EDITOR'S NOTE

The past year's supply-demand relationship for many Minnesota-produced commodities has brought dramatically rising farm prices. This has created a favorable price-income situation for Minnesota farmers. However, it has also brought increased complexity and risk in farm marketing decisions. Farmers can now gain or lose larger amounts of money, depending on the nature and timing of their marketing decisions.

This issue of the Minnesota Agricultural Economist features two articles. Both are designed to help farmers understand the decisions they must make to take advantage of the current situation.

John J. Waelti
Editor

How The Changes In Government Programs Affect Grain Marketing

by Reynold Dahl and John Arends*

"Have recent programs affected grain carryover level and its distribution between private firms and the government? Have they affected seasonal or monthly grain price variability? Have they affected use of futures markets and their roles in pricing and allocating consumption of seasonally produced grains over time? These are important decision-making questions for farmers and marketing firms."

GOVERNMENT PROGRAMS affect farmers' and marketing firms' grain marketing decisionmaking more so than they affect most other agricultural commodities. This is because farm income support programs have included price supports, stock-carrying, and other forms of grain market intervention. This article reports research results of the University's Agricultural and Applied Economics Department. This research analyzed how government program changes affect grain marketing.

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The most significant change since World War II has been substitution of direct income payments for high price supports. This shift began in 1963. It was adopted under the Food and Agriculture Act of 1965. The Act's basic provisions were carried forward under the Food and Agriculture Act of 1970. This legislation has provided programs giving farmers more flexibility in production and marketing decisionmaking. Hence, they are considered more market-oriented than previous programs.

Have recent programs affected grain carryover level and its distribution between private firms and the government? Have they affected seasonal or monthly grain price variability? Have they affected use of futures markets and their roles in pricing and allocating consumption of seasonally produced grains over time? These are important decisionmaking questions for farmers and marketing firms.

To answer these questions, our research analyzed marketing implications of the shift to direct income payments. We studied corn, the most important feed grain. Data for crop years 1953-54 through 1970-71 were analyzed. We divided this period into two parts. First was 1953-54 through 1962-63 (referred to from now on as 1953-62). This was when government corn programs emphasized the price support mechanism. Second was 1963-64 through 1970-71 (referred to from now on as 1963-70) when growers' income was supported in a larger part through direct income payments. Participating farmers were required to divert acreage from corn to soil conservation usage. Also, price support loan rates were lowered.

Price Support Loans, 1953-54 through 1962-63

Government corn programs for 1953-62 assured minimum farm prices through loans considerably above "free" market prices. Farmers who restricted acreage were eligible for loans. Farmers did receive some direct payments in 1956-58 and 1961-62. These were incentives to participate in the programs. However, this period's emphasis was on price support loans.

Figure 1 shows relatively high rates during much of this period. Every year, rates were higher than the average price farmers received for corn. In 1955, for example, the national average corn loan rate was $1.58 per bushel. That season, farmers received an average corn price of $1.35. This is 23 cents less than the loan rate. As a result, farmers in the programs usually took advantage of price support loans. Later, market prices often did not rise enough above the loan rate to encourage farmers to sell the corn and repay the loan. So, much corn was delivered to the Commodity Credit Corporation (CCC), the government price supporting agency, to repay loans at maturity.

Figure 2 shows carryover accumulated rapidly under price support operations. An all time high of over 2 billion bushels was reached Oct. 1, 1961. It is significant that most of these stocks were owned by the CCC or under price support loan. Of the total 2,016 million bushel carryover on Oct. 1, 1961, only 126 million were "free" stocks held by private firms or individuals.

Income Payments Begin 1963-64

Acreage diversion programs were initiated in 1963. Participating corn farmers had to divert acreage to soil

conservation usage. This was a requirement for income payments. Price support loan rates were lowered. Support was shifted toward direct income payments. There was less reliance on price support loans. Figure 1 shows program participants received corn support payments since 1963. These payments were not received through the market, but rather through direct income payment. During this period, the average price received by farmers for corn has been higher than price support loan rates. Figure 2 shows that total corn carryover has been reduced. Significantly while CCC stocks have declined, "free" stocks have risen. By Oct. 1, 1971, CCC corn stocks had declined to 330 million bushels while free stocks reached 333 million bushels.

