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NEW MARKETING ISSUES VIA PIK CERTIFICATES

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Introduction

The Food Security Act of 1985 permits payment of farm program benefits in part with PIK certificates. PIK certificates can do things that cash alone cannot do. This special capacity gives PIK certificates special value. A market determined premium has existed for them from the beginning. Briefly during the harvest of 1986, premiums were as high as 30 percent. To date, premiums have rarely been much less than 5 percent. In this paper we will attempt to better understand the reasons for the PIK certificate premiums and explore an alternate design of the system that would, for the most part, eliminate them.

A second objective of this paper is to understand how the special powers of PIK certificates are capable of changing the market environment itself. The fact that PIK certificates can acquire grain owned by the CCC, in the Farmer Owned Reserve, in the Special Producer Storage Loan Program, or under 9-month loan at approximately current market prices is an important change in the rules. Previously, CCC inventory had been available to the market only at prices well above the loan rate, with minor exceptions pertaining to the condition of the grain. Farmer Owned Reserve inventory was available at prices at or above a trigger-release price. The traditional 9-month loan program and the SPSLP tend to support prices at levels above the loan rate plus interest carrying charges. The availability of these supplies to the market via a new set of rules creates a radical new market environment, something closer to a free market (Kennedy) (Westcott and Hanthorn).

Additional topics discussed include the role of PIK certificates toward alleviating storage shortages, toward creating a defacto marketing loan, and toward possible USDA control of regional markets.

The Determination of PIK Certificate Premiums

The supply side of the PIK market is determined solely by the USDA as it declares what part of which government programs are going to be paid in PIK certificates versus cash. Table 1 was researched by Lise Poirier.[1] Through December 1986, it represents the known monthly history of PIK certificates by government program issuing them. January through September of 1987 is a projection made by Poirier. Note that although there are numerous programs that may issue PIK certificates, most originate from the deficiency payments and paid land diversions of the wheat and feedgrain programs.

To understand the demand side of the PIK certificate market it is necessary to understand the alternative uses of the PIK certificates (U.S. GAO). There are five categories of potential use:

1. Redeem for cash.
2. Redeem from a 9-month loan.
3. Redeem from the Farmer Owned Reserve.
4. Redeem from the Special Producer Storage Loan Program.
5. Redeem from the CCC inventory.

Table 1. Generic Certificate Balance Sheet (million dollars)

SUPPLY	APR-JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
BEGINNING SUPPLY					1186	962	1586	2514	3110	3753	4393	5028	4879	4280	3641	
'86 WHEAT DEF & DIV PMTS				829	26	625	620									2100
'86 FEEDGRAIN DEF & DIV PMTS				1446	34	20	20			1050	1060					3630
'86 RICE & COTTON DEF PMTS				59	5	15	55	25	25							183
'87 WHEAT & FEEDGRAIN ADP & PLD PAYMENTS	---NOT---					250	700	800	595			375				2720
EXPORT ENHANCEMENT PROGRAM	----AVAILABLE----			29	10	11	15	15	15	20	20	20	20	20	20	215
TARGETED EXPORT ASSISTANCE	(OCT IS CUMULATIVE)			27	1	3	3	2	2	2	2	2	2	2	2	50
CONSERVATION ACREAGE RESERVE				48	25	8		100								180
ETHANOL PROGRAM				48	7	1										55
EMERGENCY RELIEF FUND																0
DISASTER PAYMENT PROGRAM									400							400
RICE MARKETING LOAN				2	1	1	0	1	1	1	1	2				10
TOTAL ISSUANCE				2487	108	934	1413	943	1038	1073	1083	399	22	22	22	9543
TOTAL SUPPLY				2487	1294	1896	2999	3457	4148	4826	5476	5427	4901	4302	3663	9543
USE																
WHEAT	174	53	45	70	79	66	40	30	30	55	65	145	165	145	135	1296
CORN	320	146	112	147	230	222	283	285	320	335	340	345	390	440	465	4381
SORGHUM	45	10	14	9	8	8	20	16	16	21	21	26	30	40	40	323
BARLEY	36	13	6	9	12	7	15	12	15	18	18	28	28	23	18	260
OATS	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	5
RYE	0	1	1	1	1	1	0	1	1	1	1	1	1	1	1	9
SOYBEANS	8	1	2	1	0	0	1	1	1	1	1	1	5	10	25	58
RICE	45	9	15	6	1	6	1	2	2	2	2	2	2	2	2	99
COTTON	0	0	0	0	0	0	125	0	10	0	0	0	0	0	0	135
TOTAL USE	628	233	195	244	332	310	485	347	395	433	448	548	621	661	686	6566
ENDING CERTIFICATE SUPPLY				1186	962	1586	2514	3110	3753	4393	5028	4879	4280	3641	2977	

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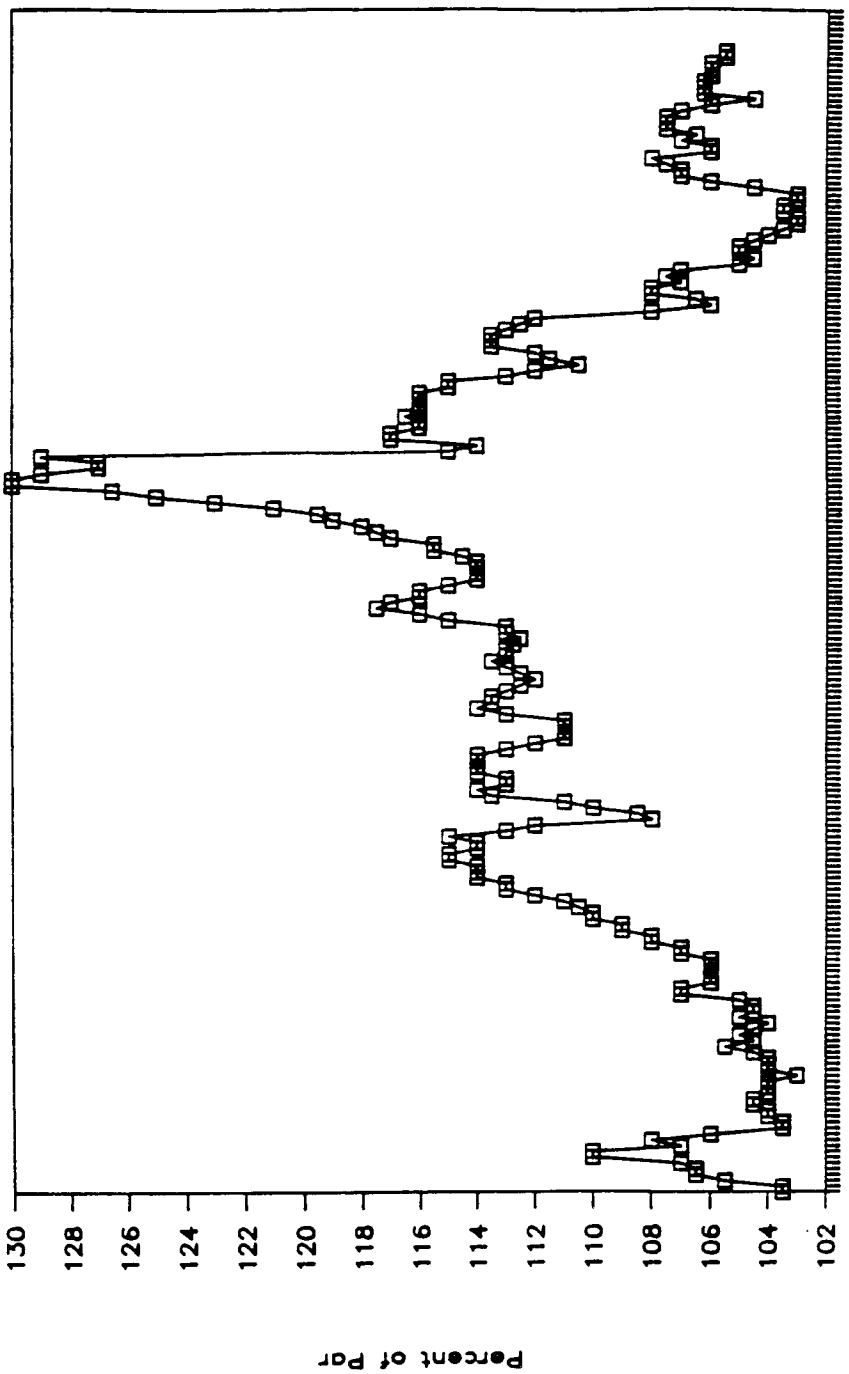
The option to redeem for cash is good for the last three months of the period determined by the eight months following the last day of the month of issuance; thereafter the PIK certificate becomes worthless. The option to redeem for cash creates a floor value. The certificate's cash value was subjected to the Gramm-Rudman-Hollings reduction for those payments related to the 1986 farm program if redeemed for cash, but not if redeemed for commodity. This is not the case for the 1987 payments. Therefore, the floor value of PIK certificates issued relative to the 1986 program is 95.7 cents on the dollar. For the 1987 program year certificates, the floor value is 100 cents on the dollar.

