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Do Japanese Soybean Futures Markets Respond to the USDA Crop Production Report?

by

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DO JAPANESE SOYBEAN FUTURES MARKETS RESPOND TO THE USDA CROP PRODUCTION REPORT?

Phil L. Colling[1]

The U.S. Department of Agriculture (USDA) currently publishes several orts which provide statistics on crop and livestock inventories, planted eage, forecasts of production, imports and exports, etc. These reports are erally thought to provide useful public information which allows ividuals to make better-informed decisions. Providing this information uld therefore lead to more efficient resource allocation. Previous earch indicates that USDA reports do provide useful information to markets showing that cash and futures market prices respond to those reports.[2]

Common sense and basic theory suggest that, for commodities traded ernationally and supplied by the U.S., prices on foreign markets should pond to relevant USDA reports. USDA reports are released at 3:00pm eastern e after futures markets in the U.S. have closed. Therefore, futures kets in foreign countries can trade on the information in USDA reports ore futures markets in the U.S. can trade on the same information. If the eign markets respond to USDA reports, then, immediately following USDA orts, the potential might exist for trades to occur in foreign futures kets that might ordinarily take place in U.S. futures markets if the U.S. kets could trade on the USDA information first.

For several years, there have been six futures markets in Japan for ported soybeans. In April 1992, the Tokyo Grain Exchange started a futures ket for corn. Since Japan is a major importer of soybeans and corn, and nce the U.S. is a large producer of those commodities, the futures markets Japan might be expected to respond to USDA reports that are relevant to rn and soybean production and supply.

The purpose of this research is to determine if imported-soybean futures ices at Japanese markets respond to the USDA Crop Production report (CPR). ent study methods are used to determine if the variance of price changes mediately following the CPR are greater than the variance of price changes other days surrounding the report. Survey data are also used to proxy pectations of the CPR to determine if prices respond to unexpected formation in the report. Futures prices at the Chicago Board of Trade BOT) are studied using the same methods to compare the characteristics of ice changes between the CBOT and the Japanese markets.

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[2]The list of recent studies which investigate agricultural commodity rice responses to USDA and other government reports is extensive. Most of he studies that currently exist are listed in the references.

FUTURES MARKET REACTIONS TO USDA REPORTS

In an efficient market, price reflects all available information relevant to the formation of that price. Prices should adjust quickly to new information. In addition, when information is released, prices should adjust to that information to the extent that it is unanticipated. Prices therefore might not respond to new information if the information was in accord with its expectations.

USDA reports are generally thought to provide information that is very relevant to various markets. This belief is evidenced by the fact that USDA goes to a tremendous effort to ensure that information regarding their reports does not become available before the official release date and time. Those reports offer a unique opportunity to study futures price behavior because the date and time that each report is released are known well in advance. Markets also have time to form expectations of those reports.

If a market's expectation of a report could be observed, the market's response to that report could be measured. In reality, a market's expectation of an event can not be observed. However, in some cases analysts' expectations of a report can be used to proxy the market's expectation. Even if a proxy for expectations concerning the report can not be observed, prices surrounding the report can still be observed. A price depends on supply and demand schedules and on expectations of future supply and demand. A change in price reflects changes in information that affect supply, demand and expectations. Therefore, larger-than-normal price movements occur as the result of larger-than-normal changes in the information set. If a USDA report provides information that on average leads to usually larger-than-normal changes in information, price changes following the release of that report should be greater, on average, than other price changes.[3] Therefore, the newsworthiness of a USDA report can be measured by comparing price changes immediately following the report to other price changes surrounding the report's release.

DATA AND METHODS

Pre-release estimates from Knight-Ridder's MoneyCenter are used to proxy market expectations of the USDA Crop Production report. Knight-Ridder releases those data two business days prior to the release of the CPR and after the close of the U.S. futures markets. Prior to each CPR, Knight-Ridder surveys roughly twenty-five analysts to obtain their forecasts of corn and soybean production estimates to be reported in the CPR. The high and low estimates are dropped and the remainder are averaged to form the mean of the pre-release estimates. Table 1 shows the news release for the pre-release estimates of the November 1992 CPR.

