Kansas Agricultural Experiment Station Research Reports

Volume 0
Issue 1 *Cattleman's Day (1993-2014)*

Article 114

2008

Distiller’s grain market price relationships, discovery, and risk management (2008)

T.W. Van Winkle

Ted C. Schroeder

DISTILLER'S GRAIN MARKET PRICE RELATIONSHIPS, DISCOVERY, AND RISK MANAGEMENT

T. W. Van Winkle and T. C. Schroeder[1]

Introduction

The substantial increase in corn use by the ethanol refinery industry (Figure 1) has resulted in livestock producers, especially cattle feeders, substituting distiller's grain (DG) for corn in feed rations. DG futures markets do not exist, but actively traded corn and soybean meal (SBM) futures are the most probable markets for hedging DG price risk. Therefore, the ability to offset DG price risk using corn and SBM futures is incorporated into analysis to quantify the strength of price relationships. If DG prices and corn or SBM futures prices are strongly related, then a viable cross hedging opportunity might exist. If they are not related, then cross hedging DG price risk in corn or SBM could increase risk. The growing importance of DG markets demonstrates a need for information regarding price relationships in the industry. The purpose of this study is to determine DG price relationships across locations and over time. Particular objectives include estimating how strongly related DG prices are across different locations, determining whether price leadership is present, and quantifying risk in cross hedging DG using existing futures contracts.

Procedure

Data used in this analysis are a compilation of public and private sources including the USDA Agricultural Marketing Service weekly feedstuff's report, *Feedstuff's* magazine, and the University of Missouri's dairy extension service weekly price quotes. Data include locations of Lawrenceburg, IN; Atlanta, GA; Buffalo, NY; Chicago, IL; Los Angeles, CA; Okeechobee, FL; Portland, OR; Minneapolis, MN; Muscatine, IA; Atchison, KS; and Macon, MO. The DG prices all are weekly quotes covering a period from the beginning of 2001 through 2006. Weekly average settlement prices for corn and SBM futures contracts used in the cross hedging portion are Chicago Board of Trade quotes obtained from the Commodity Research Bureau.

To gain a better understanding of DG price relationships across locations, we tested for the presence of long-run equilibrium relationships between prices from different markets. Market combinations showing long-run price relationships that move together over time are considered closely linked. Conversely, if prices across locations do not tend to move together, then evidence suggests that the markets are segmented.

After we evaluated the presence of long-run equilibrium relationships, we determined how quickly prices are adjusted by individual firms in response to price changes at other locations to detect price leadership among various DG market locations. A speed-of-adjustment estimate with a value of "1" indicates the market fully reacts rapidly (within

[1]Department of Agricultural Economics.

one week) to price changes at other locations. On the other extreme, a speed-of-adjustment estimate near zero implies a very slow reaction for one market to change in response to price at another market location.

Lastly, an analysis of cross-hedging DG via corn and SBM futures contracts was done using ordinary least-squares regression. Estimates for the cross-hedge ratios were obtained through this procedure. A combination of corn and SBM futures were chosen for the cross-hedging feasibility analysis because these commodities are expected to be most closely related to DG prices.

Results and Discussion

Tests of the long-run equilibrium relationship for each pair-wise DG market location and the futures markets indicated 27 of 78 (35%) combinations have a long-run relationship ($P \leq 0.05$). Some locations, such as Lawrenceburg, IN, Buffalo, NY, and Minneapolis, MN, had stronger tendencies to be more closely related to other markets. Overall, results indicate DG market prices across locations are somewhat independent of each other without strong linkages.

Considerable bi-directional information flow is present in DG markets, indicating there is not a dominant market location in regard to price leadership. Corn and SBM futures markets tend to lead the various DG market prices with little feedback. When corn and SBM futures prices change, DG market prices tend to follow with similar direction price changes, but DG market prices do not cause noticeable changes in corn or SBM prices.

Speed-of-price adjustment was estimated to determine how quickly markets respond to price changes at other locations. Speed-of-adjustment coefficient estimates are reported in Table 1. Most of the speed-of-adjustment coefficient estimates are statistically significant ($P \leq 0.05$). However, estimates range from 0.028 to 0.216, suggesting that the overall reaction time across the spatial markets is slow.

Results of assessing opportunity for cross-hedging DG using corn and SBM futures varied noticeably by location. Estimated cross-hedge ratios are presented in Table 2. The magnitude of the hedge ratios is location dependent, but the model does a poor job of capturing the price variability in the cash DG market. Using a combination of the two futures contracts does not appear to enhance the ability to explain price variability in the DG market. Therefore, cross hedging DG via corn and SBM futures contracts doesn't appear viable.

Implications

The lack of strong linkages in DG prices across location indicates buyers of DG would likely benefit from shopping around to determine the location of the best price each time DG purchase decisions are made. Monitoring prices at multiple locations is likely to be valuable for DG purchasers, as no leading markets appear to serve as barometers of other DG market prices. Also, DG prices at different locations are slow to react to price changes at other locations, meaning these markets tend to be independent and might be information starved. Perhaps additional public market information could help link DG markets more strongly across location. Existing corn and SBM futures markets are not viable cross hedges for DG, which motivates use of forward contracting or development of a DG futures market to manage DG price risk over time.

Table 1.