The CCC could dispose of much corn inventory in 1973 as market prices have risen beyond loan rates. Market prices have increased because of increased domestic and world demand. The CCC-owned corn inventory was only 100 million bushels on March 31, 1973. Furthermore, most stocks are committed or sold. This leaves CCC with only "emergency" reserves. Also, price support loans will not be extended beyond this summer. These loans are on 346 million bushels of the 1972 crop corn outstanding on March 31, 1973, and on 438 million bushels of earlier crops under reseal loans. If adequate transportation is available, this corn will be on the market and passed to private hands. By the end of this crop year, we will have the lowest level of government-owned corn stocks since WWII.

Consequently, now is the time to analyze marketing implications of decreased government stocks and increased stock-carrying by private individuals and marketing firms.

The Impact on Market Prices

Since free stocks have become more important, one would expect a closer association between annual changes in free stocks and annual changes in the season's average price received by farmers. This is because a change in the year-end free stocks reflect how well supply and demand are balanced. If year-end free stocks increase, market supplies have exceeded demand. Prices would decline. The re-

Fig. 1: Corn Prices and Support Rates, U.S. 1953-1971

$/bu.

Year beginning Oct. 1
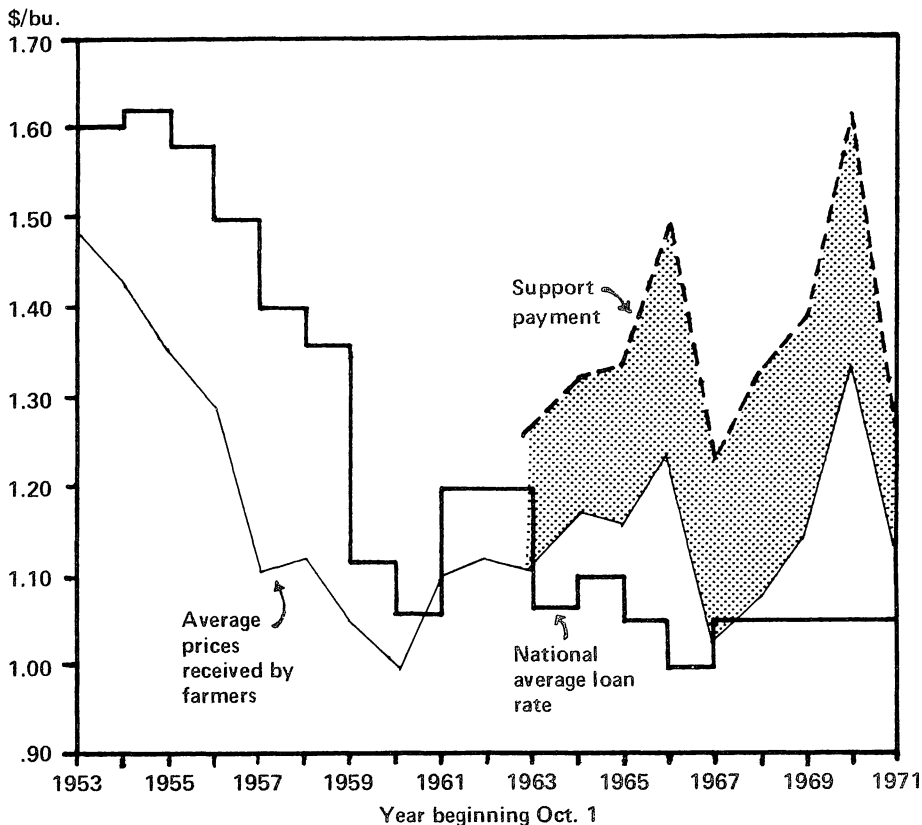
Sources: USDA, Economic Research Service

Fig. 2: Corn Carryover Stocks, U.S. 1953-1973

million bu.