The pre-release estimates allow expected and unexpected information to be distinguished so that a direct test of the efficient markets hypothesis (Fama) can be conducted. Unfortunately, only three years of the pre-release survey data, or twelve observations, are currently available. The results of the research using those data are reported later.

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[3]Sumner and Mueller provide a more in-depth explanation of this reasoning.

Because of the limited number of pre-release estimates, a more traditional event study method is also used to test for the newsworthiness of the CPR. The methods used closely follow those of Sumner and Mueller. A reason for using Sumner and Mueller's methods is to compare the current analysis and their's. Changes in closing corn and soybean futures prices were observed at the Chicago Board of Trade as well as changes in closing soybean futures prices at the Tokyo Grain Exchange, the Osaka Grain Exchange, the Nagoya Grain and Sugar Exchange, the Kobe Grain Exchange and the Kanmon Grain Exchange.[4] Closing prices twelve days around the release of the CPR are used from 1975 through 1992 for the Chicago and Tokyo Exchanges and from 1977 through 1992 for the other Japanese exchanges. The CPR is released monthly, but the primary estimates of corn and soybean production occur with the August to November reports.[5] The December corn and January soybean contracts are at the Chicago Board of Trade are examined. Prices on the Chicago Board of Trade were obtained from the Technical Tools electronic data base. For Japan, the December soybean contracts are used at the Tokyo and Osaka markets and the January soybean contracts are examined at the Nagoya, Kobe and Kanmon markets. Prices on the Japanese markets were collected from the daily publication Nihon Keizai Shinbun, which is essentially Japan's "Wall Street Journal."

Price changes are taken as differences between closing prices around the release of the CPR. The "report" or release price changes are taken as the price change from the close of trade the day of the CPR to the closing price the following day. The "non-report" price changes are the five preceding and the five following prices around the "report" price change. To take account of differences in the levels of prices, price changes were specified as a proportional change as follows (Sumner and Mueller, p. 3):

$$(1) \quad \Delta P/P_t = (P_{t+1} - P_t) / P_t.$$

Prices are limited by the amount that they can move from day to day in both the Chicago and Japanese futures markets. Those limits might reduce the measured amount of "true" price movement. However, limits occurred only occasionally following the CPR. The results probably under-report the amount by which CPRs move markets because of the limit price moves that did occur.

Summary statistics of the price changes by month are provided in Table 2. The means generally are not different from zero, as expected. The exception occurred with the November prices at the Tokyo market. The mean was less than zero at the five percent level, suggesting that during the time around the release of the report in November, prices tended to move down in the Tokyo market. There is a tendency for the distribution of price changes in many of the markets, especially the Nagoya market, to have "fat tails" or high kurtosis. This result is consistent with previous research on futures price changes. There is some evidence that the prices are skewed, especially

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[4]Most of the Japanese futures exchanges had separate futures markets for imported and domestic soybeans. Futures markets for imported soybeans were investigated in this study. There is also a futures market for imported soybeans at the Hokkaido Grain Exchange. That market was not investigated because futures prices on that market were not published consistently in the data source (Nihon Keizai Shinbun).

[5]Currently prices on the Japanese markets during October and November 1992 are not available. The Japanese prices during November of 1982 are also unavailable.

in the Nagoya market. Though the results are not reported here, tests indicate that daily price changes do not exhibit autocorrelation.

Two measures of the variability in price are used: the "expected value of the absolute price change" (Sumner and Mueller, p. 4):

$$(2) \quad E[ABS(\Delta P/P_t)] = 1/N[\Sigma_t|P_{t+1} - P_t|/P_t],$$

and the "variance of the relative price change" (Sumner and Mueller, p. 4):

$$(3) \quad var(\Delta P/P_t) = (1/N)\Sigma_t\{[(P_{t+1} - P_t)/P_t] - (1/N)\Sigma_t\{(P_{t+1} - P_t)/P_t]\}^2$$

under the null hypothesis that no difference exists between the absolute relative price changes and the variance of price changes for CPR release days and other days. The alternative hypothesis is that the absolute relative price change is greater for the announcement days than for the other days.