Speed of adjustment coefficient results

	Dependent variable											
Independent	Lawrenceburg	Atlanta	Buffalo	Chicago	Los Angeles	Okeechobee	Portland	Minneapolis	Muscatine	Atchison	Macon	Corn
Atlanta	0.140*											
Buffalo	0.216*	0.009										
Chicago	0.115*	0.036*	0.090*									
Los Angeles	0.149*	0.065*	0.085*	0.060*								
Okeechobee	0.120*	0.012	0.075*	0.042*	0.080*							
Portland	0.094*	0.024	0.054*	0.053*	0.042	0.094*						
Minneapolis	0.139*	0.050*	0.085*	0.039	0.108*	0.145*	0.067*					
Muscatine	0.111*	0.041*	0.004	0.038*	0.099*	0.158*	0.043*	0.058*				
Atchison	0.142*	0.052*	0.096*	0.057*	0.135*	0.148*	0.079*	0.148*	0.041*			
Macon	0.155*	0.031	0.079*	0.037	0.000	0.142*	0.071*	0.053	0.022	0.035		
Corn	0.061*	0.042*	0.039*	0.041*	0.071*	0.136*	0.053*	0.069*	0.048*	0.035*	0.065*	
SBM	0.067*	0.029*	0.057*	0.025	0.028	0.092*	0.043*	0.056*	0.046*	0.028*	0.037*	0.012

* $P \leq 0.05$

Table 2.

Cross Hedging Estimates for DG using Corn and SBM futures, Weekly 2001-2006

	Intercept	Corn	Soybean Meal	Adj. R^2
Lawrenceburg	0.128	0.557	0.003	-0.006
	(0.573)	(0.868)	(0.930)	
Atlanta	0.099	1.720	0.055	0.034
	(0.421)	(0.345)	(0.004)	
Buffalo	0.054	1.759	0.059	0.014
	(0.769)	(0.520)	(0.041)	
Chicago	0.110	2.826	0.031	0.004
	(0.565)	(0.319)	(0.302)	
Los Angeles	0.084	9.497	0.077	0.094
	(0.630)	(0.000)	(0.005)	
Okeechobee	0.101	-5.248	0.039	-0.001
	(0.738)	(0.240)	(0.411)	
Portland	0.100	4.175	0.078	0.035
	(0.608)	(0.147)	(0.011)	
Minneapolis	0.111	4.607	0.062	0.025
	(0.582)	(0.121)	(0.049)	
Muscatine	0.081	2.735	0.088	0.061
	(0.590)	(0.218)	(0.000)	
Atchison	0.083	3.189	0.044	0.026
	(0.551)	(0.121)	(0.041)	
Macon	0.077	6.969	0.080	0.057
	(0.691)	(0.015)	(0.008)	

Note: The numbers in the parentheses are P-values

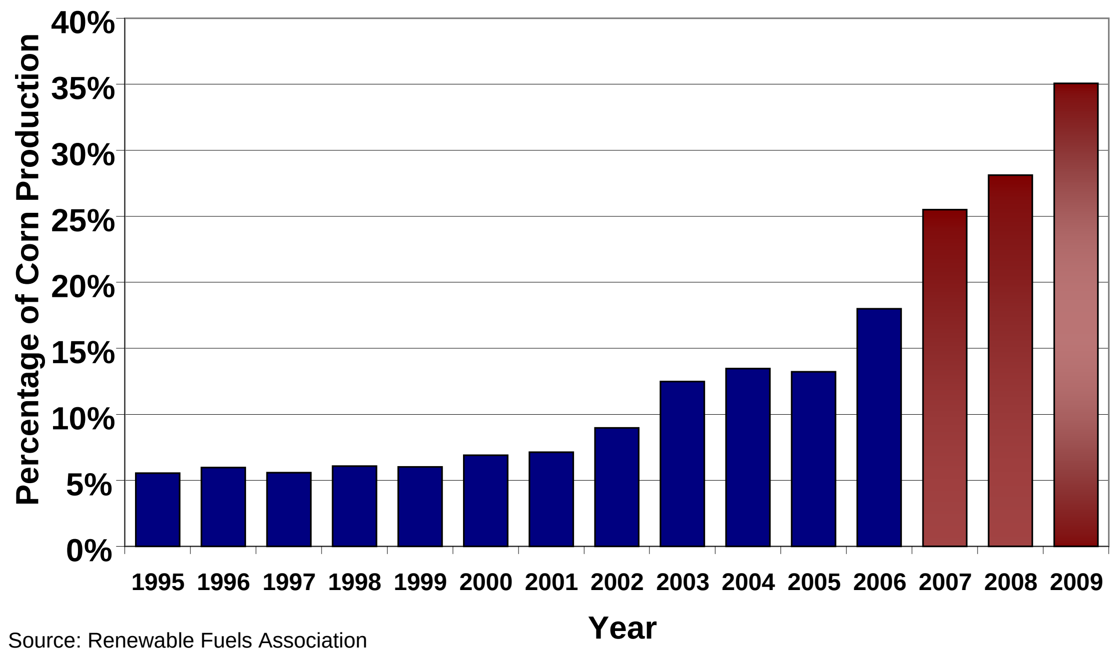

Figure 1. Percentage of U.S. Corn Production Used for Ethanol Production 1995-2009 ('07-'09 forecasted).