

## The Impact of the LDP on Corn and Soybean Basis in Missouri

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Beginning in the fall of 1998 low corn and soybean prices triggered a government price support mechanism established under the 1996 Farm Bill. This mechanism, the loan deficiency payment (LDP), created minor marketing chaos for some producers. These producers did not understand how the LDP program functioned, and they did not understand how grain marketing strategies might change with the existence of the LDP. As producers, researchers, and politicians began to understand the LDP program, more questions regarding the effectiveness and fairness of the program arose. Furthermore, some producers and Extension marketing economists argued that the LDP affected long-term basis patterns.

The 1996 Agriculture Market Transition Act gave farmers the choice of receiving a loan deficiency payment in lieu of placing their crop in storage under loan. The LDP is the loan price less the posted county price (PCP). Table 1 provides an example of how the LDP is determined for Lafayette county in Missouri. The PCP is based on a terminal or Gulf market price adjusted for a county loan differential. The PCP can be at, above, or below the local market price depending on how well the terminal or Gulf price, adjusted for the county loan differential, reflects local market conditions. Under previous farm programs, farmers forfeited the grain under loan to the Commodity Credit Corporation (CCC) when market prices were below the loan rate. The CCC could then hold the forfeited grain off the market creating a price floor at or near the loan price. The difference with the LDP in effect is that producers no longer have an incentive to forfeit the grain and thus market prices are not supported by the loan rate. Even though grain prices can fall below the loan rate due to supply and demand conditions, producers theoretically will still receive the loan rate as a floor price, i.e., cash price + LDP = loan rate.

The LDP alternative allows farmers to take the LDP up until 9 months following the beginning of harvest or until 9 months after the grain is placed under loan. This “decoupling” of marketing of grain from loan prices provide farmers the opportunity to seek profit maximization from both the loan program, in the form of an LDP, and in the cash market. In other words, the LDP program rewards producers for “picking the market top” (i.e., time of cash market sales) as well as “picking the market low” (i.e., time of taking LDP). If markets are efficient, there is no reason to expect producers could do this, but in reality this may be exactly what many producers try to do.

Despite claims that the LDP may have effected historical basis patterns, there has been little empirical research to substantiate or refute these claims. Visually reviewing basis data indicates that corn and soybean basis levels for September 1998 through the fall of 1999 are similar to historical basis levels (figures 1 and 2). However, only for certain times during the September 1998 through May 1999 and during all days for September 1999 to present has there been a LDP available. Figures 3 and 4 are used to graphically represent the 1998/1999, 2-year previous, and 5-year previous marketing year basis for Braymer, Missouri (Lafayette county). During most weeks of the 1998/1999 marketing year, corn and soybean basis was below both the 2-year previous and 5-year previous averages, but can all of the weaker basis be attributed to the LDP?

The effect on basis from a change in the LDP would occur if the LDP would cause producers to market grain at times other than would normally occur. For example, a “large”

LDP at harvest may encourage a producer to take the LDP for cash flow needs and then hold onto the grain. The effect of this would be to change harvest basis levels compared to if the grain had been sold. The government determined loan rate is set to "theoretically" provide a fixed price support level. That is, county differentials are based on long-term price relationships between the county and USDA announced terminal market price. In theory, when cash prices are below the loan rate, the cash price plus LDP would equal the loan rate. However, two factors have caused alternative outcomes. First, the county differentials may not reflect the actual price spread. Second, the government would prefer not to take possession of grain so the county differential is changed periodically to increase the value of the county LDP – effectively causing the producer to take the LDP in lieu of the loan or cause the producer to redeem the loan at the PCP. For instance, the USDA listed market rates for April 3 and April 11, 2000, had accompanying notes regarding the differential. On April 3 the note stated, add -2 cents to the Gulf corn differential. On April 11, the note stated, add -4 cents to the Gulf corn differential. (<http://165.221.16.16/public/RATESPUB/default.htm>)

The LDP can only be locked in prior to or at the time of the sale up until May 31, with the exception of grain placed under loan where the 9-month period may go beyond May 31. In essence, some perceived that producer's cash marketing decisions may have been impacted by the relative level of the PCP to cash price. If the producers marketed the cash and LDP simultaneously, then a LDP adjusted price above (below) the loan rate would cause excess (less) grain to enter the market and push the cash price lower (higher).