Aside from the floor on PIK certificate values created by the redemption for cash option, the demand side of the PIK market is derived from opportunity for arbitrage. The four remaining potential uses may or may not offer arbitrage opportunities from time to time. But when arbitrage is possible and because PIK certificates are required as part of the process of exploiting these opportunities, some part of the potential arbitrage profit might be bid as a premium for the PIK certificate. The demand for PIK certificates derived from potential arbitrage opportunities and the USDA determined supply are balanced by a market determined premium (see Figure 1). A more detailed look at the demand for PIK certificates as derived from opportunities for arbitrage follows.

FIGURE 1

GENERIC CERTIFICATE PREMIUMS*

(Average Daily Bid)



* As quoted in the Midwest grain report section of the Kansas City Grain Market Review.

Sources of Arbitrage Value

There are three determining sources of arbitrage value available to PIK certificate users:

1. Spatially determined.
2. Qualitatively determined.
3. Temporally determined.

Spatially Determined Arbitrage Value

The initial design of a system for determining PCPs attempted to recognize the spatial dimension of the commodity market by pegging local PCPs relative to nearby terminal prices. In Minnesota, for example, an official price was determined for the Minneapolis location once each day by the Kansas City office of the ASCS. Each county in Minnesota would get the official Minneapolis price and adjust by a fixed "differential" to determine their official PCP for that day. The differentials were estimated from price data collected from elevators for the dates January 31, April 1, July 1, September 30, 1985 and January 31, 1986. The high and low price observations were voided and the remaining three averaged to get the local price. These were subtracted from the Minneapolis price to get the differential. The winter market tended to receive extra weight because of two January observations.

Two types of spatial price errors were reflected in the PCPs as determined in this initial system. First, there was the spatial price errors resulting from the differentials being poorly estimated by comparison with historical standards that reflect normal transportation relationships and local market conditions. Secondly, there were spatial price errors resulting from the differentials being fixed.

Poorly Estimated Differentials

One example of this kind of error related to the dates used in the sample. Because this sample weighted the winter more heavily, it favored price differentials that reflected a frozen water transportation system which reflected the higher cost rail and truck transportation markets. This lead to wide differentials for markets that tie to the upper Mississippi river transportation system. As such, it was a windfall for these particular counties because it created artificially low PCPs during the normal movement season in this region.

Another example of this type of error was particularly apparent in northwestern Minnesota and North Dakota where the market for corn is very thin. Little business is done in corn from day to day--it is wheat country. Apparently, on these particular five observed days the bids of elevators in some of these counties reflected a serious lack of interest for corn. For example, Lake of the Woods County in northwestern Minnesota had a differential of -60 to Minneapolis while its neighboring county to the south, Beltrami, had a -20 differential. This was a 40-cent windfall to Lake of the Woods county versus its neighbor.

These particular counties in Minnesota and North Dakota became the focus for a special arbitrage opportunity that depended on the ASCS rules permitting commodities to be substituted across county boundaries. The substitution rule allowed a farmer to buy grain in another county and substitute it for grain he had produced and was entitled to seal in his home county. The farmer could then seal it in the other county at that county's loan rate and redeem it at that county's PCP. Having done that, he could no longer seal the grain in his home county. But in cases like Lake of the Woods county where the differentials had been poorly estimated to the downside, there was much interest to buy corn and use the substitution privilege in lieu of local sealing and redemption transactions. Elevators in these counties imported corn where necessary

and sold and repurchased the warehouse receipts, turning them over and over repeatedly to facilitate the temporary ownership needs of farmers in other counties.

The arbitrage profit (ARB) attributable to the use of the substitution rule with grain purchased in county B substituted for grain produced in county A was:

CLR = county loan rate

PCP = posted county price

SRV = service charges

PRM = PIK certificate premium

LMV1 = local market value on day of purchase

LMV2 = local market value on day of sale

(1) ARB = CLR(B) - PCP(B)*[1+PRM] - CLR(A) + PCP(A)*[1+PRM] -
SRV + LMV2(B) - LMV1(B)

This arbitrage opportunity was enhanced by the history of the relative regional structure of the county loan rates. Although these have been changed with annual changes in the national loan rate, they have not been significantly changed for some time in the relative sense. If they ever reflected regional differences in grain prices, it must have been long ago. In 1986 in Minnesota, for example, the loan rate for corn ranges from $1.80 in Minneapolis to $1.76 in some western counties. Transportation costs have changed substantially over the last 20 years, while the relative structure of county loan rates has, for the most part, been held constant. County loan rates in areas remote to the terminals probably should be discounted more than they are to reflect substantial transportation costs as the PCP differentials at least attempt to do. A state level range in county loan rates of 4 cents is just inconsistent with the original set of differentials used to calculate the PCPs which ranged from -5 cents in Minneapolis to -60 cents in Lake of the Woods county.

