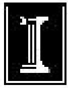
ILLINOIS RURAL POLICY DIGEST



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The Good News and Bad News of Today's Commodity Programs

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Introduction

How do today's commodity programs stack up against past programs? The good news for Illinois corn and soybean producers is that, under reasonable price expectations, the current programs provide a larger safety net than those provided by past programs. The bad news is that this increased support creates a political risk that needs to be fully recognized when making long-term investments.

The present loan-rate and counter-cyclical programs have two general "safety net" effects as commodity price falls and program payments are made. The first effect is to raise income beyond that which can be received in the market place. The second is a reduction in income variability from year to year.

As part of a recent study at the University of Illinois on commodity programs, these two effects were measured for the 1974 through 2001 programs triggered by price or income level (excluding predetermined payment programs such as AMTA). The results are summarized in this article. It was found that the 2002 Farm Bill creates a relatively large safety net. However, to the extent that the resulting income and risk-reducing effects are capitalized into land prices, it also creates a large "political risk" associated with the potential reduction of reduced support in future Farm Bills.

Source of crop revenue variability

What types of revenue variability do farm programs address? Traditionally, most program payments in Illinois have been triggered by the price of corn falling below a threshold level. In that sense, programs have focused on the variability caused by yearly changes in price.

Revenue variability, though, is caused by changes in both price and yield. As background to the commodity-program research, we investigated the amount of the crop revenue variability that is attributable to changes in price compared to the amount of the variability caused by yield. For crop revenues from 1974 through 2001, the effect of crop price on revenue variability is much greater than the effect of yield. This relatively large price effect is found for both corn and soybeans. When the revenue from both corn and soybeans combined is considered, it is found that corn contributes much more to the overall farm revenue variability than soybeans.

In other words, the market revenue (market price times yield) received by Illinois corn and soybean producers changes from year to year more from corn price changes than from any other effect. This result holds whether measured at the overall state level, county level, or individual farm level. However, the analysis of revenue variability is developed prior to inclusion of government payments. Because most of the payments to crop producers have been triggered by corn price, the "effective" variability (that which includes government payments) is likely to be considerably different from that due to market revenue alone. The remainder of this article focuses on this effective variability.

Incorporating government payments

While government programs have arguably altered market price and producer income "indirectly" through supply and demand effects, the present analysis focuses only on measuring the effects of "direct" government support (i.e., payments made to the producer) from deficiency, loan, disaster, and market loss assistance programs. With the exception of disaster payments which are usually triggered by yields, these

programs are aimed at compensating for low prices. Fixed payments – primarily in the form of the PFC payments during 1996-2001 – are not included in the analysis because they were not made in response to changes in inter-year price or income conditions.

The focus of the analysis is on the behavior of net revenue per acre with and without government payments. Net revenue is defined here as gross revenue less non-land variable costs. It can be thought of as the amount of revenue per acre remaining to cover land costs and return to management. The net-revenue per acre received from the market has no clear upward or downward trend during 1974-2001, indicating that real increases in market net revenue (adjusted for inflation) realized at the farm level stemmed mostly from increases in farm size.

When government payments are considered, it was found that, on average, payments triggered by low commodity prices increased the net revenue per corn acre by about $23 per year during the past three decades. Income variability of corn revenue was reduced by about 25%. The effects of payments on soybean revenue were, of course, much less than the effects for corn because of the traditional program emphasis on corn and wheat. Given the 1974-2001 benchmarks, a computer simulation analysis was then used to compare the effects of current and past programs.

Sizing up today's programs

Assessment of today's programs relative to past programs depends very much on one's view of the variability and long-run "equilibrium price" of corn and soybeans. If one believes that the general price level will be relatively high then the resulting forecast of LDP and counter-cyclical (CC) payments will be low. Of course, as the general price level falls, expected payments increase. For a given level of price variability, there is an average price where existing price-responsive programs have the same expected income and risk-reduction effects as those of past programs.

Table 1 illustrates the revenue and risk expectations under different corn price environments. Interpretations of the seven columns are offered below the table. Regardless of the details of these revenue and risk measures, the important point here is that they allow us to relate the current program to past programs in terms of commodity price levels. For each equilibrium or average price level in column 1, an expected government payment is estimated (column 2) as well as three measures of the reduction in risk caused by the payments (columns 3, 4, and 7).