Tests for a Report Effect

A t-test is used to test for differences in the means of the absolute relative price changes. Since the alternative hypothesis is that the price change is greater on the announcement days, a one-sided test is used. Sumner and Mueller used a t-test to test the null hypothesis of no difference in means of the absolute price changes. This test should be interpreted with caution because the t-test assumes a normal distribution. Since neither mean could be less than zero, the normality assumption is probably violated. Results reported in Table 2 also indicate skewness and kurtosis in some of the series. An F-test is used to test for the null hypothesis of no difference in variance of price changes between the report days and non-report days. The F-test does not have the flaws which the t-test has.

Table 3 reports the results for the entire sample. Results indicate that at the Chicago Board of Trade, the means of the absolute price changes are greater on report days than for non-report days. The t-statistics indicate that the mean absolute price changes are greater for the report days at the five-percent level of significance. The F-tests indicate that the variance of the report price changes are significantly greater than the non-report price changes. These results are consistent with Sumner and Mueller's results and confirm that the CPR provides information to the U.S. corn and soybean futures markets.

Results using the t-test indicate that soybean futures price changes at the Tokyo Grain Exchange and the Kanmon Grain exchange are significantly greater at the five-percent level on report days as compared to other days. However, the F-test does not indicate significance at the ten-percent level. An F-test indicates that the variance of price changes is greater following the CPR as compared to other price changes at the Osaka Grain Exchange. Price changes at the Nagoya Grain and Sugar Exchange are greater on report days almost at the ten-percent level. While the absolute price changes and the variance of prices changes at the Osaka and Kobe markets are greater following the report, they are not statistically greater than the other price changes at any conventionally-used level of significance. Results for the Kanmon Grain Exchange indicate that the absolute price changes and the variance of price changes is significantly greater following the CPR as compared to other days.

Table 4 reports results of the tests for report effects where the sample is broken down by months. The results for corn and soybeans traded at the

CBOT are also consistent with Sumner and Mueller's results and show that the CPR does provide information to those markets in each of the months. The report effect becomes less pronounced during November.

Evidence is mixed on whether a report effect exists in the Japanese soybean futures markets. The t-tests suggest that the report effect exists only during August and September in some of the markets. What is surprising is that during November, prices were actually less volatile following the report as compared to the other days. This result is partially explained by prices in Japan generally being more volatile during October and November than prices in Chicago. The F-tests indicates results similar to those using the t-test.

Price Reactions to Forecast Errors

If a market is efficient, prices reflect all available information and respond to new information to the extent that the new information is unanticipated. Therefore, just before a CPR is released, prices should reflect the expectations of the report because expectations are known information. After the CPR is released, prices should adjust to reflect the amount by which the information was unanticipated. In other words, prices should adjust to the "forecast error" of the report. The relationship between the price change and the release of the CPR may therefore be expressed as follows:

$$(4) \quad P_t - P_t^e = \beta(X_t - X_t^e) + \epsilon_t$$

where P_t is the price and P_t^e is the price expected to prevail at time t. In this analysis, P_t^e is the closing price on the day of the CPR and P_t is the closing price the following day. X_t is the information and X_t^e is the information expected at time t. In this case, X_t^e is the mean of pre-release estimates of the CPR as provided by Knight Ridder and X_t is the CPR itself.

The price change is specified as the closing price the day following the CPR minus the closing price the day of the CPR all divided by the closing price the day of the CPR (i.e. equation 1). To keep the change in the information set consistent with the specification of the price change, unexpected information was specified as the CPR information minus the mean of the pre-release estimates all divided by the mean pre-release estimate.

Results are presented in Table 5. These results should be interpreted with some caution because there are only twelve observations for the Chicago Board of Trade and only ten observation for the Japanese markets.[6] Perhaps surprising is the strength of the results given the small number of observations. The parameter estimates for the forecast error are all significantly less than zero at the five percent level. The coefficient estimates are expected to be less than zero because a negative relationship should exist between supply and price. For example, if a CPR indicates that

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[6]As with any "structural" econometric model in which time-series data are used, the coefficient estimates should also be interpreted with caution because the structure of the system probably changed over the sample. Such a change would lead to biased parameter estimates. Since the sample covers a relatively short time, any structural changes were probably minimal, although this can not be confirmed.

the crop harvest will be higher than expected, prices should fall to reflect those higher-than-expected potential supplies.