Year beginning Oct. 1.
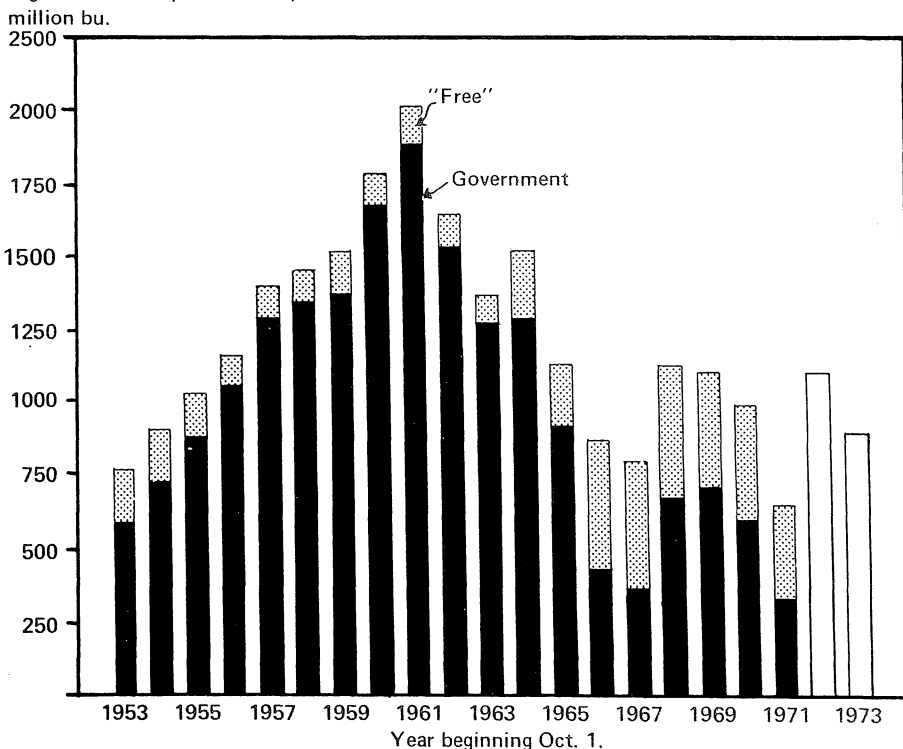
verse would be true when free stocks decline.

Annual changes in the loan rate can also influence farmers' prices. This should be of lesser significance when market prices are above the loan rates.

We analyzed how the season's average price received by farmers varied with annual changes in free stock levels and loan rates during the two periods.

During 1963-69, 75 percent of the change in the season's average price received by farmers was associated with changes in year-end free stocks and loan rate. Most of the change was associated with changes in year-end free stocks. An increase of 5.1 cents in the season's average price received by farmers was associated with a 100 million bushel decrease in year-end free stocks.

Changes in the loan rate did not significantly influence farmers' average corn prices during this period. Loan rates, however, remained quite stable during this time.

The situation was different during 1953-62. Fifty-two percent of the annual season's average price received by farmers was associated with loan rate changes and changes in year-end free stocks. Nearly all of this price change for farmers was associated with loan rate changes. In fact during this period, changes in free stocks had no significant effect on the season's average price. Free stocks were at low levels, however, while large government stocks had accumulated under price support operations.

Seasonal and monthly variabilities in corn prices are also important to farmers.

Seasonal and Monthly Variation in Prices

Farmers are interested in the seasonal trend in corn prices because they sometimes store corn in anticipation of a seasonal price increase. Table 1 shows that the seasonal price rise was more pronounced during the earlier period when loans and government stocks were dominant market factors. Corn prices are typically the lowest in November. Therefore, corn prices in Table 1 are shown relative to the November price. The average year from 1953-62, for example, has the December price 2.8 cents higher than the November price. Monthly average prices rose until July which was 10.7 cents higher than the November price. June - September prices did not vary much from month to month — averaging about 10 cents over the November price.

During 1963-70, the seasonal price pattern was less pronounced. Average prices rose over the season, but the May price averaged only 7.0 cents over November. It was also more erratic, since the January price averaged 6.9 cents over November.

In the latter period, monthly prices also varied more relative to the November price. Table 1 shows that monthly standard deviations which measure variability were higher in 1963-70. The 1963-70 May prices, for example, averaged 7.0 cents per bushel higher than November prices. In two-thirds of the years we would expect the May price to be 1.7 to 12.3 cents higher than the November price.