Consider, for example, the average government payment per acre (column 2). Under an average or equilibrium corn price of $1.50, the government support expected under today's loan and counter-cyclical programs is $118.80 per acre. On the other hand, under an average price of $2.75, the expected payment is $3.50 per acre. The average payment during 1974 – 2001 was $23.20 (bottom section of Table 1). The price level at which today's expected payments are equal to $23.20 is $2.31. When the average price is above $2.31, expected payments are below the 30 year average, while expected payments from the current commodity programs are above the average when average corn price is below $2.31. A similar analysis can be done with the risk measures. For example, column 3 indicates that if the average price is above $2.44, then the risk reduction of today's programs are less than the 30 year average. If the average price is below $2.44, today's programs offer more "risk protection. Across the different measures, the break even price is from $2.31 to $2.45.

At the time of this writing (March 2004), a farmer in central Illinois can contract new-crop corn for about $2.80. If this price level represents a new level around which prices will hover for the next few years, then the price-responsive programs of the present Farm Bill offers little in terms expected payments or risk reduction. On the other hand, it can be argued that the current Farm Bill actually offers a much bigger safety net than past programs under other conditions. For example, it is not difficult to conceive of reasonable supply and demand conditions that would be expected to result in equilibrium U.S. corn prices at or below $2.30 – indeed, the average price over the historical period of analysis was $2.22. Likewise, the ten-year projections done for the 2002 Farm Bill budgeting process were often below $2.30. Consequently, for Illinois (and thus the Midwest in general), the 2002 Bill offers expected price-responsive corn payments under reasonably likely supply/demand fundamentals that are larger than the average payment observed during 1974-2001. Likewise, the risk-reducing capacity of the Bill – as measured here – is relatively large in comparison to historical programs when the equilibrium price is below $2.30.

The above analysis is done only in the context of price-responsive programs (that is, the loan and counter-cyclical programs) for corn, representing a conservative estimate of the current safety net. It is conservative because it does not account for the average direct payments of $28 per acre which by themselves are already larger than than the average price-responsive payment during 1974-2001. It is also conservative because the current support to the soybean sector through the counter cyclical program is considerably more than traditional support. And finally, support in the form of insurance premium subsidies – which is much larger today than in the past – is not accounted for.

No free lunch

While the relatively large income-enhancement and risk-reduction effects of the current Farm Bill may be reassuring

to many policy makers and producers, there is no free lunch. One obvious “cost” of the programs is associated with federal outlays. A more subtle cost, however, is the political risk associated with changes in these outlays. Given that the income and risk effects are capitalized into land values, a reduction in program support would arguably cause a decline in the land values.

There are three reasons that the potential political risks under a relatively more generous program are presumably large. First, the high level of support found in this analysis from current price-responsive programs suggests that the attendant land-price support effect is also high. The effect of benefits accruing to landowners is not a new feature of the programs, but the magnitude of the effect may be much larger than under past programs. Moreover, this higher level of price-responsive support is in addition to the $28 of average direct payments per corn acre, which on their own represent an increase in program benefits relative to past programs.

Second, there may well be strong political incentives to reduce program support driven by budget concerns, WTO discussions, a change in the political appeal of direct payments, and a favorable farm income environment. And finally, anecdotal evidence strongly suggests that the expected payment being capitalized into current land prices is based primarily on the current program. In short, a strong “safety net” that is built into land prices carries with it the risk associated with uncertain changes to that safety net. It is important that policy makers clearly recognize that attempts to abate one type of risk can create others. And it is important that producers recognize this risk as they “pencil out” the value of land.❖

Table 1. Simulated results of 2002 Farm Bill provisions

Mean Price (1)	Average gov't payment per acre (2)	Reduction in standard deviation (3)	Reduction in coeff. of variation (4)	Net revenue at 10% VAR (5)	Net rev plus gov't, 10% VAR (6)	Increase in 10% VAR (7)
$1.50	$118.8	$29.9	138	$ -37.1	$111.6	$149.7
$1.75	$83.3	$27.8	63	$-2.34	$109.7	$112.1
$2.00	$51.8	$23.6	33	$31.1	$110.6	$79.5
$2.25	$26.8	$16.8	17	$65.1	$115.7	$50.7
$2.50	$10.9	$9.3	7	$99.0	$128.2	$29.1
$2.75	$3.5	$3.8	2	$131.9	$145.0	$13.1
--- Comparison to 1974-2001 data ---						
$2.22	$23.2	$11.1	12.1	$71.0	$104.2	$33.2
--- Implied equivalent corn price for comparable current program effect ---						
	($2.31)	($2.44)	($2.37)			($2.45)