The ASCS tried to solve this problem in the second week of October, 1986, by revising some of the more extreme county differentials in North Dakota and Minnesota. But Republican Senator Mark Andrews of North Dakota, being in a tight senate race, talked Secretary of Agriculture Richard Lyng out of it for North Dakota; however, only until November 10. On November 1, 1986, the ASCS patched this problem with a new rule that prohibited redeeming substituted commodities with PIK certificates. PIK certificate premiums immediately dropped from about 30 percent to about 15 percent (see Figure 1).

In April of 1987, the ASCS is rumored to be reviewing the relative structure of county loan rates. This review would appear to have been catalyzed by the substitution rule arbitrage activity of 1986. Aside from making new rules, the opportunities for arbitrage using the substitution rule would be much less if both county loan rates and PCPs accurately reflected the relative regional price differences.

Errors Originating From Fixed Differentials

Spatial price errors also result from the differentials being fixed. Grain transportation rates change. Local grain markets reflect these changes when they occur. A static set of differentials in this environment give rise to arbitrage opportunities if transportation rates fall below those implied by the differentials used to calculate the PCP. When transportation rates fall, locations more distant from terminals would tend to have the larger arbitrage potentials.

In cases where transportation rates rise, local market prices can fall relative to the PCPs which reflect a fixed transportation rate structure. The results can be perverse to normal grain movement patterns. For example, in April 1987 the Gulf market needing corn to meet export market commitments increased its bid to attract the needed supplies. But the PCP in Iowa was tied to the Gulf bid by a fixed differential. Accordingly, the Iowa structure of PCPs went up one

for one with the Gulf bid. But the Iowa corn market did not go up one for one because demand for transportation to move the corn from Iowa to the Gulf position increased the barge rates. As barge rates increased, the market had to reflect these higher transportation costs. Market prices increased less than the PCP structure. Opportunity for arbitrage by redeeming with PIK certificates and selling to the market were diminished. Where higher prices normally stimulate movement, here they stifled it. A special revision of the differentials to adjust for changes in barge rates was implemented several times in April 1987 to patch the problem.

Depending upon how much the ASCS is willing to invent new rules and review procedures, this problem can be managed. But short-term lags and delays as the rules react to the local market flux still leave some undesirable short-term distortions versus what would be expected from a market driven set of grain movement patterns.

As the ASCS experiments with these kinds of rules at the regional level, they might well be tempted to control regional movement patterns to "solve" regional storage problems for themselves or whomever. Yet, granting favorable differentials to certain regions carries potential for a political backlash from those areas left unaided.

Inconsistent PCPs at the Boundaries of Terminal Territories

These two types of spatial price error become especially apparent at the boundaries created when certain terminal territories are defined. Market conditions at the major terminals can vary markedly. One terminal will draw grain in from a larger region, encroaching on another's normal territory by raising its cash bid relative to a competing terminal. This is the normal mechanism that operates to balance regional supply and demand conditions. Since the ASCS fixes all county PCPs relative to the various terminal markets, neighboring counties that happen to fall on the territorial borders can see wide and varying differences in their PCPs. Those counties with the

lower PCPs can have substantially greater arbitrage opportunities relative to the local market than their neighbors.

This particular situation was patched on December 1 of 1986 by pegging each county to two terminals and determining the PCP as the higher of the two. This was a candidate for an early patch because of its high visibility and apparent local unfairness between neighboring counties.

Qualitatively Determined Arbitrage Opportunities

The second source of arbitrage value originates from failure to adequately price for differences in the quality of the commodity. We have two examples. In 1986, the early use of PIK certificates was focused in arbitrage opportunities in CCC inventory wheat. The new crop spring wheat had a low protein level. The high protein wheat from previous years was accessible with PIK certificates at depressed price levels relative to the market. This was because the protein premium scale used by the CCC was historically determined and fixed. It tended to undervalue protein in the 1986 marketing year when the market was willing to pay unusually high premiums by historical standards. In similar fashion, the CCC has been willing to sell malting grade barley at feed grade prices.

Temporally Determined Arbitrage Opportunities

The last class of arbitrage value comes from advantages gained in timing. There are two kinds. One relates to short-term price changes and the second to avoided storage costs.

The original set of rules set the PCP once each day, but the market price changed throughout the day. If one had positioned oneself to redeem a commodity with PIK certificates and intended to sell shortly thereafter, it made sense to wait for a day with a strong gain. The PCP having been determined relative to the previous day's close and being still good in the

afternoon of the next day under conditions of a strong up move in the day's market, the arbitrage profit was enhanced by the daily price change, whatever it was. ASCS has since patched this with a system for intraday price adjustments.

Attached to the forfeiture privilege of the 9-month loan is a 9-month wait. This typically costs about 3 cents per bushel per month in commercial facilities. Farm facilities that are storing sealed corn carry an opportunity cost if they could be rented to another farmer or local elevator. Or at a minimum, there are variable costs to consider when evaluating on-farm storage costs. Proper use of PIK certificates provides a way for the farmer to retain all the other benefits of the 9-month loan program and eliminate this obligation and cost to store. By redeeming with PIK certificates and simultaneously selling to the market, he substitutes the market now as a receiver of the commodity versus the CCC nine months from now. He avoids nine months of storage costs that the delayed disposal to the CCC entails.

If he does not sell the redeemed commodity immediately and, therefore, still has storage charges, he still has priced the commodity at the PCP so that he can benefit from normal seasonal price or basis appreciation even though there is some risk that his storage costs will not be recovered. Yet, it is possible that storage costs will be more than compensated by price appreciation in the market. The potential for price appreciation was present in the 9-month loan program only from much higher levels, i.e., the conventional redemption price of the original loan plus interest.

A Formula For Arbitrage Profit

Using the definitions

ARB = arbitrage profit

LMP = local market price on day of redemption

PCP = posted county price

PRM = PIK certificate premium

STC = present value of storage cost avoided

STE = present value of storage earnings foregone

SRV = service charges

CVN = convenience value

a formula for the arbitrage values discussed in this paper, excluding the substitution rule, can be expressed as

(2) ARB = LMP - PCP*(1+PRM) + STC - STE - SRV + CVN

We use the local market price on the day of redemption with PIK certificates because subsequent market prices are achieved only at risk and do not qualify to be considered as part of an arbitrage for this reason.

Convenience value is that value to the redeemer in excess of the LMP. For example, a farmer might value corn in position on his farm higher than equivalent grain that could be purchased at the local elevator by the transportation costs between the elevator and the farm. Commercial interests might also find this kind of value in CCC offerings that are well located relative to contracts they hold.

Notice that arbitrage profits are larger for the 9-month loan commodity versus the Farmer Owned Reserve and the Special Producer Storage Loan Program because storage earnings are zero for the 9-month loan and positive for the FOR and SPSL. For this reason, substantial redemptions of farm stored grain from the Farmer Owned Reserve or the Special Producer Storage Loan Program are unlikely with PIK certificates. A similar bias operates against

redemption of CCC stocks because storage is a cost to the CCC. Potential to avoid storage is therefore nil for arbitragers. Moreover, in cases where a commercial redeems CCC inventory it is to his advantage to redeem it from someone else's storage facility. Redeeming it from its own storage facility carries a cost of foregone storage earnings. In similar fashion, some country elevators are unhappy with the PIK program because storage costs avoided by its traditional customers is storage income lost by the elevator.

