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Estimates of Minnesota Farm-level Crop Commodity Payments under New House Framework

by
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Estimates of Minnesota Farm-level Crop Commodity Payments under New House Framework

Kent D. Olson and Matthew R. DalSanto[1]
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ABSTRACT

The objective of this study is to compare commodity payments under current Federal farm policy with the previous Senate and Administration proposals and the recently released "2008 Farm Bill Conference: House Agriculture Committee-Developed Concept for a Farm Bill Spending Framework." Projections of crop revenue and government payments are made using historical yield data for each example farm, the county, and the nation; historical price data; and statistical distributions and relationships of these yields and prices.

Using 2007 FAPRI price projections (which are closer to the prices expected in the next few years when a new farm bill will be in force), expected Total Government Payments (TGP) are almost entirely attributed to the fixed direct payments under all these proposals. Since commodity prices are so far above their "target levels" the possibility of a counter cyclical price or revenue payment or a loan deficiency payment is highly unlikely.

TGP under the alternative policies follows a similar pattern on the example corn and soybean farms and a slightly different but fairly consistent pattern for the example wheat and soybean farms. For the corn and soybean example farms in southern Minnesota, the HB-RCCP and USDA proposals generate very similar levels of TGPs compared to current policy. HB-RCCP provides a slightly higher expected TGP than CP for all example farms except for one and higher TGP than USDA for all farms. ACR is estimated to provide lower TGP for all example corn and soybean farms. For the example wheat and soybean farms in northwest Minnesota, the results are mixed. Compared to the other three proposals, ACR provides higher TGP for 2 of the 6 example farms. Each of the proposals does reduce risk as measured by CV. We note ACR is not quite as efficient at risk reduction except for two wheat/soybean farms in northwest Minnesota.

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Debate on the next farm bill has been under way for two years at least. Many alternative structures and systems for crop income support have been proposed. Only a few remain under active consideration. The objective of this study is to estimate and compare commodity payments under current Federal farm policy with the previous Senate and Administration proposals and the recently released "2008 Farm Bill Conference: House Agriculture Committee-Developed Concept for a Farm Bill Spending Framework." The estimates are made for 17 example farms in Minnesota which grow corn and soybeans or, in northwest Minnesota, wheat and soybeans.

In February, 2008 the House Agriculture Committee sent to Senators Harkin and Chambliss, the ranking majority and minority members of the Senate Agricultural Committee, a funding framework for the Farm Bill that would reduce funding for the House version to an amount that is $6 billion above the baseline. The commodity program provisions in this new framework are similar to those in the House version passed in July 2007 with a few differences. In this new framework the target prices for all crops and the loan rates for almost all crops would be set at their 2007 levels (i.e., as they are in the current law). As in the July version, the new framework would allow individual farmers to decide between a countercyclical price and revenue program. Opting for the countercyclical price program would be equivalent to staying under current policy given that the direct payment rates, the target prices, and the loan rates all remain unchanged. The only exception to this is that the direct payment would be eliminated

solely for 2016 to provide for budgetary considerations. However, since our analysis is restricted to what payments would have been this year, we do not consider this provision in our framework.

Crop Income Support Alternatives

In this study we estimate the potential government payments under the current price-based counter-cyclical payments and three revenue-based counter cyclical programs: the program (HB-RCCP) proposed by the House in its new framework, the Average Crop Revenue (ACR) program proposed in the Senate version of the farm bill, and the January 2007 proposal by the Administration (USDA). These revenue-based programs are specified at the crop level; they are not whole-farm revenue programs. In the rest of this section, we describe these four alternatives in more detail.

Price-Based Counter-Cyclical Payments (CCP)

Under the Farm Security and Rural Investment Act of 2002 (what we refer to as current policy (CP) and the first alternative in the new House framework), commodity programs provide income support for wheat, feed grains, upland cotton, rice, and oilseeds through three programs: direct payments, counter-cyclical payments, and the marketing assistance loan program that includes loan deficiency payments (LDPs). In the new House framework, the target prices for all crops and the loan rates for almost all crops would be set at their 2007 levels (i.e., as they are in the current law).