Column (1): The “long run” equilibrium price toward which the price will tend to move. (From a distributional standpoint, it represents the mean of the distribution that has a coefficient of variation of about 22%.)
Column (2): The average government payment per corn acre, given the average price. When the average corn price is $1.50 per bushel, the expected payment from the LDP and Counter-Cyclical programs is $118.80 per acre.
Column (3): The “reduction in standard deviation” represents one measure of the reduction in risk caused by the LDP and Counter-Cyclical programs. The standard deviation approximates the range of revenue around the mean that will be realized about 2/3 of the time. When the average price is $1.50, the government payments causes this range to be reduced by $28.
Column (4): The “reduction in coefficient of variation” is another measure of risk reduction. The coefficient of variation is another way of expressing the standard deviation, after accounting for the average level of net revenue.
Columns (5) – (7): The 10% Value at Risk (VAR) is the value at which 10% of the outcomes fall below. For example, when the average corn price is $1.50, the net revenue (without payments) would fall below $-37.10 per acre 10% of the time. With LDP and Counter Cyclical payments, it would fall below $111.60 10% of the time, representing an improvement of $149.7.

New Yield Estimates for Farmland Tax Assessments

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Introduction

Illinois land owners have expressed many concerns recently about an upcoming change in the way farmland property tax assessments will be made. This change involves the use of a different set of crop yield estimates. A frequently expressed fear among land owners is that the use of new yield estimates will raise their taxes.

We offer here some insights and perspective on the change in assessment procedure by first describing the change that is taking place. We then provide a sense of how this change affects average yield estimates on the ten most common soils in Illinois.

Background

Circular 1156, published in 1978, established crop yield estimates for known soil types in Illinois. This document was supplemented in 1994 for new soils established between 1978 and 1994. Published in 2000, Bulletin 810 contains new crop yield estimates. Bulletin 810 replaces Circular 1156, beginning with the assessment calculated in 2004.

Over the past 50 years, crop yields have increased markedly. The increases in crop yields are in part a result of more advanced technology such as improved plant varieties, improved fertilizers, improved pesticides, higher plant populations, farm machinery, and improved management. Bulletin 810 incorporates the effects of these technological and management improvements on crop production and soil productivity. Each soil type is assigned new crop yields under the assumption of an average level of management.

Bulletin 810 also incorporates a new method of calculating the average productivity index for Illinois soils. Soil productivity refers to the capacity of soil to grow crops or plants under specified environmental conditions and is influenced by soil properties, climatic conditions, and management inputs. Thus, Bulletin 810 represents new and more accurate information on the productivity of Illinois soils.

Soil productivity and farmland assessments

Illinois, like virtually all the other states, assesses farmland on its agricultural use value rather than its market value through a capitalization of net income. This capitalization process turns a future stream of net income into a current value. Market value plays no role in the assessment of farmland for real estate tax purposes. Likewise, the actual production history of a given tract is not a factor in farmland assessment.

The potential of a soil type to produce crops is measured by the productivity index. Agricultural use value is calculated for each point on a productivity index for the soils in Illinois. Each soil type is assigned a productivity index. It is possible for two different soils to be assigned to the same productivity index resulting in the same assessed valuation for both soils.

Income capitalization

Agricultural use value in Illinois is derived from an income capitalization formula specified in the Illinois Compiled Statutes (35 ILCS 200). The formula for arriving at the assessed value is:

$$\frac{\text{Gross Income less Expenses}}{\text{Capitalization Rate}}$$

AgriBank, FCB is the source of the capitalization rate. It is a five-year weighted average of interest rates on newly originated mortgage loans. This is commonly referred to as the "2032a interest rate."

The expenses are based on actual non-land production costs from a sample of farms in a database at the University of Illinois, Department of Agricultural and Consumer Economics. The formula for gross income is:

Crop Yield x Commodity Price x Crop Rotation Percentage

The yields are a function of the soil productivity index assigned to each soil type. These assignments are made via Circular 1156 for assessments for years prior to 2005 and via Bulletin 810 for assessments for 2005 and later. The yields are reviewed annually to adjust for long-term trends in crop yields.