The Distribution of Arbitrage Benefits

ARB is allocated in part to the owner of the PIK certificate, in part to the user of the PIK certificate, and in part to an intermediary that buys and resells PIK certificates. The PIK certificate owner's share of the profit (ARBown) is determined by the premium (PRMown) that it would command if sold. The intermediary's share (ARBint) is determined by the markup between his bid and offer (PRMint). The PIK certificate user gets the remainder (ARBuse). First owners who use their own PIK certificates capture all three components. Grain companies that make their own market for PIK certificates capture both ARBuse and ARBint. Some combination of these three categories is capable of quantifying the share of ARB captured by any participant.

(3) ARB = ARBown + ARBint + ARBuse

Given a PCP, the relative shares for each group are as follows:

(4) ARBown = PCP*PRMown

(5) ARBint = PCP*PRMint

(6) ARBuse = ARB - PCP*(1+PRMown+PRMint)

The key determinant of the allocation of the benefits between these groups is the market determined premium for PIK certificates. If PIK certificates are abundant relative to the broad range of arbitrage opportunities, the premium will be low and most of the benefits will go to the

user. Alternatively, if PIK certificates are scarce, benefits shift strongly to favor the owner with a windfall. Clearly the premium market allocates the benefits of this program to the classes of beneficiaries, and the policy implications of this deserve some attention.

The Demand Curve for PIK Certificates

As indicated in equations (4) and (6), low premiums shift the benefits to users. Use is stimulated. Demand is increased. High premiums reduce or eliminate benefits to potential users in the low return arbitrage situation. Demand is reduced because the user must extract some part of the arbitrage profit or he will not use the PIK certificate. Larger premiums choke off more and more of the potential users in favor of owners, until demand is in balance with supply. The classic demand curve is derived as a result.

Available PIK certificates are allocated by the market toward those uses that offer the relatively larger arbitrage profits. There is some threshold as determined by a small return to the PIK certificate user after paying the PIK certificate premium to the owners and intermediaries, below which the arbitrage possibilities are not exploited. The relative activity in redemption of PIK certificates by commodity, program, region, and season is determined by the respective degree of arbitrage opportunity offered.

Historical Background of the Payment-in-Kind Program

Payment of agricultural program entitlements in-kind is not a new concept. Congress gave the Secretary of Agriculture authority to begin a payment-in-kind program on March 22, 1961, (USDA). Farmers who agreed to reduce their plantings of corn and grain sorghum by 20 percent received the county loan rate on 50 percent of their normal yield. The Secretary had discretion whether these payments would be in cash or certificates. The certificates could be used to redeem CCC grain or farmers could choose to have the CCC market their grain rather than

take delivery. In the latter case, the farmer received a certificate that could be cashed.

The payment-in-kind program was reactivated January 11, 1983, by Secretary of Agriculture John Block without new legislation by Congress (USDA). But in this version the payment was to be made with the actual commodity without the option to convert to a cash certificate. Commodities were actually transported to farms or local facilities. Entitlements were denominated in bushels. Because the spatial distribution of CCC stocks was different than that of the entitlements, some beneficiaries were given warehouse receipts for grain at locations some distance from their business. In some cases this created a windfall and in other cases it created a shortfall in the value of the payment. For example, an Iowa farmer who received bushels of Illinois corn received a windfall relative to his neighbor who was paid with Iowa corn because Illinois corn was worth more in the local cash market. These kinds of inequities, more than likely, prompted USDA to denominate the certificates in cash when the administrative rules were designed for the 1986 version of the payment-in-kind program. The posted county price would reflect the local market values and, thus, eliminate the potential windfalls and shortfalls. Yet, as already discussed, this has not really been achieved. The current structure of arbitrage opportunities might well be more equitable than the 1983 version of the program, but improvement is still possible if USDA were to give integrity to the local market as opposed to its current reliance on terminal markets.

The Implication of Elimination of Arbitrage Opportunities

The implications of redesigning the rules to eliminate opportunities for arbitrage are interesting to contemplate. Opportunities for arbitrage would largely be eliminated if USDA were to make two changes:

1. Require that commodities redeemed early from the 9-month loan recognize the storage costs avoided or allow redemptions only late in the 9-month period.
2. Monitor local market prices to determine PCPs with full recognition of qualitative differences.

The stated goal of the PCP is to approximate the market price of the commodity. Yet, we see that the ASCS currently finds this is an almost impossible task. Their errors give arbitrage opportunities that give premium to the PIK certificates. A new set of rules that respect the local market and all the flux that is necessary at the local level would probably be more efficient and less disruptive to the normal grain movement patterns. Local elevators' bids are generally public information. ASCS need only require and enforce somehow that bids reported to it were actual transactions. Some formula that smoothed this via reference to the futures market would probably be adequate to police this relative to potential abuses such as unusually low price quotes. Moreover, in most counties there are several elevators available capable of forming a consensus of the local market conditions.

Yet, if PCPs were to more accurately reflect the local price and quality differences, and opportunities to avoid storage costs associated with the 9-month loan program were eliminated, then the arbitrage opportunities and the PIK certificate premiums would be small. The incentive to use them to redeem grain would also be less. Certificates might well be just redeemed for cash. Use could be very limited. If so, the CCC would have more difficulty liquidating its stockpile of surplus commodities. The point is that moving CCC inventory onto the market requires the presence of some incentive to redeem it. Currently the incentive originates from the arbitrage opportunities created in part by poorly determined PCP prices and in part by opportunities to avoid storage costs.

Consider setting PCPs at some percent discount to the local market prices as just described above. PIK certificates are worth more when used than when cashed because they buy at a discount to the local market. Distortions now present would be removed because the local market rules the relative PCP structure. The incentive to use PIK certificates to redeem commodities is throttled uniformly across all potential PIK redemptions by raising or lowering the discount according to the CCC's needs to move CCC stocks or avoid forfeiture. Political backlash at the regional level is avoided because all regions are given identical arbitrage opportunities through the discount. The necessary discount to throttle this process might well be more efficient, that is, cost USDA less than the current structure of arbitrage opportunities.

A premium would likely exist in the PIK certificate market that would range from a low of zero under conditions of abundance to a high of the discount rate if PIK certificates were especially scarce. The distribution of the benefits of the discount would be allocated between the PIK certificate owners and PIK certificate users via the premium as discussed previously.