If under the new programs corn prices have exhibited a lesser seasonal price trend and greater monthly variability, these considerations have important marketing implications to farmers.

Some Marketing Implications

It was frequently said that the Government was the market up to 1963. This was a fairly accurate description. The CCC did most of the stock-carrying. Market prices could only fluctuate within a narrow range around the loan rate. The price support loan set a floor. Market prices would not decline appreciably below that amount. Also, prices could not rise considerably higher than the support price. The CCC held large stocks. It was authorized to sell when the price reached 105 percent of the loan rate plus carrying charges. Farmers had few marketing decisions such as when to store and when to sell corn not within regulations and operations of the price support mechanism.

This situation changed after 1963. Then loan rates were lowered, and market prices were usually higher than the loan rate. The market can now better determine price. More price variability has resulted because the support price and CCC stocks are no longer the dominant factors.

Now farmers and marketing firms must more carefully watch cash and futures markets and prices.

Table 1. Corn: Seasonal Pattern of Prices and Monthly Price Variability, U.S. 1953-62—1963-70

	1953-1962		1963-1970	
	Price increase from Nov.	Standard deviation	Price increase from Nov.	Standard deviation
	(cents per bushel)			
December	2.8	3.0	0.1	5.3
January	3.3	3.0	6.9	5.5
February	4.4	3.1	3.7	5.1
March	4.0	3.0	5.1	5.3
April	6.9	3.1	5.8	5.3
May	9.1	3.2	7.0	5.3
June	10.4	3.2	4.1	5.5
July	10.7	3.2	3.3	5.5
August	10.4	3.3	1.9	5.5
September	10.5	3.2	4.3	5.5
October	4.2	3.0	0.2	5.3

The Growing Importance Of Futures Markets To Grain Marketing

by **Reynold Dahl**

"Hedging is an important marketing tool to most grain merchandisers and processors. It can also be important to farmers."

IN RECENT YEARS, use of grain futures markets has increased substantially. The annual average open contracts in corn futures rose from 54.8 million bushels in 1957-58 to 331.6 million bushels in 1970-71. This is largely because of increased hedging prompted by more private stock-carrying and greater price uncertainty in the new farm programs. When CCC stocks dominated the market, there was little need for hedging. Futures markets were used little.

There is a widespread view that futures markets are primarily speculative markets. However, they depend upon hedging for their existence. Increased use of futures markets when farm programs changed reflects the importance of hedging to futures trading.

Hedging is an important marketing tool to most grain merchandisers and processors. It can also be important to farmers. Hedging is entering into a futures contract on an organized commodity market as a temporary

substitute for an intended later transaction in the cash market.

There are two principal ways corn farmers can hedge. First, they can hedge all or part of their crop before production is completed to take advantage of a price they consider favorable. The closing prices of Chicago corn futures on May 29, 1973, for example, were as follows:

July	$2.12 5/8/bu.
Sept.	$2.05 5/8/bu.
Dec.	$1.98 1/2/bu.
March, 1974	$2.00 3/8/bu.
May, 1974	$2.00 3/4/bu.

On May 29, a Minnesota farmer notes that No. 2 yellow corn for December delivery in Chicago is $1.98½/bushel. To get his local December market price, he must subtract transportation and handling costs to Chicago. If his local cash price in December is normally 17 cents below cash corn in Chicago, $1.98½ is equivalent to $1.81½ at his local elevator.

If, on May 29, he decides to accept $1.81½ for December delivery, he can sell December corn futures through his broker at $1.98½ for all or part of the production he anticipates. He is using the futures market to forward price his corn. The futures contract he sells May 29 serves as a temporary substitute for his anticipated sale of cash corn at his local elevator in December. When he sells his cash corn, he buys back the Decem-

ber future. If prices have dropped, the futures profit added to his local cash corn price should give him a net price close to $1.81½. On the other hand, if prices rise, he cannot benefit since he loses on the future. However, his local cash price will also be higher so the net price should be $1.81½.

Futures Prices as a Guide to Storage

Farmers sometimes store corn at harvest in anticipation of profit from a seasonal price rise. This involves risk. Some years prices do not rise sufficiently to pay storage costs including interest on the capital invested in the corn, insurance, and out-of-pocket costs in operating storage facilities. Further, monthly corn price variability has been greater since 1963. The seasonal price rise has been less pronounced as demonstrated in this issue's lead article.

