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Buying Behavior of a Major U.S. Grain Exporter:

Relationships Between Bid

and Actual Gulf Basis

by

Gene L. Seiter
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ABSTRACT

The relationship between projected and realized Gulf of Mexico-Kansas City (Gulf-KC) basis, on hard red winter wheat for a major U.S. grain exporter was investigated. Data for this paper came from publications distributed by the exporter, which bases offers for forward contracts on its basis projections. Regression analysis revealed seasonal variations in the accuracy of bid basis as a predictor of actual basis, and seasonal differences in marketing preferences between assemblers and exporters was postulated to explain this phenomena. No evidence was found to suggest that exporters enjoy a monopsonistic advantage in grain purchase.

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Buying Behavior of a Major U.S. Grain Exporter:

Relationships Between Bid

and Actual Gulf Basis

Introduction

The price of wheat at the local elevator is derived from the daily bid of the closest future contract bid. The futures market establishes an anticipated value for wheat, delivered to Kansas City, at some date in the future:

"At any point in time, the trading level for a distant futures option represents the consensus of traders' opinions as to what the cash price will be in a future period." (Purcell, p. 203)

This does not mean the futures quote is a good prediction of cash prices in the later time period. The consensus on any particular day is a function of expectations of the buyers and sellers of the futures.

A margin must be added to the futures contract bid to arrive at the anticipated price at the export terminal. The margin (or basis) reflects the fact that wheat ready for export at the Gulf is worth more than wheat in Kansas City, which must be transported to the Gulf. This basis reflects wages, fuel costs, spoilage, taxes, insurance, interest and opportunity costs, and storage costs of transporting and preparing wheat for export from Gulf terminals. The Gulf-to-local basis must be subtracted from the Gulf price to determine local price. This basis must be subtracted because the wheat in local elevators, which must be

moved to the Gulf, is worth less than wheat at the Gulf ready for export. This formula is illustrated in Table 1 below:

Table 1.

**Determination of the Cash Bid Price, at the
Local Elevator, on Hard Red Winter Wheat**

November 6, 1984	
	Record the closing price of the nearby Kansas City wheat future3.75
ADD	Gulf to Kansas City basis. 0.41
	Gulf price 4.16
SUBTRACT	Gulf to local basis. 0.47
	Local cash bid 3.69

The basis for the local elevator will vary largely due to location but also because of the different opportunity costs, insurance rates, management fees, storage charges and interest costs faced by different businesses. The future contract bids change daily but the local elevator's basis will remain relatively constant, and with a constant basis at the local elevator, changes in the daily local bids can be at least partly explained by changes in the daily futures price:

"When the futures prices change, the local cash bids tend to move in the same direction and roughly in the same magnitude as the change in future quotes." (Purcell, p. 205)

The use of futures prices as a baseline for forward contract price negotiations, and use of hedging as a risk-reducing tactic ensure a correlation between futures prices and local prices. If on Friday the

Kansas City futures market on hard red winter wheat closes 10-15 cents per bushel lower, the local elevator manager will "take protection" and lower his bids over the weekend. The move will be taken to protect the business operating margin. His cash buying price reflects this margin and allows him to protect his position by placing a hedge by selling in the futures market, or by accepting a forward contract from an exporter, who will in turn hedge his position by buying in the futures market.

Exporters at the Gulf attempt to anticipate the amount of wheat needed at the Gulf to meet export demand. The exporters estimate a future export price sufficient to attract enough grain to fill anticipated order and make a profit (or minimize losses). From this price the grain exporter will offer forward contracts sufficient to fill their storage bins to meet the amount needed for export. The expected basis is determined by the closing price of the nearby Kansas City wheat futures contract minus the anticipated export price at the Gulf. This is illustrated in Table 2:

Table 2.

Determination of the Projected Basis at the Gulf
(90-day prediction)

November 6, 1984	
	Anticipated export price at the Gulf (Feb.) 4.28
LESS	Closing price of the nearby Kansas City future. 3.77
EXPECTED BASIS. 0.47

This expected basis reflects many factors including insurance, transportation, interest, opportunity costs, management fees, storage, spoilage, short term strength and weaknesses of export demand relative to national

demand, and the exporter's expected wheat reserves. Three scenarios can develop after the basis is determined and forward contracts negotiated.

First, the export and the anticipated price might equal one another. The prediction error will equal zero and the firm will break even on the transaction. This is not likely to occur because it is very difficult to predict future price levels with 100% accuracy. Second, the export price could be lower than the anticipated price. In this case the basis will narrow and the firm will lose money on the transaction. This is true because the firm would be obligated to receive wheat, which it bought on forward contracts, at a price higher than that which prevails in the cash market.