The parameter estimates for soybeans are all of roughly the same order of magnitude, with perhaps the exception of that for the Kobe Grain Exchange, suggesting that the Japanese markets value the information in the CPR and that prices respond accordingly. Adjusted R-squares in roughly the 0.27 to 0.54 range, again with the exception of that for the Kobe market, suggest that the forecast error in the CPR explains a fairly large proportion of the price response the day following the report. The Durbin Watson statistics for all of the soybean equations are acceptable, suggesting that the error terms are well behaved. Those equations were estimated using OLS with White's consistent covariance matrix estimator. The Chicago Board of Trade corn equation was estimated using an autoregressive-one process because when the equation was first estimated using OLS, the Durbin Watson statistic indicated the presence of first-order autocorrelation.

SUMMARY AND CONCLUSIONS

The results of this study indicate that prices at five futures markets in Japan for imported soybeans respond to the USDA Crop Production report. An event study method was used that compares the variance of price changes just after a report is released to the variance of ten other price changes surround the report's release. The results of the tests for differences in absolute price changes and variances in price changes indicate that prices in Japan respond to the report, but perhaps not to the degree that soybean futures prices at the Chicago Board of Trade respond to the report. Pre-release estimates of analysts' expectations of the report were used to estimate price reactions to unexpected information in the report. Those results indicated that prices at the five Japanese soybean markets respond to the Crop Production report with roughly the same magnitude as soybean prices at the Chicago Board of Trade.

Since this study has determined that futures markets in Japan for imported soybeans react to the USDA Crop Production report, it might be concluded that the potential exists for traders to trade on Japanese soybean futures markets who want to trade on information in the Crop Production report as quickly as possible. Therefore, the Japanese markets might have post-report trades that otherwise might exist at the Chicago Board of Trade. If the new futures market for corn at the Tokyo Grain Exchange also respond to the Crop Production report, it might also have the trades of those wishing to trade corn futures quickly after the report is released.

Despite the results of this study, it can not be concluded that the Chicago Board of Trade looses business to the Japanese markets due to the timing of the release of the USDA Crop Production report or any other USDA report. Even if data on volume in the Japanese markets were currently available, it would be extremely difficult to determine if the Chicago Board of Trade looses business to the Japanese markets. This is because data on volume do not indicate who trades, or why they trade, but just the total number of trades. A survey of futures traders might reveal if and the extent to which the timing of USDA report releases causes futures trades to occur at Japanese markets or elsewhere.

REFERENCES

Aradhyula, S.V., T. Kesavan and M.T. Holt. "Price Volatility and Futures Market Reactions to USDA Hogs and Pigs Report." Proceedings of the NCR-134 Conference on Applied Price Analysis, Forecasting, and Market Risk Management, Iowa State University, 1992.

Barnhart, S.W. "Commodity Futures Prices and Economic News: An Examination Under Alternative Monetary Regimes." Journal of Futures Markets 8(1988): 483-510.

Barnhart, S.W. "The Effects of Macroeconomic Announcements on Commodity Prices." American Journal of Agricultural Economics 71(1989):389-403.

Carter, C., and C. Galopin. "USDA Hogs and Pigs Reports: Futures Prices, Information, and Forecasting." Proceedings of the NCR-134 Conference on Applied Price Analysis, Forecasting, and Market Risk Management, Iowa State University, 1989.

Colling, P.L., and S.H. Irwin. "The Reaction of Live Hog Futures Prices to USDA Hogs and Pigs Reports." American Journal of Agricultural Economics 72(1990):84-94.

Colling, P.L., S.H. Irwin and C.R. Zulauf. "Do Livestock Futures Prices Overreact to USDA Hogs and Pigs Reports." Working paper, U.S. Department of Agriculture, Economic Research Service, Commodity Economic Division, 1992.

Colling, P.L., S.H. Irwin and C.R. Zulauf. "The Response of Wheat, Corn and Soybean Futures Prices to the USDA Export Inspection Report." Proceedings of the NCR-134 Conference on Applied Price Analysis, Forecasting, and Market Risk Management, Iowa State University, 1992.