Farmers who understand futures markets can use cash-futures price relationships as a guide to storage. They can earn returns on storage through hedging. This involves less risk than storing corn and not hedging.

Grainmen refer to the relationship between cash and futures prices as the basis. They usually are more interested in the basis than in the price level because the basis represents a storage price. When cash prices are at wide discounts to futures prices, we have a

Fig. 3: Average Weekly July Basis for Corn in Southwestern Minnesota, ten years, 1962-63 to 1971-72.
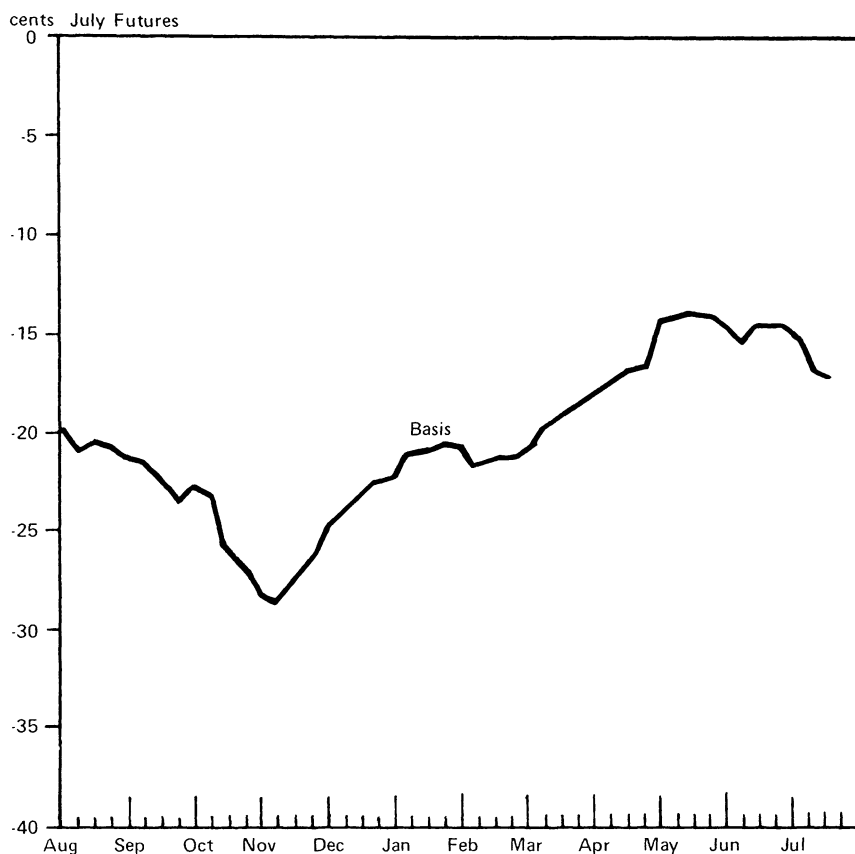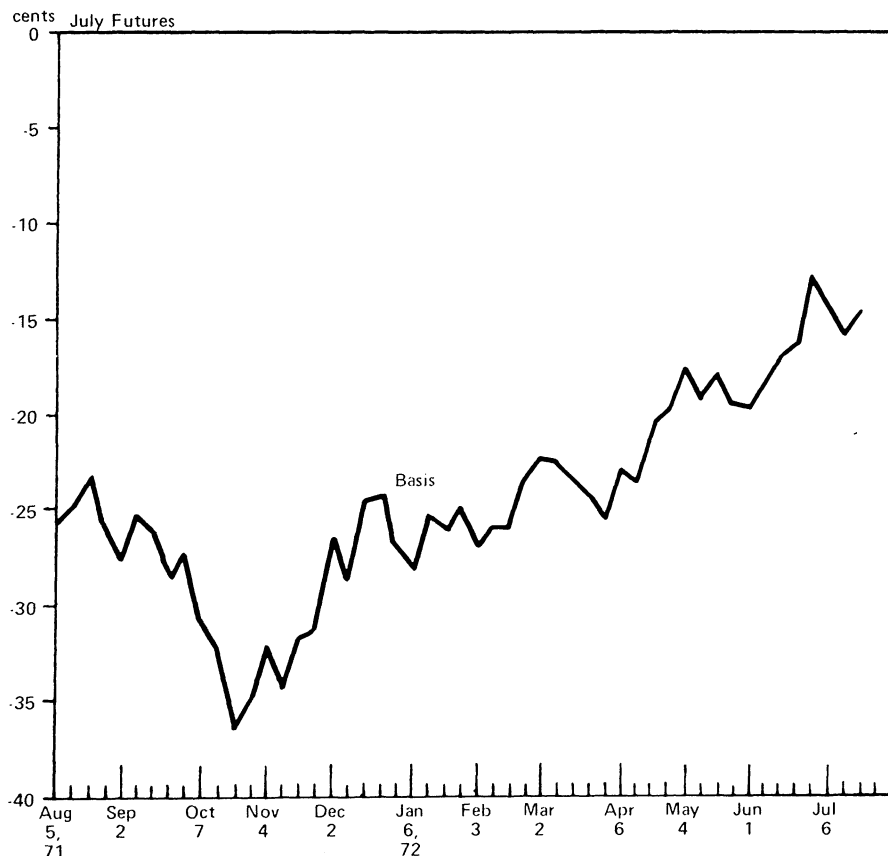

