Futures Trading, Market Interrelationships, and Industry Structure

Dennis W. Carlton

Futures markets arise as a response to economic uncertainty. One goal of this paper is to measure how futures trading in existing contracts changes in response to changes in uncertainty caused by inflation. A difficult issue that other researchers have addressed is why only a small handful of all markets have successful futures markets (see, e.g., Telser and Higginbotham). Although we do not provide a complete answer to this question, we make progress toward an answer by investigating the covariance structure of various futures prices. This allows us to predict which markets are the least needed and to see whether we would have predicted the demise of the rye futures market. Recently, a question of much policy interest has been how inflation affects the variability of prices (see e.g., Fischer). We examine this question for futures prices and investigate how the entire variance-covariance structure of futures prices depends upon inflation. This information is valuable in predicting how the comparative advantage of different futures markets is likely to shift under various inflationary conditions. Finally, the existence of a futures market should have an impact on the industrial organization of markets that deal in goods whose prices are related to the futures price. We explore this relatively unstudied topic later in this paper.

Futures Trading and Uncertainty

If there were no uncertainty, there would be no need for futures markets. Uncertainty creates an incentive for a futures market because some people may wish to avoid risk while others may be willing to bear risk and because people may have very different beliefs about likely future spot prices and may be willing to bet on their beliefs. As times become more uncertain, one would expect the number of futures markets as well as the volume of trading on futures markets to increase. One proxy for uncertainty is the variance of the spot price. However, that measure fails to capture at any instant the ex ante uncertainty facing traders. For example, on 1 January suppose the price of corn could be normally distributed either with variance 1 or variance 1,000. The ex post realization of variance need not capture the ex ante variance unless there is a large number of repetitions of the (ex ante) stochastic structure. But there cannot be a large number of repetitions because risk and ex ante beliefs change day by day. One way to deal with this problem is to postulate that the ex ante uncertainty is related to underlying general uncertainty caused by inflation. (See Fischer for documentation of inflation effects on price variance.) An investigation of the relation of futures trading to inflation will uncover how general uncertainty caused by inflation translates into uncertainty in specific markets, which in turn translates into increased futures trading. Such an approach will of course miss the effect of uncertainty in specific markets that is unrelated to general uncertainty caused by inflation.

The following model was used to explain futures trading volume:

\[ \ln V = \beta_0 + \beta_1 t + \beta_2 PI + \beta_3 \ln CROP, \]

where \( V \) is volume of futures contracts traded during the year; \( t \), time; \( PI \), a measure of inflation that affects uncertainty; and \( CROP \), crop size. The model was estimated for futures

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[1] Working (1953) recommends using open interest rather than volume as a measure of how well used futures markets are. His reason is that arbitrage trading would raise volume, not open interest. For my purposes, arbitrage trading is of interest, and for that reason I use volume as the dependent variable.

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contracts traded on the Chicago Board of Trade for wheat, corn, oats, rye, soybeans, and all grains, a category which consists of wheat, corn, oats, rye, and soybeans.\(^2\) Equations are estimated using annual data for the period 1950–81 for grains other than rye, and 1950–70 for rye. The rye futures market on the Chicago Board of Trade ended in 1970. (Rye is included in the volume and crop variables for all grains 1950–70.)

Several different measures for PI were used to reflect different beliefs about how inflation generates uncertainty. The different measures of PI that were used are (a) inflation and its absolute value, (b) inflation squared, (c) the absolute deviation of inflation from a four-year average, and (d) the absolute deviation of inflation from an ARIMA model of inflation estimated in levels (with one or two lags) and in first differences (one lag).

The first two measures reflect the belief that inflation generates uncertainty about prices, while the last two measures reflect the belief that it is only unexpected inflation that generates uncertainty about prices.

Table 1 presents the estimation results for both of the measures of PI, PIA, and PIDEVA. The variable PIA is the absolute value of inflation which is measured as the December to December change in the consumer price index (CPI); PIDEVA is the absolute value of the deviation of inflation from a four-year average. (The results for the other measures of inflation and unexpected inflation were generally similar to those in table 1.)

The main result of table 1 is that there appears to be a large and statistically significant relationship between the volume of futures trading and inflation levels for wheat, corn, and oats. The magnitude of the estimated effect is similar in each case and implies that an increase of 1% in inflation increases trading by about 6% to 7%. The magnitude of this effect strikes me as unusually large, and if true would represent a significant force influencing futures trading in these markets.