The third possible scenario is that actual prices could be higher than expected prices. The basis will widen in this situation, and the firm will make a profit on the transaction. The firm will profit because they will have bought the wheat on forward contracts for a lower price than that which prevails in the cash market. In sum, exporters benefit (lose) from underestimating (overestimating) the future Gulf-KC basis. Of course the impact on the profits of the assembler is opposite of that of the exporter. For example, if the exporter underestimates the basis, assemblers who forward contract lose since if the assembler had waited and sold his wheat in the cash market, he would have been able to receive a higher price for the commodity. Producers who forward contract earn higher profits if exporters overestimate the future Gulf-KC basis. The exporters could have waited and bought their wheat at the lower cash price for the commodity.

Problem

In a perfectly competitive market, bidding by rival firms for supplies of wheat available for export would force exporters to offer forward contract basis bids which closely approximate the anticipated basis. Thus, over time the mean of the errors in prediction of the basis for any individual firm would tend toward zero. However, important economies of scale exist in grain exporting, and as a result, a small number of large firms dominate the United States export market. This presents the opportunity for economic profits since it is conceivable that exporters could take advantage of their greater access to information, exploit quasi-monopsonistic conditions in local markets, or engage in collusive activities. If this were actually the case, we could expect to find a bias in the setting of forward contract basis bids favorable to export firms. In other words, we would expect the mean of the errors in basis projection for an individual firm to be significantly less than zero.

Methodology and Results

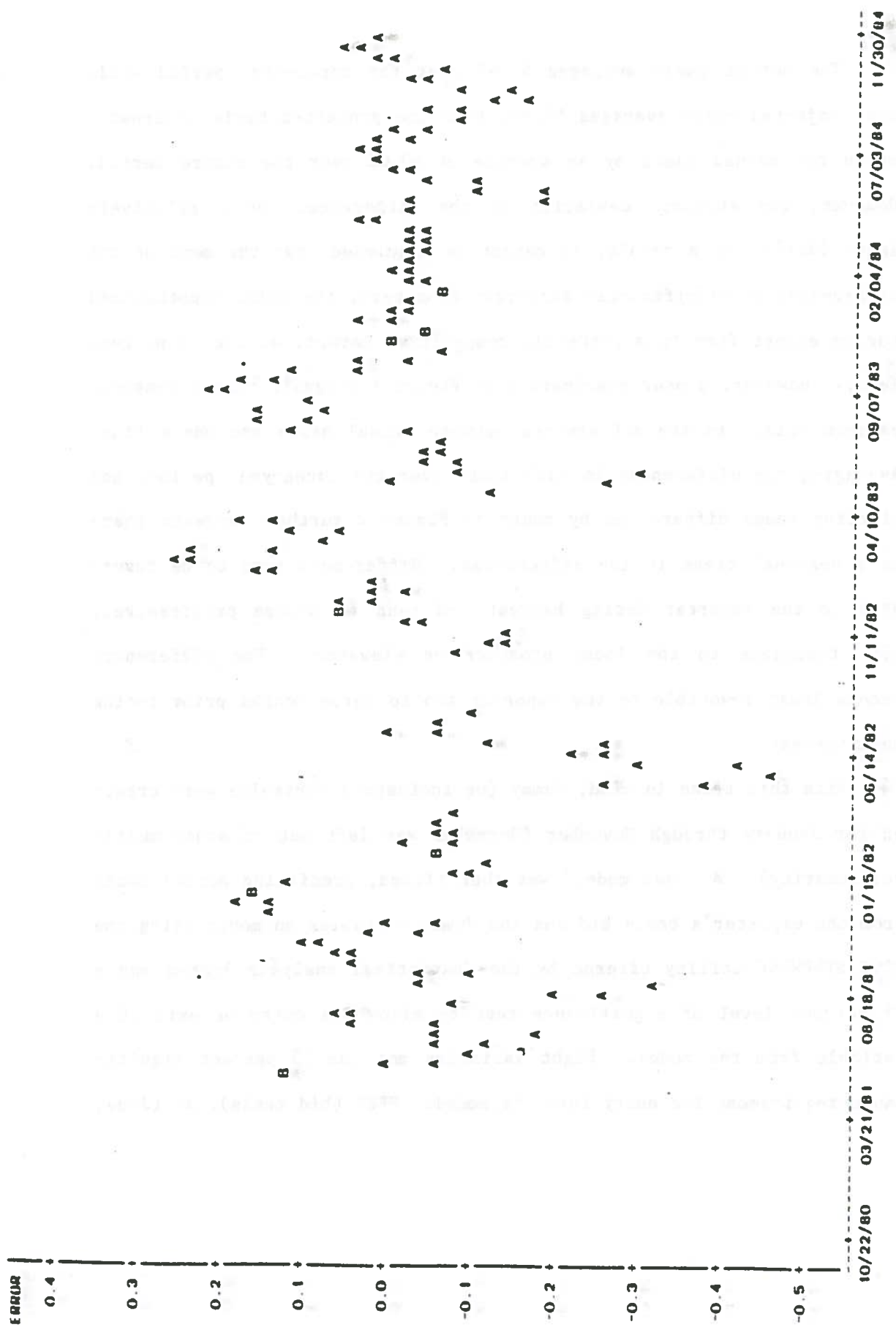
To test the hypothesis that export firms are able to exploit a monopsonistic advantage in grain purchasing, information on the basis bids and actual prices on hard red winter wheat for export from Houston for a major U.S. grain exporter were obtained. Available data included daily quotes for grain at the Gulf, as well as basis offers on forward contracts for various future dates. From this data, 90-day projections of the Gulf basis (upon which forward contracts are based) and the actual Houston-Kansas City basis for each Thursday from 2/5/1981 to