Direct payments are paid to farmers of covered crop commodities on the basis of the direct payment specified in the 2002 Act, 85% of their base acres for the crop, and their payment yield for the crop. The payment is made regardless of current production levels and market conditions. The Act fixes direct payments for the duration of the Act as $0.28 per bushel for

corn, $0.44 for soybeans, and $0.52 for wheat (Table 1). These are the same prices and rates in the new House framework.

Table 1. Direct payments, target prices, and loan rates for corn, soybean, and wheat under the 2002 policy and the new House framework.

	Direct payment ($/bushel)	Target price ($/bushel)	Loan rate ($/bushel)
Corn	0.28	2.63	1.95
Soybean	0.44	5.80	5.00
Wheat	0.52	3.92	2.75

A counter-cyclical payment (CCP) is made if the national seasonal average market price is less than the target price minus the direct payment rate (e.g., $2.63 minus $0.35, or $2.35 for corn). The CCP is calculated as the target price minus the direct payment minus the higher of the national season average market price or the loan rate. For example, a corn farmer will receive a CCP if the national seasonal market price falls below $2.35. The maximum CCP per bushel for corn is $0.40 per bushel which is the difference between $2.35 and the loan rate of $1.95. The total CCP for a farmer is the product of that year's CCP per bushel, the farm's payment yield, and 85% of the acreage base.

Under the Marketing Assistance Loan Program, farmers can take a loan at harvest at the loan rate set in the Act. Farmers have the option to choose and usually do choose to receive a loan deficiency payment (LDP) in place of taking the loan. If the local market price is below the national loan rate, the local LDP is the difference between the local market price and the national loan rate. If the market price is above the loan rate, no loans or LDPs are available. Under the 2002 Act, the receipt of the LDP was not conditioned on the sale of the commodity; thus, the commodity could be held and sold at prices higher than the price used to determine the LDP received.

House's proposed Revenue-Based Counter-Cyclical Payment (HB-RCCP)

The House included an optional revenue-based counter-cyclical payment program (HB-RCCP) in the bill it passed in July and a revised form in its new framework. This is not a whole-farm revenue program but a commodity-based program. A revenue-based payment would be triggered when the national actual revenue per acre for a covered commodity is less than the national target revenue per acre. The national target revenue per acre for a commodity would equal to the 2002 farm bill's target price less the 2002 farm bill's direct payment rate multiplied by the national program yields for each commodity as listed in the 2002 farm bill. The national actual revenue per acre for a commodity would equal the national average yield for the commodity times the higher of the season-average market price or the loan rate for the commodity. If a payment is triggered, the national revenue-based payment per acre would be converted to a payment rate for producers by dividing the national revenue payment rate per acre by the U.S. average payment yield per base acre under the 2002 farm bill countercyclical payment program. An individual producer's revenue-based counter-cyclical payment would be determined by multiplying the national average payment rate for the commodity times 85% of the producer's base acres times the producer's program payment yield under the 2002 farm bill countercyclical payment program.

Senate's proposed Average Crop Revenue Program (ACR)

In the version of the new farm bill passed by the Senate in December, they proposed both a program similar to current policy and a revenue-based program based on state-level yields. This new program is called Average Crop Revenue (ACR). The Senate's ACR program includes a fixed payment of $15 per acre plus a potential revenue-based counter-cyclical payment based on a State's (versus national) actual and guaranteed revenue for each covered commodity. The

ACR program replaces direct payments, the current CCP, and the marketing loan program and LDPs.

Under the Senate's ACR program, a revenue counter-cyclical payment is made to producers in a State if the actual State revenue from the crop year for the covered commodity is less than the revenue counter-cyclical program guarantee for the crop year for the covered commodity in the State. The actual State revenue is calculated by multiplying the actual State yield for each planted, not harvested, acre by the revenue counter-cyclical program harvest price. The revenue counter-cyclical program harvest price is the harvest price used under revenue coverage plans under the Federal Crop Insurance Act.

The revenue counter-cyclical program guarantee is 90 percent of the expected State yield for each planted acre and the revenue counter-cyclical program pre-planting price. The expected State yield for each planted acre is based on a linear trend of the yield per planted acre from 1980 through 2006 using National Agricultural Statistics Service data. The revenue counter-cyclical program pre-planting price is the three-year average price used to determine crop insurance guarantees under the Federal Crop Insurance Act during the current crop year and the preceding 2 crop years. The revenue counter-cyclical program pre-planting price is not allowed to decrease or increase more than 15 percent from the pre-planting price for the preceding year.