There appears to be no relation between

\begin{table}[htp]
\centering
\caption{Futures Volume (log)}
\begin{tabular}{llllllll}
\hline
Market & Constant & Time & CROP (log) & PIA & PIDEVA & \(\rho\) & MSE \\
\hline
Wheat & 11.01 & .03 & .49 & .06 & .49 & .10 \\
 & (3.51) & (1.65) & (1.06) & (2.33) & .43 & 11 \\
Corn & 12.92 & .09 & .11 & .06 & .49 & .07 \\
 & (3.17) & (4.21) & (.22) & (2.72) & .39 & .09 \\
Oats & 21.33 & -.06 & -1.04 & .09 & .37 & .19 \\
 & (4.06) & (-2.40) & (-1.46) & (2.36) & .21 & .23 \\
Rye & 13.76 & -.09 & .27 & -.22 & .13 & .35 \\
 & (6.19) & (-3.14) & (.38) & (-2.86) & .18 & .48 \\
Soybeans & 16.35 & -.11 & .31 & -.01 & .36 & .18 \\
 & (4.20) & (-3.30) & (.23) & (-.85) & .34 & .18 \\
All grains & 15.95 & -.08 & -.03 & .02 & .62 & .04 \\
 & (3.97) & (4.48) & (-.07) & (1.09) & .59 & .04 \\
\hline
\end{tabular}
\end{table}

Sources: Trading volume was obtained from Chicago Board of Trade Statistical Annual, Chicago Board of Trade, various issues. Crop size was obtained from USDA, various issues. Information used to construct PIA and PIDEVA was obtained from Survey of Current Business, various issues.

Notes: t-ratios are in parentheses beneath each coefficient. \(\rho\) is the serial correlation, while MSE is the mean-squared error of the equation corrected for serial correlation. All regressions were estimated over the period 1950–81 with the exception of rye. The rye equation was estimated over the period 1950–70.
volume and inflation for soybeans, and an unanswered question is why soybeans differs from the others. The rye equation represents a puzzle. The results suggest that inflation has a tremendous negative effect on volume traded. I find this result surprising, but there are several lines of inquiry that could unravel the puzzle. Inflation should tend to increase the error in predicting one price by another. If a commodity closely related to (deliverable) rye is not traded in a futures market, then traders wishing to hedge or speculate in that commodity could take a position in the rye market. If during inflationary times the relationship between rye and this other commodity is sharply attenuated, then these traders would withdraw from the rye market. A related reason for a decline in trading as a result of increasing inflation has to do with the different types of the commodity that are deliverable on the futures market. Increasing inflation causes price variances to increase and could cause the grade actually delivered to be subject to greater uncertainty. This factor could cause trading to decline. See Working (1954) for a discussion of this problem.

Two other results in table 1 deserve mention. First, size of crop never matters, presumably because of the very high correlation between time and crop for most grains (rye is the exception). The estimates in table 1 are basically unchanged when crop size is omitted. Second, the other measure of inflation, \( P_{DIVA} \), produces results very similar in magnitude to those of \( P_{IA} \) in terms of the effect of an (unanticipated) increase of one percent in inflation. However, in all cases, \( P_{DIVA} \) is much less statistically significant than \( P_{IA} \). It appears that the level of inflation, rather than the unanticipated component of inflation, is more significantly correlated with volume traded.

Models similar to (1) were also estimated with the logarithm of real gross national product (GNP) replacing the time trend and with a measure of the percentage of each year's production sold at government price supports. There was virtually no change in results regarding the effect of inflation on volume.

In order better to assess the importance of how trading is affected by inflation, table 2 lists the futures volume for grains analyzed in table 1 for 1965 and 1980.

Table 2 shows that wheat, corn, and oats comprise a significant fraction of grains traded. This means that the strong volume effects of inflation on these markets represent an economically sizable effect on overall grain futures trading.