Colling, P.L., S.H. Irwin and C.R. Zulauf. "The Reaction of Pork Belly and Live Hog Futures Markets to the USDA Cold Storage Report." Working paper, USDA, ERS, April 1993.

DeVore, N. and P. Orazem. "Market Responses to Error-Ridden Government Crop Forecasts." Selected paper presented at the 1991 AAEA annual summer meeting, Manhattan, Kansas, 1991.

Fackler, P.L. "On the Relation Between Futures Price Movements and USDA Reports." NC-134 Monograph on Applied Price Analysis, Forecasting, and Market Risk Management, Iowa State University, 1985.

Fama, E. "Efficient Capital Markets: A Review of Theory and Empirical Works." Journal of Finance 25(1970):383-417.

Fortenberry, T.R. and D.A. Sumner. "The Effects of USDA Reports on Futures and Options Markets." Proceedings of the NCR-134 Conference on Applied Price Analysis, Forecasting, and Market Risk Management, Iowa State University, 1990.

French, K.R., R. Leftwich and W. Uhrig. "The Effect of Scheduled Announcements on Futures Markets." Graduate School of Business, University of Chicago, working paper no. 273, 1989.

Garcia, P. and R.M. Leuthold. "The Effect of Market Information on Corn and Soybean Markets." Proceedings of the NCR-134 Conference on Applied Price Analysis, Forecasting, and Market Risk Management, Iowa State University, 1992.

Gorham, M. "Public and Private Sector Information in Agricultural Commodities." Economic Review(Federal Reserve Board of San Francisco), (Spring 1978), pp. 30-38.

Hoffman, G. "The Effect of Quarterly Livestock Reports on Cattle and Hog Prices." North Central Journal of Agricultural Economics 2(1980):145-50.

Hudson, M.A., S.R. Koontz, and W.D. Purcell. "The Impact of Quarterly Hog and Pig Reports on Live Hog Futures Prices: An Event Study of Market Efficiency." Department of Agricultural Economics Bulletin AE-54, Virginia Polytechnic Institute and State University, June 1984.

Milanos, N. "The Effects of USDA Crop Announcements on Commodity Prices." Journal of Futures Markets 7(1987):571-89.

Miller, S.E. "The Response of Futures Prices to New Market Information: The Case of Live Hogs." Southern Journal of Agricultural Economics 2(1979):67-70.

Nihon Keizai Shinbun. Tokyo, Japan, all August through November issues, 1975 to 1991 and August and September 1992 issues.

Patterson, P.M. and B.W. Brorsen. "USDA Exports Sales Report: Is it News?" Selected paper presented at the 1991 AAEA annual summer meeting, Manhattan, Kansas, 1991.

Schroeder, T., J. Blair, and J. Mintert. "Abnormal Returns in Livestock Futures Prices Around USDA Inventory Report Releases." North Central Journal of Agricultural Economics 12(1990):293-304.

Sumner, D.A., and R.A.E. Mueller. "Are Harvest Forecasts News? USDA Announcements and Futures Market Reactions." American Journal of Agricultural Economics 71(1989):1-8.

U.S. Department of Agriculture. Crop Production, National Agricultural Statistics Service, all August to November reports, 1975 to 1992.

U.S. Department of Agriculture. "Hog Reports and Market Prices." Agricultural Situation, Statistical Reporting Service, April, 1977

Table 1. **Knight-Ridder Pre-Release Estimates of the November 1992 USDA Crop Production Report.**

KNIGHT-RIDDER MoneyCenter News #11439 Received at 2:15P on 6-Nov-92

Pre-release Estimates: USDA Nov corn/soybean crop--11/6--KRF

The following are analysts' estimates in billions of bushels for the November US crop production report, based on conditions as of Nov 1 and compiled by Knight-Ridder Financial News. The report is scheduled for released at 1400 CT Tuesday. Parenthesis after the category denotes the number of estimates in that average and range.