Alternatively, consider setting the PCPs at monitored local market prices and redeem PIK certificates for cash, only at a discounted value. That is, failure to redeem commodities carries some penalty. PIK certificates then would achieve their highest value when used. Rather than take less, a PIK certificate owner could opt to redeem some commodity at some local PCP. Since the PCP now closely approximates the local market prices, he would receive the equivalent of full value for the PIK certificates by immediately selling the commodity in the local market. Or he could sell his PIK certificates to other users. Under these rules the market for PIK certificates would likely fluctuate between a small premium and a small discount to face value. Users might be willing to pay a small premium to accumulate PIK certificates to accomplish specific transactions that have convenience value as discussed earlier. Owners might well be willing to sell

at small discount to avoid the service charges that an elevator might charge for the conversion of PIK certificates into commodity and then into cash. This design is efficient in the sense that it forces the use of the PIK certificates without creating windfalls to the recipient or extra costs to USDA.

The Role of PIK Certificates Toward Solving the Grain Storage Problem

PIK certificates were celebrated in 1986 as the solution to the grain storage problem. At the firm level this was an accurate evaluation of the program. A farmer could get rid of his storage problem by sealing the grain, redeeming with PIK certificates, and selling to the market. Storage costs avoided were typically sufficient to cover any premium paid to acquire the PIK certificates.

But what is true for the individual or the firm is not necessarily true for the region or the industry. A farmer solves his storage problem by selling. But until the grain is consumed or exported out of the region it still must be stored by someone. Since this grain must find new ownership in the private sector a depressed price results, but still there is some price where the grain will be held privately. Regional demand may well be stimulated at these depressed prices, but beyond that the benefit of the payment-in-kind program to regional storage problems lies in the degrees of freedom offered to the private sector to shift ownership.

The Role of PIK Certificate Toward Creating a New Market Environment

The fact that PIK certificates can acquire at approximately current market prices grain owned by the CCC, in the Farmer Owned Reserve, in the Special Producer Storage Loan Program, or under

9-month loan is an important change in the rules. Previously, CCC inventory had been available to the market only at prices well above the loan rate, with minor exceptions pertaining to the

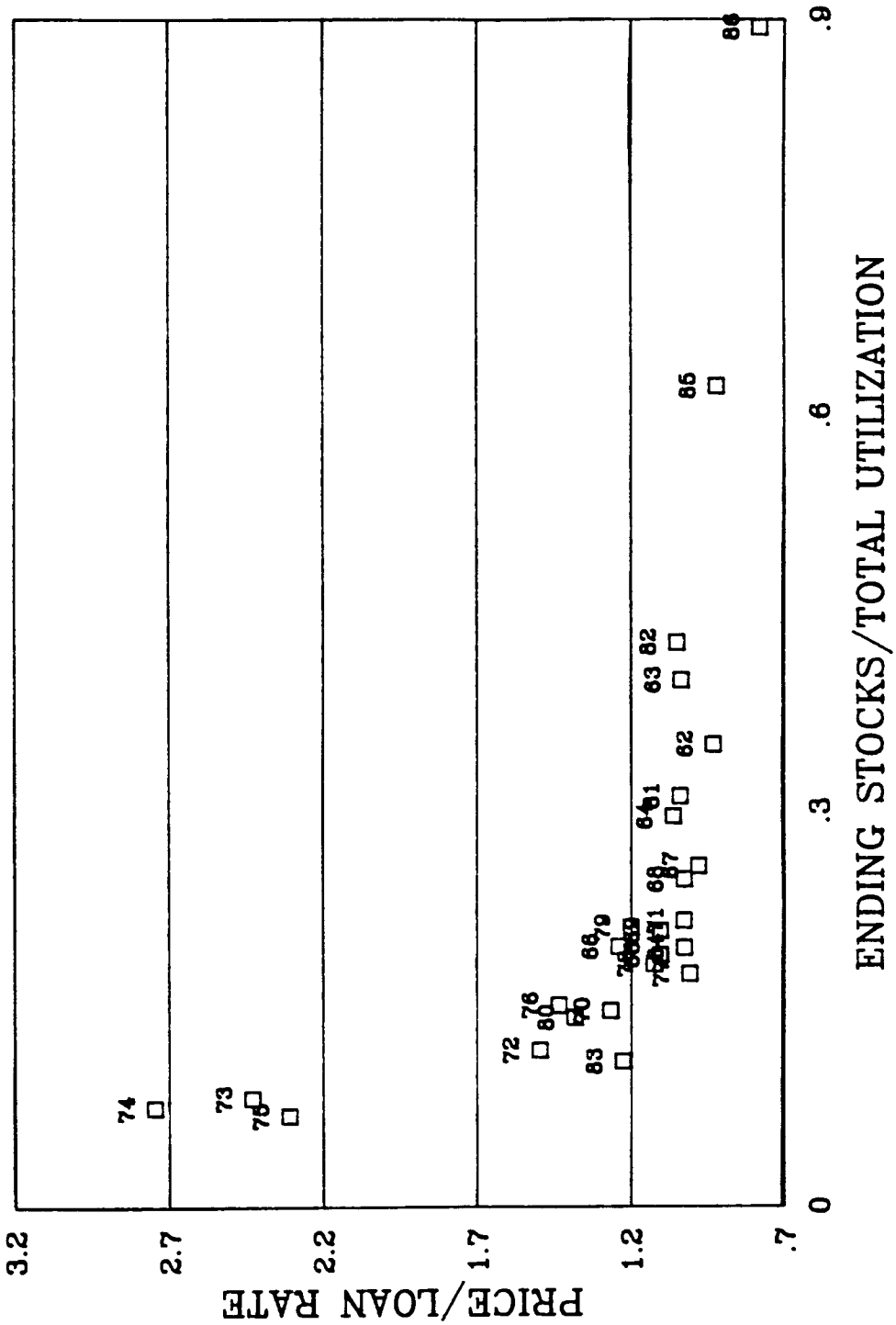
condition of the grain. Farmer Owned Reserve inventory was available at prices at or above a trigger-release price. The traditional 9-month loan program and the SPSLP tend to support prices at levels above the loan rate plus interest carrying charges. The availability of these supplies to the market via a new set of rules creates a radical new market environment, something closer to a free market. The former market environment was dominated by the price supporting mechanics of the 9-month loan whenever ending stocks were burdensome and a free market only when they were not.

A Review of the Price Supporting Mechanics of the 9-Month Loan

Historically, whenever the ending stocks of corn have exceeded 20 percent of annual use, the loan rate set by USDA has become the dominant price determining factor (Van Meir). Figure 2 shows the average price received by farmers expressed as a multiple of the loan rate and charted against ending stocks as a fraction of total use for the period 1962 through 1986.[2] Notice that whenever the ending stocks exceed 20 percent of total use, the price to loan rate ratio remains close to 1. The loan rate and the price level are almost identical under these conditions. When ending stocks are less than 20 percent of annual use, prices tend to exceed the loan rate and are determined more by the need to ration available supplies. The drought years of 1980 and 1983 show a 20 to 40 percent premium relative to the loan rate under conditions of a 10 to 14 percent ending stocks figure. These data suggest that an ending stocks figure of less than 10 percent would be capable of returning us to the high price levels similar to the period 1973-1975.

A similar threshold in wheat emerges from the 1962-1986 data at about the 50 percent ending stocks to total use level (see Figure 3). For soybeans this threshold is not so clear, with ending stocks less than 20 percent of annual use being a necessary but not sufficient condition (see Figure 4).