### Interrelationship among Different Futures Markets

There has been a good deal of research on the characteristics of successful futures markets (see e.g., Telser and Higginbotham, and Gray). Most frequently cited characteristics include volatility of the spot price, standardized commodity, and a large volume of transactions in the underlying commodity. Whether a new futures market in a particular commodity is needed or whether an existing one is redundant will depend upon many factors including the interrelationship of the commodity under analysis with existing futures markets. For example, if the price movements of two types of corn are very highly correlated, the need for two futures markets rather than one (with either or both grades deliverable) is diminished. Of course, the number of transactions in each type of corn may be so great as to justify establishing two futures markets. My point is that, ceteris paribus, high correlation of price movements lowers the need for two separate futures markets. Not only among the same crop, but also across crops, there might be a high correlation of prices since common factors (like weather) may affect both. In this section, I will look at the correlations of price among several of the grain contracts traded at the Chicago Board of Trade over the period 1950–70. I then use these results to investigate whether it would have been reasonable to predict in 1970 that the rye futures market would fail, as it did in 1970. (Of course, all economists are excellent at “predicting”

### Table 2. Volume of Futures Contracts Traded on CBOT (in millions of bushels)

<table>
<thead>
<tr>
<th></th>
<th>Wheat</th>
<th>Corn</th>
<th>Oats</th>
<th>Rye</th>
<th>Soybeans</th>
<th>All Grains</th>
</tr>
</thead>
<tbody>
<tr>
<td>1965</td>
<td>3,418</td>
<td>3,971</td>
<td>450</td>
<td>227</td>
<td>17,827</td>
<td>25,893</td>
</tr>
<tr>
<td>1980</td>
<td>27,141</td>
<td>59,735</td>
<td>1,605</td>
<td>—</td>
<td>58,841</td>
<td>147,321</td>
</tr>
</tbody>
</table>

Source: Chicago Board of Trade Statistical Annual, various issues.

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2 A related explanation is that inflation increases basis risk (risk that the differential between the spot price of a particular type of rye and the futures price will shift) and therefore reduces the incentive to trade.
past events.) An alternative approach also reported below is to ask how much worse predictions of a spot price become when futures prices are unavailable. I will then discuss the effect inflation should have on the price correlations, attempt to measure this effect, and discuss what these altered correlations mean for futures trading.

**Market Interrelationships**

The futures price has been shown to be an unbiased estimator of the future spot price in several studies (Peck). Therefore, the difference between the actual spot price at time of delivery and a futures price sometime earlier provides an estimate of the market’s prediction error. One can form a vector consisting of the prediction error for each grain. One can then estimate a variance-covariance matrix for this vector. To the extent that there is a high correlation between errors of different crops, it suggests that similar factors may be influencing the price formation in each crop.

Data from 1950–70 were gathered on spot prices (the average of the weekly high and low) just before time of delivery (the week of 16 July) and futures prices (the closing price or the average of the high and low closing price) on 15 January for the Chicago Board of Trade July contract for wheat, corn, rye, oats, and soybeans. By subtracting the futures price from the spot, an error vector was formed for each grain analyzed. Sample means, standard deviations, and correlations were then estimated. The mean and standard deviation of the errors are presented in table 3.

Table 3 shows that the hypothesis that futures prices are unbiased predictors of spot prices cannot be rejected at the 5% significance level. The forecast errors are small relative to the mean spot price. (The average errors are all below 4% of the average spot price.) Table 3 also shows that the soybeans price is by far the most volatile, while the oats price is the least. The correlation matrix of the forecast errors is presented in table 4.

The correlation matrix combined with the error variances can shed light on the ability of one futures market to substitute for another. For example, suppose that we assume that in the absence of a futures market, traders could still form the same unbiased estimate of the spot price as does the futures market. The question is how they could take positions to insure themselves (or expose themselves to risk) based on movements in the unknown prediction error analyzed in tables 3 and 4. One answer is to take a position in a related market. If the forecast error of futures market 1 and 2 have a correlation of $\rho$ and if market 1 ceases to exist, then the variance of that part of the error uncorrelated with the error in market 2 is $(1 - \rho^2)\sigma^2$, where $\sigma^2$ is reported in table 3 and is the variance of the forecast error in market 1 when futures market 1 existed. Clearly, the larger is $(1 - \rho^2)\sigma^2$, the less desirable it is to use futures market 2 as a substitute for futures market 1.

In table 5, I present an estimate of $(1 - \rho^2)\sigma^2$ for pairs of grain markets. In comparing different markets, one must be careful to adjust for differences in the potential scale of the market. Because the number of underlying transactions giving rise to an interest in futures trading is likely to depend upon crop size, I have multiplied each measure of $(1 - \rho^2)\sigma^2$ by the square of crop production (bushels) in 1970 to obtain a measure of the loss from using one futures market to substitute for another.