If required, the revenue counter-cyclical payment to be paid to the producers on a farm is the product obtained by multiplying (1) the difference between the revenue counter-cyclical program guarantee for the crop year for the covered commodity in the State and the actual State revenue from the crop year for the covered commodity in the State; (2) the acreage planted or considered planted to the covered commodity for harvest on the farm in the crop year; (3) the quotient obtained by dividing the actual production history (APH) yield on the farm by the

expected State yield for the crop year; and (4) 90 percent. The fixed $15 payment per acre is paid regardless of whether a counter-cyclical payment is required under the ACR program or not.

Administration's proposed Revenue-Based Counter-Cyclical Payment (USDA)

The administration's revenue-based counter-cyclical program (USDA, 2007) is similar to that proposed by the House except the national target revenue is determined using the national average yield for the commodity during the 2002-2006 crop years, excluding the low and high yield years (instead of the House's use of the national program yields set in the 2002 bill). A revenue-based payment would be triggered when the national actual revenue per acre for a covered commodity is less than the national target revenue per acre. The national target revenue per acre for a commodity would equal the 2002 farm bill's target price less the 2002 farm bill's direct payment rate multiplied by the national average yield for the commodity during the 2002-2006 crop years, excluding the low and high yield years. The national actual revenue per acre for a commodity would equal the national average yield for the commodity times the higher of the season-average market price or the loan rate for the commodity. If a payment is triggered, the national revenue-based payment per acre would be converted to a payment rate for producers by dividing the national revenue payment rate per acre by the U.S. average payment yield per base acre under the 2002 farm bill countercyclical payment program. An individual producer's revenue-based counter-cyclical payment would be determined by multiplying the national average payment rate for the commodity times 85% of the producer's base acres times the producer's program payment yield under the 2002 farm bill countercyclical payment program. Base acres and program payment yields would remain fixed over the life of the 2007 farm bill. The national yield for determining target revenue would remain fixed over the life of the 2007

farm bill and would equal the average yield for the 2002-2006 crops, excluding the high and the low year.

Analysis Data and Methods

For this study, we used the historical yield data from seventeen farms in Minnesota (Table 2). This individual farm data was coupled with historical national prices and yields and rules under current policy and each proposal. In each year we used a farm's actual acreage for the cropping mix; for the projected impacts, we used the actual 2005 cropping mix. However, for Pennington and Polk farms we had only data on total planted acreage (and not individual crop acreage), so we divided the total acreage into half soybean and half wheat (farms in these two counties did not grow corn). The farms had other crop and livestock enterprises, but we focused only on the corn, wheat, and soybean crops for this analysis.

Table 2. Location, acreage, and yields of example farms

County and farm number	Location within Minnesota	Average crop acreage, 2002-2005 (acres)	Average corn yield, 2002-2005 (bu/ac)	Average soybean yield, 2002-2005 (bu/ac)	Average wheat yield, 2002-2005 (bu/ac)
Cottonwood 1	Southwest	1052	171	40	--
Cottonwood 2	Southwest	886	168	44	--
Cottonwood 3	Southwest	1041	170	46	--
Faribault 1	South Central	1043	182	51	--
Faribault 2	South Central	340	186	55	--
Goodhue 1	Southeast	149	158	39	--
Goodhue 2	Southeast	754	168	41	--
Goodhue 3	Southeast	1300	180	43	--
Pennington 1	Northwest	1976	--	25	45
Pennington 2	Northwest	1653	--	26	52
Pennington 3	Northwest	1758	--	21	41
Pipestone 1	Southwest	472	147	44	--
Pipestone 2	Southwest	170	164	49	--
Pipestone 3	Southwest	764	168	47	--
Polk 1	Northwest	1663	--	34	61
Polk 2	Northwest	1612	--	26	48
Polk 3	Northwest	469	--	26	49

Projections of crop revenue and government payments are made using historical yield data for each farm, the county, and the nation; historical price data; and statistical distributions and relationships of these yields and prices. We used historical yields for each farm, the county, and the nation; historical data on prices to estimate statistical distributions of the yields and prices including averages, standard deviations, and correlations; and each proposal's rules for calculating payments. Historical state and national prices and yields were obtained from USDA's National Agricultural Statistics Service data. We projected yields based on deviations from the yield trend. By incorporating the correlations between yields and prices, we also allowed the joint movements of price and yield.