The prices are an average of monthly prices received by farmers for a twelve month calendar year. This data is obtained from the USDA, Illinois Agricultural Statistics Service.

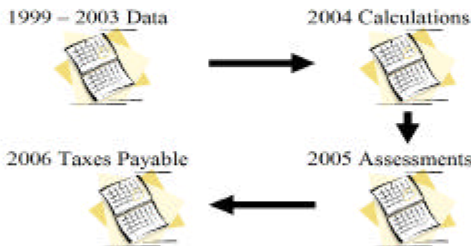
The crop rotation percentages are based on actual rotations from the same dataset as that used for the expense information.

Assessed value

The assessed value is then equalized at one-third of the assessed value (EAV). Any increase or decrease in the EAV per acre by PI shall not exceed 10% of its preceding year's certified EAV.

The timing of the assessments and payments can be represented as:

Timing of Assessments



The potential impact of bulletin 810 on farmland assessments

As indicated above, beginning with the 2005 farmland assessments, Bulletin 810 is the source of productivity indices, replacing Circular 1156. The range of productivity indexes in Circular 1156 is from 60 at the lower end to 130 at the top for average productivity. Bulletin 810 has a range from 82 to 127 for average productivity. Thus, the Bulletin 810 scale is compressed and generally shows higher PI's when compared to Circular 1156. However, it is very important to keep in mind that different formulas are applied to the two different scales, so examination of the change in scale by itself is not particularly meaningful.

How is this change likely to affect farmland assessments for real estate tax purposes? Before getting a feel for this impact, it is important to note that the change from Circular 1156 to Bulletin 810 will not occur in a vacuum. Other factors will affect the change in 2005 assessments as they do in any other year, such as changes in commodity prices, crop rotations, farm expenses, and the capitalization rate. But, for our purposes here, we will consider the potential impacts of C1156 to B810 in isolation.

In the farmland assessment formula, gross revenue is affected by the change in soil productivity index through the change in yield. Circular 1156 uses yield functions based on information available in the mid-1970's. These yield functions are a linear relationship between the productively index and the crop yield. For farmland assessment purposes, these yield functions were modified at various times to reflect an increased yield potential. Bulletin 810 uses yield functions based on information available during the 1990's. These yield functions are modified annually to reflect increased yield potential.

Table 1 lists the ten most prevalent soil types in Illinois, covering about 45% of the acres used for corn, wheat and soybeans. For each soil type, yield estimates for corn and soybeans are given from Circular 1156 and from Bulletin 810.

Table 1. Estimate of Bushels Per Acre for Farmland Assessment Purposes

Soil Type	Acres	Corn-C1156	Corn-B810	Beans-C1156	Beans-B810
Drummer	1,600,000	157.9	162.2	49.6	50.7
Tama	1,400,000	157.9	157.0	49.6	49.3
Hickory	1,300,000	102.4	102.4	33.7	34.2
Fayette	925,000	138.1	137.5	43.9	43.9
Sable	925,000	161.9	160.9	50.8	50.4
Flanagan	840,000	165.9	162.2	51.9	50.7
Bluford	780,000	126.2	114.1	40.5	37.5
Cisne	730,000	130.2	123.2	41.7	40.0
Ipava	720,000	165.8	160.9	51.9	50.4
Muscatine	690,000	165.8	166.1	51.9	51.8
Total	9,910,000				
Weighted Ave		146.2	144.7	46.3	45.9

The clear message from Table 1 is that the use a new yield formula does not necessarily lead to an increase in the assessment yield. In fact, for these 10 soil types, the average yield falls slightly. Of course, this result does not mean that every yield estimate will fall. Examination of the individual soil-type yields suggests that the changes will tend to be either a small increase or a small decrease.

While it behooves land owners to keep an eye on the underlying assessment factors, care should be taken when interpreting the change from Circular 1156 to Bulletin 810. As mentioned above, two different scales are used and the formulas applied to the scales are different. To illustrate, the average PI index for Cisne soil is 87.5 in Circular 1156 while it is 97 in Bulletin 810. Although the index increases when changing to Bulletin 810, the change in formula causes the average corn yield to decrease (as shown in Table 1) from 130.2 to 123.2.

In sum, many factors may lead to changes in farmland assessment during the next few years. However, in general, the change in the way yields are calculated does not appear to be a particularly important one.

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