### **Description of Model and Data Used**

Multiple regression analysis was used for this analysis. For the current study, factors affecting corn and soybean basis are lagged basis, futures price, a proxy for the loan deficiency payment (LDP), futures market liquidity, days prior to contract expiration, futures contract dummy variables, and location dummy variables. The nearby basis model specified for this study is:

$$\text{Basis}_{jit} = f(\text{lagged basis}_{jit}, \text{futures price}_{jt}, \text{PCP}_{jit} / \text{cash price}_{jit}, \text{futures market liquidity}_{jt}, \text{days prior to contract expiration}_{jt}, \text{futures contract dummy variables}_{jt}, \text{location dummy variables}_{jit})$$

This study uses daily data between January 1993 and November 1999. Variable descriptions and summary statistics of selected variables are given in table 2. Nearby Basis is defined as the cash price minus the closing futures price for commodity  $j$  ( $j = \text{corn and soybeans}$ ), in location  $i$  ( $i = \text{Braymer, Cameron, Charleston, Chillicothe, Concordia, Corder, Hannibal, Jamesport, Kansas City, Sikeston, St. Joseph, St. Louis, and Tarkio}$ ), on day  $t$  ( $t = 1, 2, \dots, 1690$ ). Cash prices were obtained from DTN Farm Dayta. Futures prices, rolled forward on the first trading day of the contract expiration month, are from Bridge. Similarly, the futures market liquidity variable was computed from data obtained from Bridge. Posted County Price (PCP) data were obtained from CARD, Iowa State University.

The futures price was included as an explanatory variable to determine the relative price effect on basis. It is hypothesized that an increase in the relative price would strengthen basis in the short-run (day to day). The ratio of PCP-to-cash price variable was included to determine whether the presence of the LDP effected basis when here was LDP available. Defined in this manner, when the PCP differs from the cash price the producer could receive a net cash price

either above or below the loan rate. If the ratio is greater (less) than one, then a farmer could receive an adjusted cash price above (below) the loan rate, if the grain was marketed and the LDP taken simultaneously. There is expected to be no economic impact on basis from a change in the PCP-to-Cash price variable, because producers are assumed to market the LDP and cash independently. However, it is worth noting that taking the harvest time LDP may provided producers with short-term cash flow relief that allowed producers to store grain in anticipation of higher prices later in the marketing year. For this reason, seasonal models were estimated separately.

A futures market liquidity variable was constructed as the ratio of futures volume to open interest. The variable is included in the basis models as a proxy for the ability of hedgers and speculators to enter or exit the market. Days prior to expiration was included in the basis models to account for storage costs associated with storing the commodity. Also, as commodity futures contracts approach expiration, supply-demand factors in the cash and futures market equate. As the number of days prior to expiration increases, it is expected that basis will weaken.

## **Results**

The explanatory variables explained around 95% of the variability in corn and soybean basis. As expected, lagged basis was positive

The PCP-to-cash price ratio variable for both the corn and soybean basis equation was negative and statistically significant. For corn, a one percentage point increase in the ratio would decrease basis by up to a \$0.023/bushel. The \$0.023/bushel decline in corn basis is one-fifth of the average corn basis. This impact could be viewed as being economically significant; however, only for a very small portion of the days when the LDP was available was the maximum PCP-to-cash price ratio observed. For soybean, a one percentage point increase in the soybean ratio would have weakened soybean basis by \$0.006/bushel. Thus, the presence of the LDP did not have a significant long-run economic impact on either the corn or soybean basis.

The long-run impact of a one dollar increase in corn or soybean futures is almost a \$0.20/bushel and \$0.02/bushel strengthening of corn and soybean basis, respectively.

A one day increase in the number of days prior to expiration weakened corn basis by \$0.0003/bushel. Because the futures price in this study was rolled forward on the last day of the month prior to contract expiration, the days to expiration variable varied between 1 and 60. Thus, basis would be about \$0.02/bushel weaker at 60 days prior to contract expiration compared to the beginning of the expiration month.

Location variables varied in magnitude; however, locations further from the default location (Kansas City) and further away from river terminals were larger in absolute value. This is consistent with the difference in transportation costs of markets further from terminal and river markets.

## **Summary**

Results of this analysis indicate that there is evidence to suggest that soybean and corn basis patterns may have been effected by the presence of the LDP payment; however, deviations from historical basis levels were seldom large enough to matter. For a full version of this document go to: <http://agecon.lib.umn.edu/ncr134/cp00pa01.pdf>.

Table 1. Determination of Loan Deficiency Payment for Lafayette County Missouri

	PCP Below Loan Rate	PCP Above Loan Rate
A. Gulf price	\$2.16	\$2.46
B. Gulf differential	\$0.46	\$0.46
C. Posted county price based on Gulf cash price (A ? B)	\$1.70	\$2.00
D. Kansas City price	\$1.88	\$2.36
E. Kansas City differential	\$0.22	\$0.22
F. Posted county price based on K.C. cash price (D ? E)	\$1.66	\$2.14
G. Posted County Price (maximum of line C and F)	\$1.70	\$2.14
H. County Loan Rate	\$1.87	\$1.87
I. Loan Deficiency Payment (LDP) rate (H - G, where H - G > 0 for LDP to be in effect)	\$0.17	\$0.00