<table>
<thead>
<tr>
<th>Grain</th>
<th>Mean</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheat</td>
<td>-4.68</td>
<td>18.71</td>
</tr>
<tr>
<td>Corn</td>
<td>3.82</td>
<td>12.33</td>
</tr>
<tr>
<td>Oats</td>
<td>1.77</td>
<td>8.21</td>
</tr>
<tr>
<td>Rye</td>
<td>-4.88</td>
<td>17.73</td>
</tr>
<tr>
<td>Soybeans</td>
<td>10.13</td>
<td>34.49</td>
</tr>
</tbody>
</table>

**Table 4. Correlation Matrix of Forecast Errors**

<table>
<thead>
<tr>
<th></th>
<th>Wheat</th>
<th>Corn</th>
<th>Oats</th>
<th>Rye</th>
<th>Soybeans</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheat</td>
<td>1.0</td>
<td>.75</td>
<td>.67</td>
<td>.60</td>
<td>.70</td>
</tr>
<tr>
<td>Corn</td>
<td>1.0</td>
<td>.79</td>
<td>.56</td>
<td>.57</td>
<td></td>
</tr>
<tr>
<td>Oats</td>
<td>1.0</td>
<td>.49</td>
<td>.54</td>
<td>.45</td>
<td></td>
</tr>
<tr>
<td>Rye</td>
<td>1.0</td>
<td>.45</td>
<td>.54</td>
<td>.45</td>
<td></td>
</tr>
<tr>
<td>Soybeans</td>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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4 The unbiasedness of futures prices is somewhat controversial, as some studies in Peck show. Later, we test for unbiasedness in the markets we examine.

5 The source for price information was the Chicago Board of Trade Statistical Annual, various issues. I reported cash price, in order of preference, the price of one particular deliverable grade (at par) during the week of 16 July, during the week subsequent to 16 July, during the week prior to 16 July, the price of another deliverable grade during the week of the 16th, during the subsequent or prior week, and the futures prices during the week of the 16th. For most cash prices, the preferred price quote was available.
Table 5. Estimate of \((1 - \rho^2)\sigma^2\) for Pairs of Grain Markets

<table>
<thead>
<tr>
<th>Futures Market</th>
<th>Substitute Futures Market</th>
<th>Variance of Forecast Error ((1 - \rho^2)\sigma^2)</th>
<th>Loss Measure from Using One Futures Market to Substitute for Another ((\times 10^{10}))</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rye</td>
<td>wheat</td>
<td>200</td>
<td>.3</td>
</tr>
<tr>
<td>Oat</td>
<td>corn</td>
<td>25</td>
<td>21.2</td>
</tr>
<tr>
<td>Corn</td>
<td>oat</td>
<td>57</td>
<td>983.0</td>
</tr>
<tr>
<td>Wheat</td>
<td>corn</td>
<td>155</td>
<td>283.8</td>
</tr>
<tr>
<td>Soybeans</td>
<td>corn</td>
<td>615</td>
<td>780.6</td>
</tr>
</tbody>
</table>

Such a loss measure has the property that it is invariant to the units (e.g., bushels) in which price is quoted (as it must be if it is to be a sensible measure) and reflects the potential economic interest of using the futures market. This loss measure is presented in table 5. (A comparison of \((1 - \rho^2)\sigma^2\) across markets is not a meaningful way to compare loss because that measure depends on the units in which the price of each grain is quoted and there are no “natural” units to use.)

Table 5 suggests that in 1970 the least costly market to eliminate was rye followed by oats. In fact, the rye market was eliminated in 1970. (A rye futures market still exists in Winnipeg, though the volume of trade is small in relation to the volume of trade that existed on the rye futures market at the Chicago Board of Trade.)

One improvement to the above methodology is not to limit the question to whether one market can be a good substitute for another but rather whether one set of markets can be a good substitute for another set of markets. Such an approach would involve calculations not of simple correlations but of multiple correlations where, say, the wheat error and corn error are used to predict the rye error. Such calculations lead to the same conclusion as table 5. Another improvement would involve relaxing the assumption that without the futures market it would still be possible to have the same unbiased forecast of the future spot price as does the futures market. A third improvement would be to correct for the inflation that is occurring throughout the period by using real (rather than nominal) prices. If one is to deflate, the question arises as to which deflator to use to deflate the July futures price on 15 January and the 16 July spot price. It would seem reasonable to deflate the futures price on 15 January by the price deflator expected on 15 January to prevail on 16 July. Such indices do not exist. A feasible alternative is not to express all prices relative to an index (which always leads to the usual index number problem even without the problem just addressed) but relative to a commodity for which a futures market exists. Then, the July futures price on 15 January can be deflated by the January futures price of the numéraire, and the July spot price can be deflated by the July spot price of the numéraire.