Fig. 4: Weekly July Basis for Corn in Southwestern Minnesota, 1971-72

positive storage price. This is the time to store cash grain and hedge it through futures sales to earn returns on storage. As the delivery month approaches, cash prices usually strengthen relative to futures prices. The basis narrows. Therefore, profits are earned. Earning returns on storage through hedging can result when cash-futures price relationships indicate such market opportunities exist. Here is an example:

Figure 3 is an average basis chart for corn for crop years 1962-71 at a southwestern Minnesota country elevator. To get the basis, this elevator's buying price for corn 1 day each week is subtracted from the July corn future price on the same day at Chicago.

The basis is then averaged for each week. Note that the average basis is widest in November at the peak of harvest. This is typical because much corn is being sold at harvest. Elevator and transportation facilities are being used to capacity. So cash prices are depressed relative to future prices. On Nov. 1, the average basis was 28 cents under the July future. It narrows to 21 cents under by January 7. Then it is steady until March. By May 7, it narrows to 15 cents under. This is a typical basis movement over time, but it varies from year to year with the size of the corn crop.

In 1971, we had a large corn crop. The basis chart for the 1971-72 crop year at the same elevator is shown in figure 4.

That year, the basis was even wider at harvest than the 10 year average. On Oct. 21, the basis was 36 1/2 cents under the July future. It narrowed to 24 1/2 cents under on Dec. 23. Thereafter, the movement was irregular during January, February, and March. In April, it began to narrow again, moving to 12 7/8 cents under the July future in late June.

Farmers sometimes sell most of their corn crop at harvest. If they had storage facilities, this would not have been a good decision in the fall of 1971. The heavy corn crop that year depressed cash prices to abnormally large discounts to future prices. The storage price was high because much corn needed storing. A wide basis of 36 1/2 cents under the July future showed this. It should have told the farmer to store rather than sell. If he had done this, the results could have been as follows:

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Cash			Futures		Basis
Oct. 21	Cash corn at elevator	93 cents	Sell July future	129 1/2	-36 1/2 cents
Dec. 23	Sell corn at elevator	104 cents	Buy July future	128 1/2	-24 1/2 cents
	Change in cash	+11 cents	Change in basis		+12 cents

On Oct. 21, the farmer decided to store rather than sell his harvested corn because the basis was 36 1/2 cents under July. He hedged by selling a July future in the bushel amount equal to what he stored at $1.29 1/2/ bushel. By Dec. 23, the basis had narrowed to 24 1/2 cents under – a narrowing of 12 cents. On Dec. 23, he may have decided to take this 12 cents return on his storage hedge. If he did, he would have bought back his July future and sold his corn at the local elevator. Cash prices rose 11 cents. His futures profit was 1 cent for a total return of 12 cents per bushel return for 2 months storage. This is equal to the change in the basis.