FIGURE 2
US CORN
1962-1986



Traditionally, when the 9-month loan rate has dominated prices, there have been some typical and somewhat predictable seasonal price change patterns. Consider the following three seasons within the marketing year for corn and soybeans; shift the timeframe forward by three months for wheat:

1. The harvest season (October-November)
2. The early storage season (December-April)
3. The late storage season (May-September)

The Harvest Season

For a producer that has complied with the rules of the government program, the 9-month loan rate effectively becomes the USDA's bid for his crop. When he "seals" the crop, he is paid the loan rate that is applicable to his county by the Commodity Credit Corporation (a differential is applied to the national loan rate to determine local loan rates at the county level). After nine months he may forfeit his "sealed" crop to the CCC and keep the proceeds of the original loan. On the other hand, any time prior to forfeiture he may redeem the crop by paying the principal and interest on the loan. If he opts to seal and forfeit nine months later, he has effectively sold his crop to the CCC at the loan rate. There would seem to be no point to take less from the market than what the CCC is bidding.

However, there is a cost to storing corn for the 9-month period while waiting for the forfeiture privilege to mature. Depending upon how a producer views this cost of storage, it may make sense to sell during the harvest period at something less than the loan rate. If a farmer must rent commercial storage space for perhaps as much as
3 cents per bushel per month plus in charges, out charges or minimum charges, etc., he incurs substantial costs while storing for the necessary nine months that entitle him to the forfeiture privilege. After forfeiture, the storage costs are paid by the CCC.

FIGURE 3

US WHEAT

1962-1986

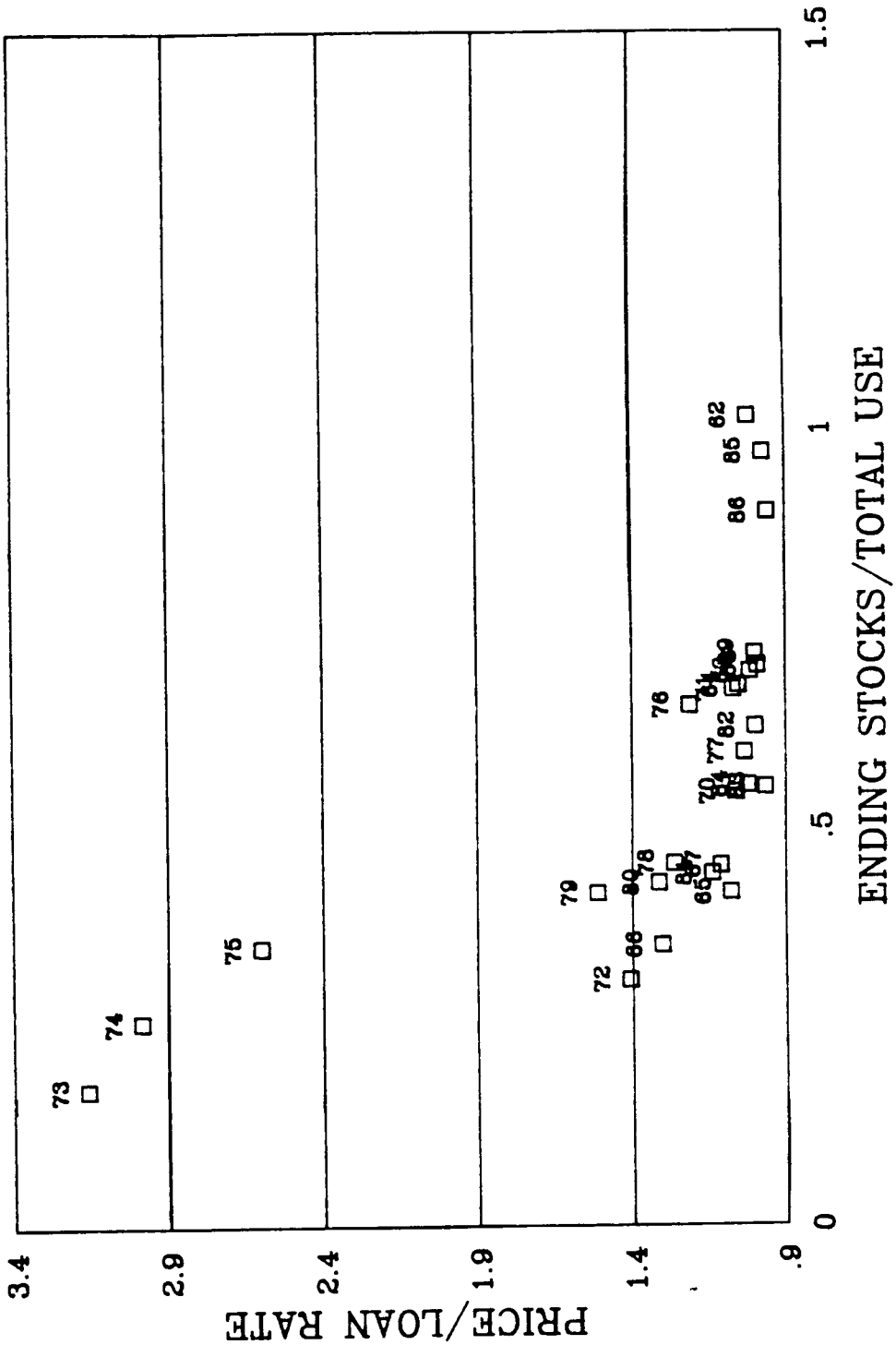
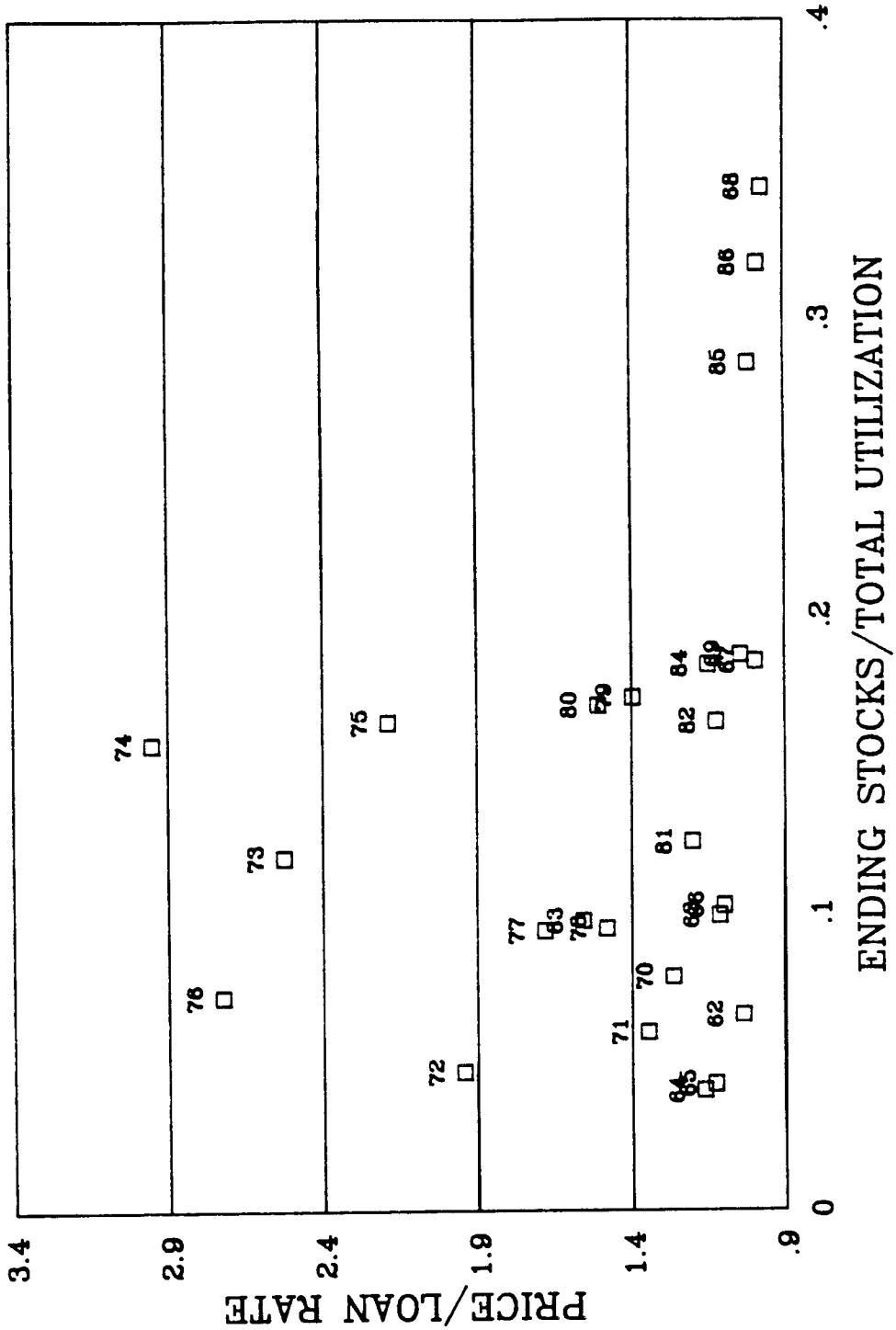