10/18/1984 were taken. If data for a particular Thursday was found to be missing, data from the previous Wednesday was substituted, and if data from Wednesday was also missing, data from the following Friday was substituted. Missing data required the use of information from seven Wednesdays and two Fridays. In addition, the firm made no 90-day basis bids from 5/7/1982 to 7/15/1982, resulting in a gap of eleven observations. Finally, data was completely unavailable for a 5-week period in 1982, resulting in a gap of five observations. In total, there were 198 complete observations.

The subject firm's 90-day basis projections are not made for each day in the future but rather for the half-month period three months in the future. The firm revises these half-month projected prices daily, thus each actual basis examined was matched with two or three predicted basis bids. An average of the basis bids offered was used when evaluating the accuracy and bias of the basis projections. This average of the 90-day basis bids for each period was subtracted from the actual Gulf basis ninety days from the date of projection to determine the "error" in prediction. The results of this operation are shown in Figure 1, prediction error plotted against date.

A cursory examination of the graph suggests there may be evidence of monopsonistic behavior. A total of ninety-four (94) times, 58 percent of the observations, the difference between the projected basis and the actual basis was negative. In twelve instances, 7 percent of the observations, the actual basis equaled the basis bid. In fifty-seven (57) instances, 35 percent of all observations, the actual basis was lower than the projected basis. In these instances the firm would have suffered a loss on the transaction.