To implement the last two improvements, I adopted the following approach. First, all prices were expressed relative to oats. I then investigated how much lower was the mean-squared error of an equation predicting the spot price from its futures price than the mean-squared error of an equation predicting the spot price from the futures prices of other markets. The decline in the mean-squared error represents the deterioration in prediction that occurs because of elimination of a futures market. As before, I construct a loss measure by weighting this decline by the square of production (bushels) in 1970. In table 6, I report the decline in mean-squared error by grain for the two different regressions and the loss measure.

\(^*\) A specific quadratic utility function would have to be postulated to determine the scalar multiple needed to convert the loss measure into a dollar value. The loss measure is an underestimate because it ignores the effect that the demise of one futures market has on production decisions and on the use of other futures markets. See Anderson and Danthine for an analysis of these issues and for a generalization of the loss measures used in this paper. These loss measures do not deal with the thorny question of what organizers of futures markets lose when a futures market ends, though it seems reasonable to expect their loss to be monotonically related to the loss to society.

\(^7\) If futures markets are efficient, no price in addition to the futures price should help predict the spot price, and prediction errors should be serially uncorrelated.

The approach of table 5 was also redone using deflated prices. The commodities wheat and oats were both used as numéraires to check that the results were not sensitive to which commodity was chosen as the numéraire. The commodity chosen as the numéraire is implicitly assumed to have its futures market continue to exist. The conclusion that rye was the least costly futures market to eliminate was unchanged.
Table 6. Decline in Mean-Squared Error for Grains

<table>
<thead>
<tr>
<th>Grain</th>
<th>Decline in Mean Squared Error</th>
<th>Loss Measure from Eliminating Futures Market ($ \times 10^{13}$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheat</td>
<td>.036</td>
<td>65.25</td>
</tr>
<tr>
<td>Corn</td>
<td>.010</td>
<td>159.85</td>
</tr>
<tr>
<td>Rye</td>
<td>.015</td>
<td>.02</td>
</tr>
<tr>
<td>Soybeans</td>
<td>.010</td>
<td>12.70</td>
</tr>
</tbody>
</table>

Note: Regressions based on annual data 1950–70. Regressions not using own-futures price were corrected for first-order serial correlation.

The message of table 6 is that eliminating the rye futures market would impose the least cost if one futures market in table 6 were to be eliminated. A very curious finding is that if table 6 is redone using wheat price as numéraire (or not deflating at all), then it turns out that the mean-squared error is higher for the oats equation predicting spot price using oats futures prices than for the oats equation predicting spot prices using all other futures prices. This suggests that the oats futures market was not efficient; and, given that inefficiency, the relevant calculation for change in mean-squared error is between an equation predicting spot price with all other futures prices and one with all futures prices. Performing this calculation does not alter the anomalous result for oats. (Recall that adding a variable to a regression does not guarantee that mean-squared error falls in finite samples.) This analysis, together with that of table 5, suggests that it would not have been surprising if both the oats and the rye futures markets had ended in the early 1970s. Interestingly, the volume on the oats futures market was at its lowest level in two decades in the early 1970s. Volume on the oats futures market has risen substantially since the early 1970s, perhaps because of inflation, as table 1 suggests.

The Effect of Inflation on Market Interrelationships

Recent interest has centered on how inflation affects the variance of relative prices (see, for example, Fischer). The previous subsection emphasized the importance of the interrelationship of markets. Only by understanding this interrelationship can one figure out when new markets are needed, when existing ones are no longer needed, or what grades of commodities should be deliverable on a futures contract. An important issue is how inflation affects the relationships among markets.

Consider the vector $P$, consisting of futures prices for several grains on 15 January relative to the futures price of wheat. Consider the vector, $P - P$, consisting of spot prices for several grains on 16 July relative to the spot price of wheat. The vector $P - P$, has a variance covariance matrix $\Sigma$. The object is to see how the elements of $\Sigma$ depend on measures of inflation. The recent literature has tended to focus attention on the diagonal elements of $\Sigma$ in an effort to see if inflation raises the variability of relative prices. Actually, such studies typically form aggregate indices of price dispersion and do not estimate individual price variances (see Fischer).