FIGURE 4

US SOYBEANS

1962–1986



The fall market price that will successfully compete with the effective CCC bid is that which is greater than the loan rate after adjusting for nine months of storage costs recognized by a particular seller. But different sellers recognize different degrees of storage cost. For example, a substantial amount of corn is held in farm storage position, and much of this storage has low variable costs associated with its use. Grain that could be stored in these farm facilities for nine months at very nominal variable costs is unlikely to come onto the harvest market at a discount to the loan rate in excess of these variable costs.

Farm storage that could be rented to a neighbor or local elevator carries an opportunity cost that would justify sales at a discount to the loan rate. Likewise, commercial storage charges to grain holders justify sales at a discount to the loan rate by this class of grain owners.

We have already seen evidence in Figures 2-4 that when scarce, the grain and soybean markets are typically higher than and independent from the loan rate in effect. As ending stocks versus annual use increase, the loan rate becomes increasingly important at making the market, and the forfeiture privilege operates to remove the excess supply at the support price.

Still, the market does flex seasonally relative to the rules of the 9-month loan program. Seasons that have particularly large projected surpluses tend to have harvest markets at a substantial discount to the loan rate (see Tables 2-4).

In corn, since 1980 discounted harvest market environments have existed when ending stocks as a percent of use exceeded 49 percent. The 1981 ending stocks as a percent of use were 36 percent, but this did not result in a discounted fall market. The data suggest that there is an ending stocks versus annual use threshold somewhere between 36 and 49 percent which, if exceeded, will lead to a depressed fall corn market. Similar thresholds are suggested by these data for wheat at about 55 percent and soybeans somewhere between 18 and 29 percent.

Table 2. Corn Harvest Market Environment*

Year	Ending Stocks Versus Annual Use	National Loan	National Harvest Price (Oct-Nov)	Discount To Loan
1980	.19	225	304.5	79.5
1981	.36	240	239.5	-.5
1982	.49	255	205.5	-49.5
1983	.15	265	316.0	+51.0
1984	.23	255	260.0	+5.0
1985	.62	255	216.0	-39.0
1986	.84	192	143.5	-48.5

* Based on the new marketing year, September 1 through August 31.

Source: Feed Situation and Outlook Yearbook, ERS-USDA, November, 1986, pp. 30 and 36.

Table 3. Wheat Harvest Market Environment

Year	Ending Stocks Versus Annual Use	National Loan	National Harvest Price (Jul-Aug)	Discount To Loan
1980	.43	300	387.5	87.5
1981	.44	320	362.0	42.0
1982	.63	355	330.0	-25.0
1983	.55	365	347.5	-17.5
1984	.55	330	336.0	6.0
1985	.97	330	291.0	-39.0
1986	.88	240	225.5	-14.5

Source: Wheat Situation and Outlook Yearbook, ERS-USDA, February, 1987, pp. 16, 23, and 35.

Table 4. Soybean Harvest Market Environment

Year	Ending Stocks Versus Annual Use	National Loan	National Harvest Price (Oct-Nov)	Discount To Loan
1980	.16	502	793.0	291.0
1981	.12	502	605.0	103.0
1982	.16	502	520.0	18.0
1983	.10	502	788.0	286.0
1984	.18	502	605.0	103.0
1985	.29	502	488.5	-13.5
1986	.32	477	459.5	-17.5

Source: Oil Crops Situation and Outlook Report, ERS-USDA, November, 1986, pp. 27 and 28.

The above thresholds would seem to be determined where the demand side of the market is adequately supplied by sellers willing to sell at a discount; that is, sellers facing various degrees of exposure to storage costs. Although some of the new rules of the PIK certificate program may also operate to exacerbate this discount market environment, it is important to note that such a discount market did exist before PIK certificates changed the rules.

The Early Storage Season

Now the crop has been moved into storage. Some of the storage costs have been paid by the various owners of the stored crops to get the crop into this position, depending upon the local rules the elevators require. Yet, some of the costs remain variable; that is, they can be stopped by selling the crop. If the market needs are comfortable met be this class of owner, willing to sell at a discount to stop storage charges, then discounts can persist well into the early storage season. This is typically a less severe discount than experienced in the harvest season. If the market is not adequately supplied by this class of owner, then prices rise to a small premium to the loan rate plus interest costs; that is, the cost of redeeming the grain from the CCC. The market then is typically well supplied by those who would redeem from the CCC and sell to the market for a modest profit created. This is the classic tight free stocks situation and it identifies the upper price potential so long as the ending stocks as a percent of annual use do not fall below the thresholds identified in Figures 2 through 4.