COMPARISON OF DATA FROM 1980 TO 1985

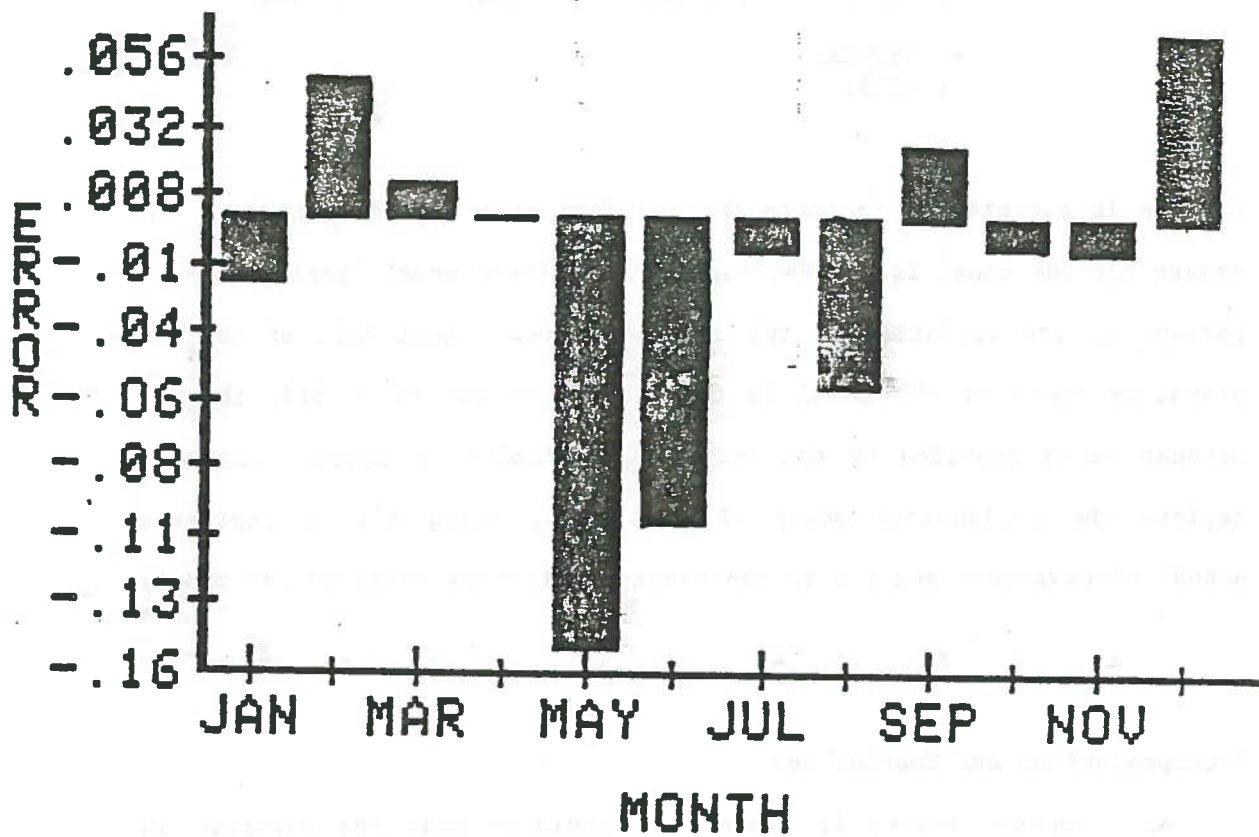


8/9/1985

The actual basis averaged \$0.47 over the three-year period while the projected basis averaged \$0.45, thus the projected basis underestimated the actual basis by an average of \$0.02 over the entire period. However, the standard deviation of the differences was a relatively large \$0.12. As a result, it cannot be concluded that the mean of the differences is significantly different from zero, the value hypothesized for an export firm in a perfectly competitive market, at the 10 percent level. However, closer examination of Figure 1 suggests that a seasonal pattern exists in the differences between actual basis and basis bids. Averaging the differences in each month over the three-year period, and plotting these differences by month in Figure 2 further suggests there is a seasonal trend in the differences. Differences tend to be favorable to the exporter during harvest and tend to become progressively more favorable to the local producer or elevator. The differences become least favorable to the exporter two to three months prior to the next harvest.

With this trend in mind, dummy (or indicator) variables were created for January through November (December was left out to avoid multicollinearity). A 'best model' was then fitted, predicting actual basis from the exporter's basis bid and the dummy variables on month using the PROC STEPWISE utility offered by the Statistical Analysis System and a 15 percent level of significance test to allow the entry or exit of a variable from the model. Eight variables met the 15 percent significance requirement for entry into the model: PRED (bid basis), X1 (Jan),

Figure 2



X3 (Mar), X5 (May), X6 (Jun), X9 (Sep), and X10 (Oct). The model fitted is as follows:

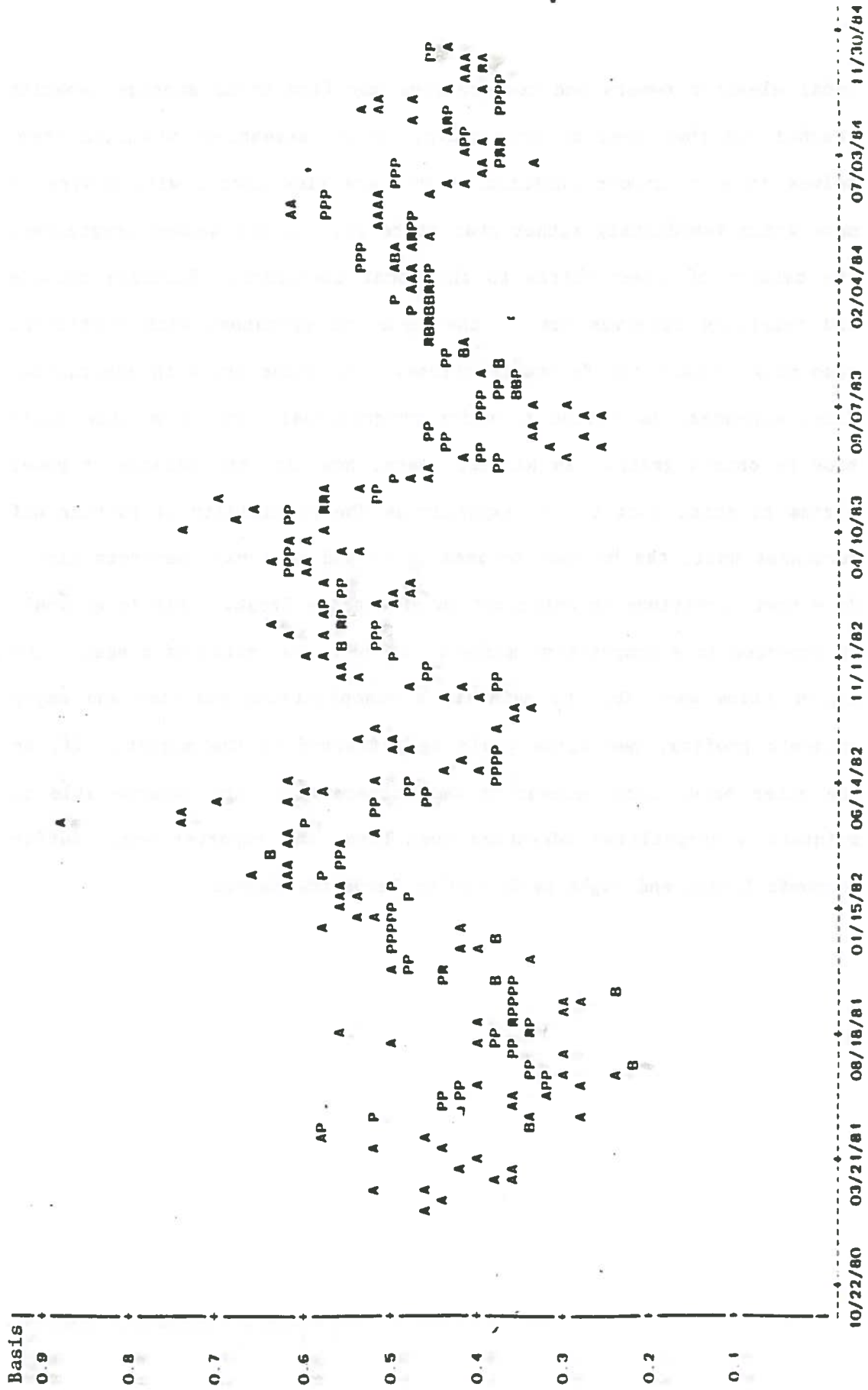
$$\begin{aligned}
 \text{Current Basis} = & .2915 + .3717\text{PRED} + .04356\text{X1} + .06420\text{X3} \\
 & (.0380) \quad (.0712) \quad (.0288) \quad (.0281) \\
 & .12634\text{X5} + .05178\text{X6} - .05687\text{X7} - .06293\text{X9} \\
 & (.0253) \quad (.0262) \quad (.0262) \quad (.0284) \\
 & - .05292\text{X10} \\
 & (.0275)
 \end{aligned}$$

Figures in parentheses indicate the standard error of the estimate. R-square for the model is 0.4384, meaning the fitted model 'explains' 43.8 percent of the variation in the current basis. About half of the explanatory power of the model is contributed by the basis bid, the remainder being provided by the indicator variables on month. Figure 3 depicts the explanatory power of the model, using A's to represent actual observations and P's to represent predictions based on the model.

Interpretations and Conclusions

As discussed above, it cannot be concluded that the exporter in question enjoys a long-run monopsonistic position. Although the analysis revealed a -\$0.02 bias (favorable to the exporter) in the differences between the projected basis and the actual basis, this was not statistically significant. Furthermore, a small bias favorable to the exporter might be anticipated even in a purely competitive market if entrepreneurs were risk averse. Within a single season, however, shifts in the balance of marketing power can be observed. The exporter finds himself in an advantageous position immediately after harvest. Some

FIGURE 3: PREDICTED AND ACTUAL BASIS BY DATE



local elevator owners and cooperatives may find their storage capacity reached and thus need to move grain. Also, assemblers who find themselves in a cash-poor position or who are risk averse will desire to move grain immediately rather than store it. As the season progresses, the balance of power shifts to the local elevators. Supplies dwindle and remaining reserves are in the hands of operators with sufficient resources to wait for favorable prices. The exporter, with substantial fixed expenses, is forced to offer progressively more favorable basis bids to obtain grain. As harvest nears, however, the balance of power begins to shift back to the exporter as the possibility of putting off purchases until the harvest becomes surer and as local operators liquidate their positions in anticipation of a price break. This is as would be expected in a competitive market. If over the course of a season the export firms were able to maintain a monopsonistic position and enjoy economic profits, new firms would be attracted to the market. If, on the other hand, local elevators and cooperatives were somehow able to maintain a competitive advantage over time, the exporter would suffer economic losses and might be forced to leave the market.

References

Purcell, Wayne. Agricultural Marketing: Systems, Coordination, Cash and Futures Prices. Reston, Virginia: Reston Publishing Company, Inc. 1979.