	Average	Range	USDA Oct report	Final 1991 production
Soybeans (25)	2.128	2.100-2.180	2.108	1.986
Corn (24)	9.170	8.925-9.536	8.938	7.474

	Soybeans	Corn
ADM Investor Services	2.120	9.200
A. G. Edwards	2.140	9.200
AgriAnalysis	2.108	9.234
AgriVisor Services	2.117	9.150
Allendale Inc.	2.105	9.062
Brock Associates	2.150	9.120
Cargill Investor Services Inc.	2.125	8.925
Dean Witter Reynolds	2.140	9.245
DEC Futures	2.151	9.109
Farmers Commodities Corp.	2.180	9.536
Hjort Associates	2.108	9.128
Knight-Ridder Global Weather Services	2.102	9.180
Lehman Bros.	2.142	9.130
Merchants Trading	2.100	9.150
Merrill Lynch Futures	2.130	9.038
O'Connor and Co.	2.112	9.141
Midco Commodities	2.130	9.248
Peters and Co.	2.150	9.200
Prudential Securities	2.126	9.185
RWA Associates	2.121	9.190
Smith Barney, Harris, Upham and Co.	2.149	9.280
Steward-Peterson Advisory Group	2.150	9.210
UNECO Investor Services	2.139	9.165
US Commodities (DSM)	2.100	9.060
Weather Services Corp.	2.100	na

End

Table 2. Summary Statistics for Daily Price Changes Twelve Days Surrounding the Crop Production Report by Month, 1975 to 1992.

Price-Change Statistic	August		September		October		November	
	Corn	Soybeans	Corn	Soybeans	Corn	Soybeans	Corn	Soybeans
--Chicago Board of Trade--								
Mean	-0.068	-0.053	-0.012	-0.002	-0.080	-0.070	-0.051	-1.074
(s.e.)	(0.107)	(0.125)	(0.087)	(0.100)	(0.120)	(0.090)	(-0.701)	(0.097)
Variance	0.023	0.031	0.015	0.020	0.011	0.016	0.010	0.019
Skewness	0.121	-0.190	0.175	-0.169	0.258	0.057	-0.057	-0.305*
Kurtosis	.347	0.019	0.336	0.489	0.439	0.939	1.519**	0.224
--Tokyo Grain Exchange--								
Mean		-0.109		-0.099		-0.030		-0.253**
(s.e.)		(0.128)		(0.112)		(0.122)		(0.115)
Variance		0.031		0.025		0.028		0.023
Skewness		0.234		-0.061		-0.252		-0.012
Kurtosis		0.608*		0.364		-0.065		-0.255
--Osaka Grain Exchange--								
Mean		-0.130		-0.000		-0.004		-0.182
(s.e.)		(0.136)		(0.140)		(0.130)		(0.141)
Variance		0.033		0.035		0.028		0.031
Skewness		0.388		-0.056		-0.594**		-0.317
Kurtosis		0.639		4.860**		1.599**		0.272
--Nagoya Grain and Sugar Exchange--								
Mean		-0.179		-.059		.077		-0.098
(s.e.)		(0.143)		(0.187)		(0.106)		(0.143)
Variance		0.036		.062		.018		0.031
Skewness		-0.307*		0.744**		-0.174		1.049**
Kurtosis		1.868**		41.717**		0.775**		7.171**
--Kobe Grain Exchange--								
Mean		-0.159		-0.011		-0.118		-0.179
(s.e.)		(0.135)		(0.116)		(0.108)		(0.123)
Variance		0.032		0.024		0.019		0.024
Skewness		0.300		-0.070		-0.201		-0.365
Kurtosis		0.579		0.792		1.265**		0.882
--Kanmon Grain Exchange--								
Mean		-0.126		-0.001		-0.105		-0.135
(s.e.)		(0.127)		(0.104)		(0.097)		(0.111)
Variance		0.029		0.019		0.016		0.019
Skewness		0.020		0.020		-0.452		-0.131
Kurtosis		0.026		0.026		0.635		0.505

Note: Significance is indicated by one and two asterisks for the ten- and five-percent levels, respectively.