Table 2. Description of Variables and Summary Statistics of Data used in Estimation of daily Basis Equations for Corn and Soybean (21,970 observations)

Variable	Description	Avg	S.D.
$j$	Commodity, where $j$ = corn, soybean		
$i$	Location, where $i$ = Braymer, Cameron, Charleston, Chillicothe, Concordia, Corder, Hannibal, Jamesport, Kansas City, Sikeston, St. Joe, St. Louis, and Tarkio.		
$t$	Days between January 1993 and November 1, 1999, $t = 1, \dots, 1680$		
Cash <sub>jit</sub>	Local cash price of commodity $j$ in town $i$ on day $t$ . Corn (\$/bu) Soybean (\$/bu)	\$2.586 \$6.240	\$0.715 \$1.049
Nearby Futures <sub>jt</sub>	Nearby futures price for commodity $j$ , rolled forward on the first day of the contract expiration month, on day $t$ . Corn (\$/bu) Soybean (\$/bu)	\$2.684 \$6.413	\$0.595 \$1.003
Basis <sub>jit</sub>	Local cash price of commodity $j$ minus nearby futures of commodity $j$ in town $i$ on day $t$ . Corn (\$/bu) Soybean (\$/bu)	-\$0.097 -\$0.173	\$0.218 \$0.197
Lagged Basis <sub>jit</sub>	Lagged one day local cash price of commodity $j$ minus lagged one day nearby futures of commodity $j$ in town $i$ on day $t$ . Corn (\$/bu) Soybean (\$/bu)		
PCP <sub>jit</sub> / Cash Price <sub>jit</sub>	Government determined Posted County Price (PCP), for commodity $j$ , for the county town $i$ is located divided by Cash <sub>jit</sub> . Corn (\$/bu) Soybean (\$/bu)	97.3% 98.1%	4.2% 2.2%
Futures Liquidity <sub>jt</sub>	Trading volume for commodity $j$ on day $t$ divided by open interest for commodity $j$ on day $t$ . Corn (%) Soybean (%)	18.2% 31.3%	7.6% 10.4%
Expiration <sub>jt</sub>	Continuous variable equal to the number of days prior to contract expiration		
Contract Dummy <sub>jt</sub>	0 or 1 binary variables differentiating the different contract months of commodity $j$		
Location Dummy <sub>jit</sub>	0 or 1 binary variables differentiating location of cash price quote		

Figure 1. Nearby Corn Basis for Braymer, Missouri, January 1995 through October 1999.

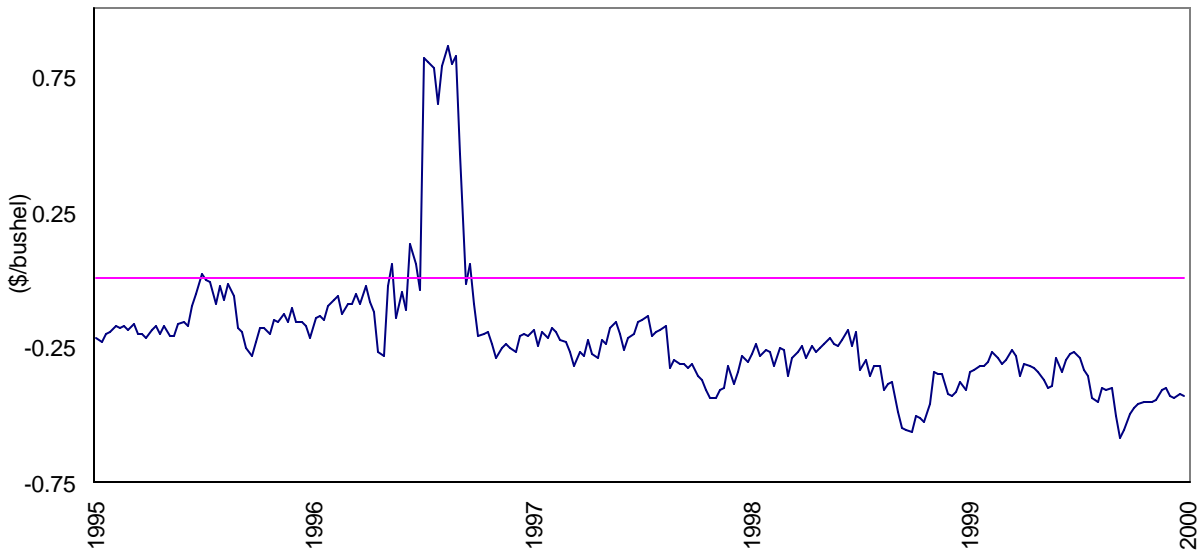


Figure 2. Nearby Soybean Basis for Braymer, Missouri, January 1995 through October 1999.