The Late Storage Season

The strong relationship between the market price and the 9-month loan redemption price weakens. It can be caused by Southern Hemisphere supplies for export markets, availability of substitutes such as wheat for feed, the earlier harvest in southern states or, perhaps, a dramatic change in outlook associated with summer new crop weather developments. Whatever the reason, there is a tendency for the relationship to deteriorate.

The New Market Environment

Because PIK certificates provide an alternative way to redeem grain and soybeans from CCC inventory, the Farmer Owned Reserve, and especially the 9-month loan, they change the market dynamics we have just discussed in a very fundamental way. Grain and soybeans that previously would be naturally forfeited to the CCC unless certain minimum prices prevailed in the market are now offered for sale at posted county prices. The CCC is bidding the loan rate for grain and soybeans and simultaneously offering them at approximately the market price. Given an adequate supply of PIK certificates, the result is that all supplies are available to the market. It is fair to characterize this as a free market with a few administratively determined distortions that have already been discussed.

Therefore, the new market environment is a free market so long as PIK certificates are plentiful. What will this market be like? This market will likely be more volatile and less predictable seasonally. The 9-month loan program stabilized prices around the loan rate and dictated to some degree the seasonal price patterns. The new market will be different by not being stabilized and seasonally dictated by the 9-month loan rate. But what if PIK certificates become scarce? Then, yes, the market would be expected to revert to its former self. Between these two extremes a blend can be expected, throttled by the premium paid in the market for PIK certificates. Low premiums encourage use and create more degrees of ownership freedom in the market. High premiums curtail use and create more of a traditional market environment heavily influenced by the 9-month loan and CCC ownership of excess supply.

Defacto Marketing Loan

The marketing loan concept if extended to the grains would allow the Secretary of Agriculture to lower the redemption price for grain sealed in the 9-month program. That is, grain

sealed could be redeemed for less than the original sealing price. The new lower redemption price would operate to support prices at this lower level in a similar manner to the traditional 9-month loan program. A market clearing price and thus a free market environment could be created if the redemption price were lowered sufficiently, just as it has been created in the current PIK certificate market environment. In this sense the two programs can accomplish the same objective. The new lower redemption price would operate in place of the current posted county prices.

Although the two programs have much in common, some differences to keep in mind are:

1. Current legislation allows the marketing loan redemption price to be lowered only to 70 percent of the basic loan rate or $1.60 per bushel at the national level for the 1986 corn crop. The 1986 PIK certificate induced market environment for corn was much lower than this in the first half of the season. The Secretary would need broader authority to lower prices for the marketing loan to create a free market environment.
2. Regional inequities would persist and probably be more severe than those that result from the current system of posted county prices. The relative structure of posted county prices, although imperfect as discussed, are a closer approximation of the market determined spatial price surface than are the county level loan rates. Under a marketing loan, adjustment to county loan rates would determine the relative spatial structure of the announced redemption prices.
3. The lower redemption prices would be changed only upon review by the Secretary of Agriculture. They would be fixed for at least short intervals, whereas, posted county prices can change from hour to hour.
4. Redemption of a 9-month loan at the posted county price avoids the interest charges that

have accrued on the loan, while redemption at a lower price by way of the marketing loan program would not ignore the interest.

5. The marketing loan would not make CCC inventory or Farmer Owned Reserve grain available to the market.

The Potential to Use PCPs to Control Local Markets

At least originally, the goal of the PCP was to recognize and approximate the local market price. The administrative rules created fell short of this goal, creating various arbitrage opportunities

which created premiums in the PIK certificate market but served to stimulate conversion of the PIK certificate into commodity instead of cash.

The clash between the local market prices and the USDA's attempts to identify it has revealed some new and likely unforeseen policy choices for USDA. Until early May of 1987, the USDA seemed to be patching the system, chasing the regional flux of the market by occasionally issuing new PIK differentials for specific regions. In May of 1987, it appeared that they began to experiment with posted county prices as a policy instrument to make the market. USDA began to issue official terminal prices at artificially low prices relative to the market reality. Arbitrage opportunities were intentionally created to move grain into the private sector and depress prices. The May 1987 experience is reported to have been motivated by the USDA's need to keep the cost of subsidized sales of wheat to the USSR from increasing as a result of an increase in the market determined price of wheat. They appear to have been motivated to depress the price and make specific wheat supplies available to meet the quality requirements of the USSR agreement.

The payment-in-kind program offers the USDA a rich menu of policy options just in terms of how it is administered. Although the original program seemed to be oriented toward less

government involvement in the agricultural economy, the opposite extreme seems to be an available policy option. This is indeed a rich policy menu to be available at the administrative level. It is likely that these potential powers will be fully explored and utilized at least in an experimental way. The ultimate fate of the payment-in-kind program, or at least its design, would seem to hinge on the resulting political backlash that will occur when various regions or groups receive differential shares of the artificially created arbitrage.

Summary

PIK certificate premiums originate from USDA created arbitrage opportunities that cannot be exploited without PIK certificates. Under conditions of scarcity of the certificates, these arbitrage values get bid in part into a premium for the PIK certificate.

There are three determining sources of arbitrage value: spatially determined, qualitatively determined, and temporally determined. Spatially determined arbitrage values originate from poorly estimated differentials and fixed differentials. Qualitatively determined arbitrage values result from failure of the USDA to adequately price for quality differences such as high protein wheat or malt versus feed grade barley. Temporally determined arbitrage values result from short-term market fluctuations and opportunities to avoid storage costs. Arbitrage values are additionally influenced by convenience value and service charges.

Part of the arbitrage value is shifted from the user of PIK certificates to previous owners of PIK certificates via the premium paid in the PIK certificate market. This mechanism operates to throttle the demand for PIK certificates. High premiums choke off the benefits of using PIK certificates from the users and, thus, curtail their use. Owners of PIK certificates receive a windfall profit in the form of the premium. An alternate system that recognizes the potential to avoid storage costs, focuses on the local market to determine posted county prices, and cashes

PIK certificates only at a discount to their use value, for the most part, eliminates the PIK certificate premiums.

PIK certificates can solve a storage problem for an individual or a firm but cannot solve it for a region. At the regional level, PIK certificates help alleviate storage shortages mostly by facilitating change of ownership in the private sector. Modest improvement in regional disposition may also result from the depressed prices that are possible in the free market environment created by PIK certificates. The free market environment created by PIK certificates is more volatile and seasonally unpredictable than the traditional market environment dominated by the price supporting features of the 9-month loan. The market environment will be free or supported depending upon the general availability of PIK certificates.

The free market environment created by PIK certificates carries all the benefits of a marketing loan plus has several subtle differences that, on balance, probably make it a superior approach.

Although traditionally PCPs were attempts to find the local market, they are potentially a mechanism to control it. USDA is likely to experiment with this newly discovered policy option. The ultimate fate of the payment-in-kind program, or at least its design, will likely be determined by the political backlash that results from regional differences in artificially determined arbitrage potentials.

FOOTNOTES

1. Lise Poirier is an economist for the Pillsbury Company.

2. These data are based on the old marketing year, October 1 through September 30, except for 1986 which is based on the new marketing year, September 1 through August 31.

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