Table 3. Tests for Announcement Effects Over the Entire Sample

Statistic	Commodity	
	Corn	Soybeans
--Chicago Board of Trade--		
Non-Report Days		
$E[ABS(\Delta P/P_t)]\times 100$	0.884	1.028
$Var(\Delta P/P_t)\times 100$	0.013	0.018
Report Days		
$E[ABS(\Delta P/P_t)]\times 100$	1.433	1.913
$Var(\Delta P/P_t)\times 100$	0.034	0.052
t-Statistic for Report Effect	3.683**	4.965**
F-test for Report Effect	2.613**	2.892**
--Tokyo Grain Exchange--		
Non-Report Days		
$E[ABS(\Delta P/P_t)]\times 100$		1.244
$Var(\Delta P/P_t)\times 100$		0.027
Report Days		
$E[ABS(\Delta P/P_t)]\times 100$		1.623
$Var(\Delta P/P_t)\times 100$		0.037
t-Statistic for Report Effect		1.793**
F-test for Report Effect		1.382
-- Osaka Grain Exchange--		
Non-Report Days		
$E[ABS(\Delta P/P_t)]\times 100$		1.307
$Var(\Delta P/P_t)\times 100$		0.031
Report Days		
$E[ABS(\Delta P/P_t)]\times 100$		1.424
$Var(\Delta P/P_t)\times 100$		0.052
t-Statistic for Report Effect		0.317
F-test for Report Effect		1.679**

continued

Table 3. continued

Statistic	Commodity	
	Corn	Soybeans
--Nagoya Grain and Sugar Exchange--		
Non-Report Days		
$E[ABS(\Delta P/P_t)]\times100$		1.190
$Var(\Delta P/P_t)\times100$		0.037
Report Days		
$E[ABS(\Delta P/P_t)]\times100$		1.522
$Var(\Delta P/P_t)\times100$		0.037
t-Statistic for Report Effect		1.286
F-test for Report Effect		1.003
--Kobe Grain Exchange--		
Non-Report Days		
$E[ABS(\Delta P/P_t)\times100$		1.140
$Var(\Delta P/P_t)\times100$		0.024
Report Days		
$E[ABS(\Delta P/P_t)]\times100$		1.371
$Var(\Delta P/P_t)\times100$		0.030
t-Statistic for Report Effect		1.097
F-test for Report Effect		1.252
--Kanmon Grain Exchange--		
Non-Report Days		
$E[ABS(\Delta P/P_t)]\times100$		1.043
$Var(\Delta P/P_t)\times100$		0.019
Report Days		
$E[ABS(\Delta P/P_t)]\times100$		1.414
$Var(\Delta P/P_t)\times100$		0.033
t-Statistic for Report Effect		1.925**
F-test for Report Effect		1.739**

Note: Significance for a one-sided test is represented at the ten- and five-percent levels by one and two asterisks, respectively.

Table 4. Tests for Announcement Effects by Month

Statistic	Month of Crop Production Report and Commodity							
	August		September		October		November	
	Corn	Soybeans	Corn	Soybeans	Corn	Soybeans	Corn	Soybeans
--Chicago Board of Trade--								
Non-Report Days								
$E[ABS(\Delta P/P_t)]\times100$	1.105	1.279	0.907	1.017	0.797	0.842	0.726	0.972
$Var(\Delta P/P_t)\times100$	0.019	0.028	0.013	0.017	0.010	0.012	0.009	0.017
Report Days								
$E[ABS(\Delta P/P_t)]\times100$	1.871	2.222	1.370	1.819	1.397	1.951	1.093	1.669
$Var(\Delta P/P_t)\times100$	0.059	0.066	0.034	0.052	0.028	0.058	0.020	0.040
t-Statistic for Report Effect	2.059**	2.170**	1.534*	2.310**	2.277**	3.538**	1.503*	2.064**
F-test for Report Effect	3.075**	2.387**	2.591**	3.119**	2.871**	4.792**	2.254**	2.407**
--Tokyo Grain Exchange--								
Non-Report Days								
$E[ABS(\Delta P/P_t)]\times100$	1.280		1.184		1.281		1.231	
$Var(\Delta P/P_t)\times100$	0.028		0.023		0.027		0.024	
Report Days								
$E[ABS(\Delta P/P_t)]\times100$	2.056		1.854		1.400		1.182	
$Var(\Delta P/P_t)\times100$	0.056		0.045		0.032		0.017	
t-Statistic for Report Effect	1.749**		1.592*		0.280		-0.123	
F-test for Report Effect	2.018**		1.965**		1.400		0.719	
-- Osaka Grain Exchange--								
Non-Report Days								
$E[ABS(\Delta P/P_t)]\times100$	1.328		1.261		1.229		1.411	
$Var(\Delta P/P_t)\times100$	0.031		0.035		0.029		0.032	
Report Days								
$E[ABS(\Delta P/P_t)]\times100$	1.837		1.652		1.208		1.000	
$Var(\Delta P/P_t)\times100$	0.051		0.042		0.020		0.015	
t-Statistic for Report Effect	1.081		0.797		-0.017		-0.846	
F-test for Report Effect	1.650**		1.225		0.695		0.467	