The following model was estimated for each element of the variance covariance matrix $\Sigma$:

$$ u_i(t) = \beta_0 + \beta_1 P_{it} + \epsilon, $$

where $u_i(t)$ is difference between spot price (16 July) and futures price (15 Jan.) for grain $i$ in year $t$ (see text for how numéraire was applied); $P_{it}$ is measure of inflation; $\epsilon$, error; and $\beta_1$ parameter to be estimated, $i = 0, 1$. The same measures of inflation reported in the first section were used. The results of this estimation over the period 1950–70 were disappointing, in that the estimates of the effect of inflation on elements of the variance-covariance matrix were so imprecise (standard errors so large) that the results were consistent with inflation having either a large effect or no effect on $\Sigma$. When rye was dropped from the analysis so that the period could be extended to 1981, the results improved considerably with several of the elements of $\Sigma$ being significantly affected by inflation. I expect that an analysis based on more data will turn up significant effects of inflation on most, if not all, elements of the variance-covariance matrix of prices.

Assuming that inflation affects $\Sigma$, what are the likely repercussions on futures markets? (Carlton investigates effects on markets without futures exchanges.) First, inflation likely will raise the volatility of each commodity's
relative price. That effect, alone, should tend to increase trading on futures markets and could provide an explanation for the results reported in table 1. Second, inflation likely will raise the prediction error from using one (or several) price to predict other prices. This means that traders using a futures market in \( Y \) to hedge or speculate on the risk in movements in the price of \( X \) will be less likely to do so (holding the variance of prices constant). A decline in trading in the futures market for \( Y \) could result, and a new futures market for \( X \) might be established, or an existing futures market for \( X \) might be more heavily used. (An offsetting effect could be that the ability of one futures market to predict some other commodity’s price improves relative to another futures market, and trading could therefore rise on the advantaged futures market.) Moreover, depending on the deliverable grades, the entire character of the futures market could change if uncertainty about the relative prices of deliverable grades alters the good whose price the futures market is predicting. (See Working 1954 for an interesting example of this.)

Futures Markets and the Industrial Organization of Related Markets

In the previous section, we discussed how the interrelationship among prices could affect the introduction or demise of a futures market. A related point is that the presence or absence of a futures market could have a great effect not only on other futures markets but also on any other markets that deal in a good whose price is correlated with the futures price. In fact, there should be a relationship between the existence of a futures market and the industrial organization of related markets. (See Carlton for a related discussion.)

Most markets are not auction markets, where instantaneous price adjustment costlessly occurs. For most markets, firms must set price and grope for the correct market-clearing price. Auctions cannot be held continuously, and firms will develop in the distribution chain that have specific marketing capital to help them decide which customers should obtain delivery and at what price. In a sense, firms with marketing capital act as a substitute for an established auction market. A futures market makes it easier to price a product whose price is related to the one sold on the futures market. Therefore, the establishment of a futures market imposes a capital loss on those firms that have developed specific marketing capital and reduces the need for such firms.

A futures market provides an opportunity for those with information to earn more than they otherwise could. Firms that would gain most by the establishment of a futures market are those firms whose operations are sufficiently large that they have access to a good sample of market information. A futures market will create an incentive for such firms to develop.

Another effect of the establishment of a future market is that smaller firms (not publicly traded) could become more specialized. Rather than diversifying risk through many activities (such as planting different crops), firms can focus attention on the activity they do best and use a futures market to diversify their risk. In the case of grains, this effect could lower the price of certain flexible types of farmland. (I thank Jack Carr for discussions on this point.)

I have not yet found adequate data to test thoroughly the effects of a futures market on industry structure. One of the few studies on this topic by Cox concentrated on the effect of futures markets on farm size and did find an effect. (Risk-averse farmers could eliminate risk and farms grew larger.) The relationship between futures markets and industry structure is a subject that deserves more attention.

Summary

This paper has investigated the important link between uncertainty created by inflation and the volume of futures trading. The interrelationship between different futures markets was examined and it was shown how that interrelationship could be used to analyze the likelihood of various futures markets dying. Finally, the relatively unexplored effect of a futures market on the industrial structure of related markets was discussed.

References


Chicago Board of Trade Statistical Annual, various issues.


