders and other professional speculators) and thus that a good portion of their commitments were probably in the reporting rather than the nonreporting category. Since floor traders and other professional speculators combined held as a maximum only 7 percent of the short side, and reporting speculators as a trading group held over 36.7 percent¹⁰ of the short side, it can be deduced that at least 29.7 percent of the short side was held by large speculators who were *not* classified as floor traders or as professional traders. It is argued here because of the larger average commitments of egg dealers and handlers (and egg processors as well) that the "egg men" were almost certainly the dominant group within the reporting speculative category.

It is our hypothesis that the means by which the egg futures market grew to unprecedented heights during a period when hedging needs in the market were declining is the following: New, predominantly long speculators met sufficient price resistance from market shorts that the egg futures prices (although slightly overestimated) were kept fairly well in line. The price defense was not provided by hedging or by professional speculation, but principally by the speculation of hedgers-turned-speculators.¹¹ These were hedgers or former hedgers who no longer could profit by carrying sizable egg stocks but who saw profit opportunities in speculation and who thus became the dominant force in the reporting speculator group, defending prices against the sporadic onslaughts of avocational speculation.

The Decline of the Egg Futures Market

The next question is: What caused the demise of this unusual equilibrium growth situation just described? What precipitated the abrupt reversal in the trend of market activity in 1961?

As is commonly the case in examination of futures market phenomena, there was a sufficient number of factors influencing the decisions of traders that it is not possible to uncover a simple causal relationship. However, the price series, the profit records, the patterns of use, and the long and short commitments of trading groups all contribute some clues as to the reasons for the rapid abandonment of the egg futures market.

First and foremost, however, the unique and artificial foundation of use in the egg futures market undoubtedly made it vulnerable to minor changes in its

¹⁰ Computed from data in Table 9 of 16.

¹¹ The argument is not meant to imply that there is anything uncommon about hedgers in a market holding speculative positions as well. What was uncommon about the situation in the egg futures market was that the commitments of these traders became predominantly speculative as the opportunity for hedging declined and that their commitments comprised a major portion of the reporting speculative category.

compositional balance. The market did not have the resilience provided by a healthy hedging use. To be sure, some of the same men and firms may have traded in the market for many consecutive years, first as hedgers and then primarily as speculators. However, once their futures transactions were no longer related to their merchandising and processing operations, profits alone held them to the market. And our evidence would indicate that when their relatively easy profit opportunities showed signs of weakening, these traders were ready to desert.

Hints of the weakened profit opportunities for large speculators may be gleaned from several sources. The following paragraphs illustrate how the interaction of various market forces undoubtedly strengthened the disequilibration and contributed to the phenomenal rate of abandonment experienced in this market.

Although the large speculators may have initiated the desertion, it must be remembered that their profits were primarily at the expense of the numerous, unskillful small speculators, of which the nonreporting group was principally comprised. Thus the analysis of the downfall of the market begins with the profits, losses, and long and short commitments of this trading group.

Chart 3 indicates that the losses of small traders were very large in 1959/60. In the twenty-six-year period studied, only twice before did the net losses of this group exceed those of 1959/60; that was in 1945/46 and in 1954/55. Chart 4 shows that these three years were also years of rapid growth in market use. Thus the losses of the relatively unskilled group were most pronounced in years when new, predominantly long, unskilled traders came into the market.

The effect of the heavy losses on the small speculator group appear to have been twofold: some heavy losers undoubtedly left the market immediately, although mass exodus from the market was only apparent in the year after the first heavy loss; small traders who traded in egg futures in the year following heavy losses had a greater affinity for the short side of the market.

In 1945/46 it appears that a number of small traders who sustained losses were hit with sufficient force to eliminate them from the market. In the two later years of heavy losses the response of small traders was not so much to abandon the market immediately but to take more short positions the following year. In 1960/61, following the heavy losses of 1959/60, the enthusiasm of small traders for the short side of the market was sufficiently great that in all but five of the twenty-four semimonthly statistics, nonreporting traders were net short, and for the year as a whole the small traders averaged a net short position.

This affinity for the short side of the market had a pronounced effect on profits. It did not enable the small, relatively unskilled traders to make net profits in 1960/61, but it certainly cut their losses and made the profits of large speculators and hedgers considerably more problematical than they had been in almost a decade. For the first time since 1952/53 hedgers tallied net losses, and large speculators, although still the winners, had their profits shaved considerably.

The affinity of small traders for the short side of the market in 1960/61 was only one indication that the era of easy profits was over for the large egg-industry speculators. There is evidence that egg futures prices in the 1960s had become less volatile, and consequently less interesting to the profit-seeking speculators. The changes in production and marketing of eggs had repercussions on the pric-

ing of eggs as well. With vertical integration, the production of eggs is only a short step from the retailing, and opportunities for frequent imbalance between supplies and demands are materially reduced when a large portion of supplies are committed in advance of production.

Therefore, it is argued that the hedgers-turned-speculators initiated the trend of abandonment of the market, partly because 1960/61 was not a good year for them in terms of profits, but more significantly, because they recognized that changes in the industry itself were such that the days of relatively easy and exciting profits were over for them.

For most of the twenty-six years studied, the egg futures market had a sizable amount of public speculation; it has commonly been referred to as a highly speculative market. It is argued here, however, that at all times it was in fact a market attuned to the activities and serving the interests of the "hedging" community. Although hedging transactions became a miniscule portion of total market commitments during the period studied, the influence of the egg industry on the pricing and use of the market has from start to end of the period studied been very significant indeed.

The evidence of the egg futures market suggests not only that futures markets exist to meet the needs of hedgers—but that hedging firms are principally responsible for the pricing in these markets as well. Assuredly, the level of public speculation and the adequacy of professional speculation affect the functioning of a futures market and the prices these markets produce. However, the dominant influence on prices is that of the hedging firms—the companies and individuals who deal in the spot commodities as well as in the futures.

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