continued

Table 4. continued

Statistic	Month of Crop Production Report and Commodity							
	August		September		October		November	
	Corn	Soybeans	Corn	Soybeans	Corn	Soybeans	Corn	Soybeans
--Nagoya Grain and Sugar Exchange--								
Non-Report Days								
$E[ABS(\Delta P/P_t)]\times100$	1.287		1.202		1.018		1.252	
$Var(\Delta P/P_t)\times100$	0.031		0.064		0.019		0.034	
Report Days								
$E[ABS(\Delta P/P_t)]\times100$	2.353		1.746		1.107		0.881	
$Var(\Delta P/P_t)\times100$	0.085		0.041		0.017		0.009	
t-Statistic for Report Effect	2.155**		0.832		0.242		-0.744	
F-test for Report Effect	2.746**		0.636		0.897		0.281	
--Kobe Grain Exchange--								
Non-Report Days								
$E[ABS(\Delta P/P_t)\times100$	1.279		1.077		1.039		1.164	
$Var(\Delta P/P_t)\times100$	0.031		0.022		0.020		0.024	
Report Days								
$E[ABS(\Delta P/P_t)]\times100$	1.710		1.833		1.094		0.847	
$Var(\Delta P/P_t)\times100$	0.041		0.047		0.018		0.012	
t-Statistic for Report Effect	0.924		1.868**		0.145		-0.740	
F-test for Report Effect	1.340		2.185**		0.899		0.497	
--Kanmon Grain Exchange--								
Non-Report Days								
$E[ABS(\Delta P/P_t)]\times100$	1.206		0.980		0.919		1.068	
$Var(\Delta P/P_t)\times100$	0.026		0.017		0.015		0.019	
Report Days								
$E[ABS(\Delta P/P_t)]\times100$	1.936		1.524		1.228		0.967	
$Var(\Delta P/P_t)\times100$	0.055		0.040		0.022		0.016	
t-Statistic for Report Effect	1.652*		1.504*		0.918		-0.260	
F-test for Report Effect	2.124**		2.338**		1.454		0.835	

Note: Significance for a one-sided test is represented at the ten- and five-percent levels by one and two asterisks, respectively.

Table 5. Futures Price Reaction to the Crop Production Report, August 1990 to November 1992

Commodity	Constant	Forecast Error	Adj. R^2	Durbin Watson	Method
--Chicago Board of Trade--					
Corn:	0.008 (0.015)	-0.651** (0.261)	0.291	1.498	AR1
Soybeans:	0.006 (0.004)	-0.734** (0.186)	0.390	1.439	OLS
--Tokyo Grain Exchange--					
Soybeans:	0.007 (0.005)	-0.806** (0.179)	0.495	2.432	OLS
--Osaka Grain Exchange--					
Soybeans:	0.006 (0.005)	-0.479** (0.174)	0.272	2.818	OLS
--Nagoya Grain and Sugar Exchange--					
Soybeans:	0.003 (0.004)	-0.490** (0.124)	0.463	1.861	OLS
--Kobe Grain Exchange--					
Soybeans:	0.002 (0.006)	-0.399** (0.135)	0.109	1.980	OLS
--Kanmon Grain Exchange--					
Soybeans:	0.006 (0.003)	-0.617** (0.100)	0.544	2.450	OLS

Note: Significance for a one-sided test is represented at the ten- and five-percent levels by one and two asterisks, respectively. Standard errors of the estimated coefficients are presented in parentheses. There are twelve observations for the Chicago markets and ten observations for the Japanese markets.