Because the cash corn price increased 11 cents between Oct. 12 and Dec. 23, he could have earned nearly as much by storing and not hedging. Storing without hedging, however, involves a price risk. If prices had declined, he would have lost. When he hedges, he is interested only in changes in the basis. Over time, basis movements are more easily predictable than are changes in cash corn prices. The basis usually narrows after harvest. This is demonstrated in figure 3. When this happens, he gains through a storage hedge even though cash prices may fall.

Rather than selling on Dec. 23 and taking his 12 cents/bushel storage earnings, the farmer may store for a longer time. From figure 3, he knows that in late May or June the basis has averaged about 15 cents under the July future over a 10 year period. To earn an additional 9 1/2 cents in storage, does he want to store from Dec. 23 to May or June? If he decided that 9 1/2 cents would pay his costs and leave a net profit, these would have been the results.

"Because the cash corn price increased 11 cents between Oct. 12 and Dec. 23, he could have earned nearly as much by storing and not hedging. Storing without hedging, however, involves a price risk."

If he stored until June 29, the basis would have narrowed to 12 7/8 cents under. This is a change of 11 5/8 cents from Dec. 23. So he earned an additional return of 11 5/8 cents storing from Dec. 23 to June 29. Because the basis narrowed more than he expected, he earned 2 1/8 cents per bushel more than he had anticipated. Had he stored corn without hedging from Dec. 23 to June 29, he would have gained only 2 cents/bushel. This is because the cash price increased that much.

This illustrates how storage hedging opportunities exist in a year when corn supplies are large. In such years, cash prices often are depressed relative to futures. Then storage prices are high. Farmers can take advantage of these high storage prices by storing corn and selling futures. A storage hedge is usually profitable in years of large crops.

When corn supplies are short relative to demand, such opportunities may not exist. Then, demand for cash corn pulls cash prices up relative to futures. Sometimes cash prices may even be higher than futures prices. When cash prices exceed futures prices, we have negative storage prices. In such years, it's usually better to sell rather than store. Negative storage prices have prevailed during much of the 1972-73 crop year. Heavy cash corn demand for export and feeding has pulled cash prices above futures prices.

Farmers who wish to use futures markets for storage hedging should study cash-futures price relationships over time through basis charts. These are illustrated in figures 3 and 4. Then for marketing decisionmaking, farmers can judge when storage prices are high or low.

Implications for Country Elevators

From the end of World War II through the mid-1960's when government-owned grain stocks were high and rising, many country elevators earned substantial income through storage and grain handling for the CCC. Congress directed the CCC to use commercial facilities whenever possible in price support storage and marketing operations. This involved no price risks for country elevators since they did

Cash			Futures		Basis
Dec. 23	Cash corn at elevator	104 cents	July futures	128 1/2 cents	-24 1/2
June 29	Sell corn at elevator	106 cents	Buy July futures	118 7/8 cents	-12 7/8
	Change in cash	+2 cents	Change in basis		+11 5/8

not own the grain. The elevators did not have to be concerned with markets, cash future price relationships, and hedging.

The situation has changed dramatically in recent years as CCC stocks have declined. Today, country elevators can no longer rely on the CCC to provide storage and grain handling income. If a country elevator operator cannot fill his house with CCC grain, is the alternative to run empty after the harvest time marketing rush? One alternative might be grain purchase and storage in anticipation of a cash price

rise. This can be risky, however. Substantial losses can result if market prices weaken. A better alternative is use of the cash-futures price relationship to guide storage operations and earn storage returns through hedging. Country elevator operators must learn to hedge and use futures markets. Otherwise, they will have difficulties competing with firms who do know.

Conclusions

The mid-1960's shift to income payments with price support loans closer to market prices has implications

for farmers and marketing firms. Resulting reduction of CCC stocks and recent export and domestic demands mean CCC stocks and loan levels are no longer dominant market factors. Market prices can now fluctuate more.

Decisions when to sell and when to store are more important. Farmers and marketing firms will find futures markets important marketing tools in forward pricing and storage operations. Cash-futures price relationships can be reliable decisionmaking guides for farmers and marketing managers who understand and study them.