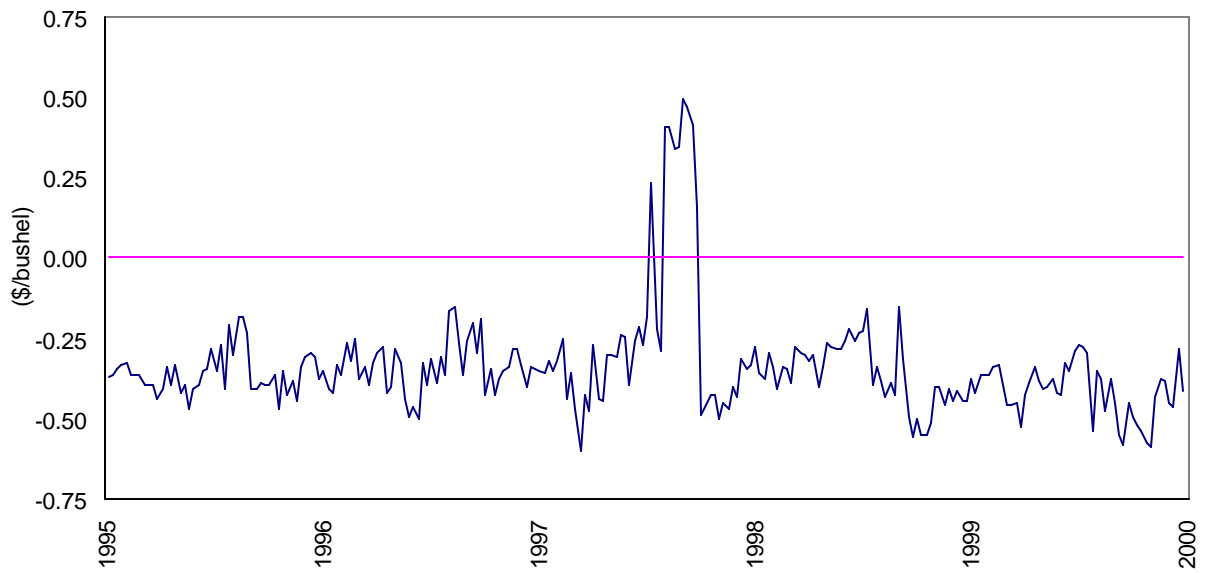


Figure 3. Braymer, Missouri, Weekly Nearby Corn Basis for 1999, 1998-1999 Average, and 1994-1999 Year Average, Marketing Year begins 1<sup>st</sup> week of September.

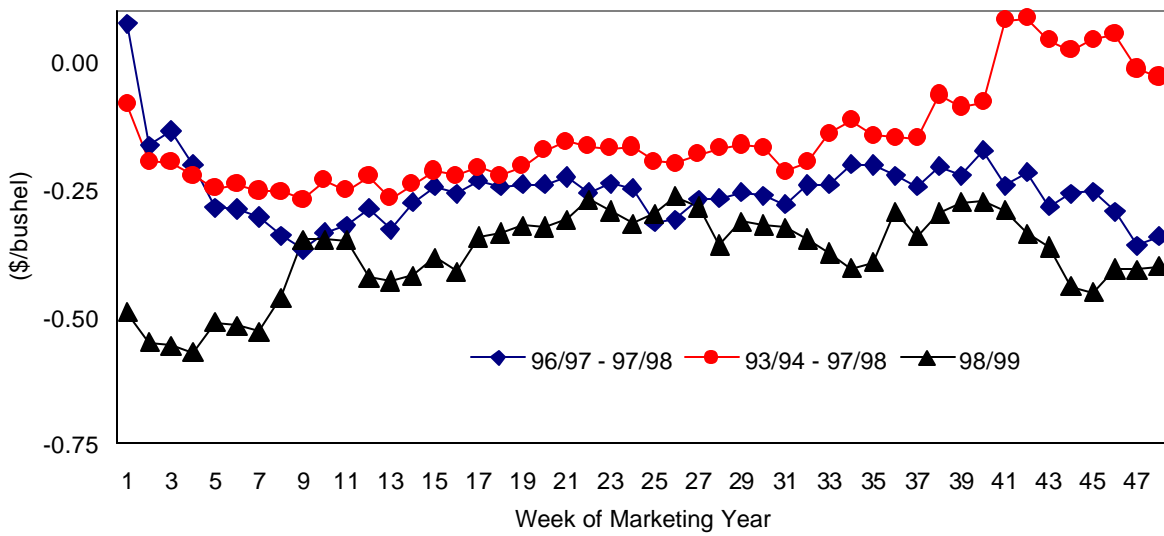


Figure 4. Braymer, Missouri, Weekly Nearby Soybean Basis for 1999, 1998-1999 Average, and 1994-1999 Year Average, Marketing Year begins 1<sup>st</sup> week of September.