Estimates of the future bushel price of the three commodity crops were taken from the January 2007 Food and Agricultural Policy Research Institute (FAPRI) Agricultural Outlook (Table 3). For each of the projections, the simulated crop price was assumed to have a mean equal to the FAPRI projection and a variance based on NASS historical price data.

Table 3. Projected national prices used in the analysis ($/bu).

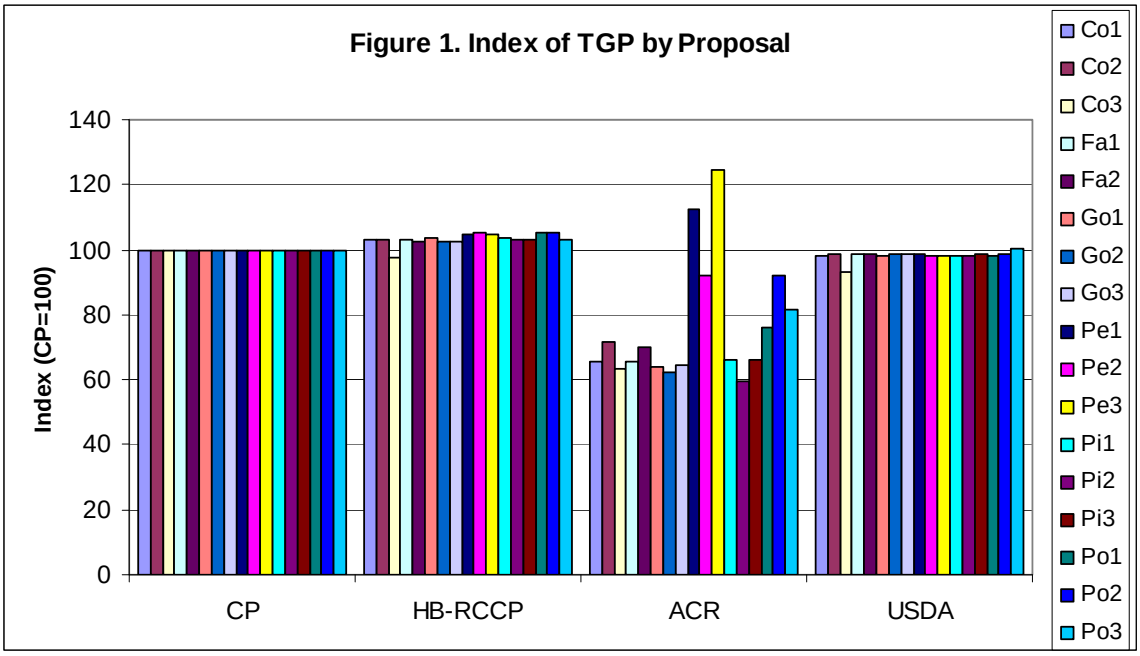
Corn	3.16
Soybean	6.10
Wheat	4.28

In each of the simulated projections, the @Risk program© (Palisade, 2006) was used to conduct a Monte Carlo simulation within Microsoft Excel© with draws for price and yield coming from the distributions described above. Each farm's average crop revenue, resulting government payment, and the variation in those revenues were estimated. To establish an accurate distribution of potential results, 10,000 "draws" were taken from the statistical relationships and used to calculate crop revenue and the potential government payments under each proposal's rules.

Impact on Farm Revenue

To improve our understanding of the potential impact of the most recent proposals for commodity income support programs on crop revenue, we estimated government payments under the price-based current policy (CP) which is the same as the new House framework, the revenue-based proposal (HB-RCCP) in the new House framework, the Senate's Average Crop Revenue (ACR) proposal, and the Administration's revenue-based proposal (USDA) from January 2007.

Total Government Payments (TGP) under the alternative policies follow a very similar pattern on the example corn and soybean farms. TGP follows a slightly different but fairly consistent pattern for the six example wheat and soybean farms. To see this pattern more clearly, we calculated the relative size of TGP for each farm by setting the TGP for current policy as a benchmark with an index value of 100 (Figure 1).

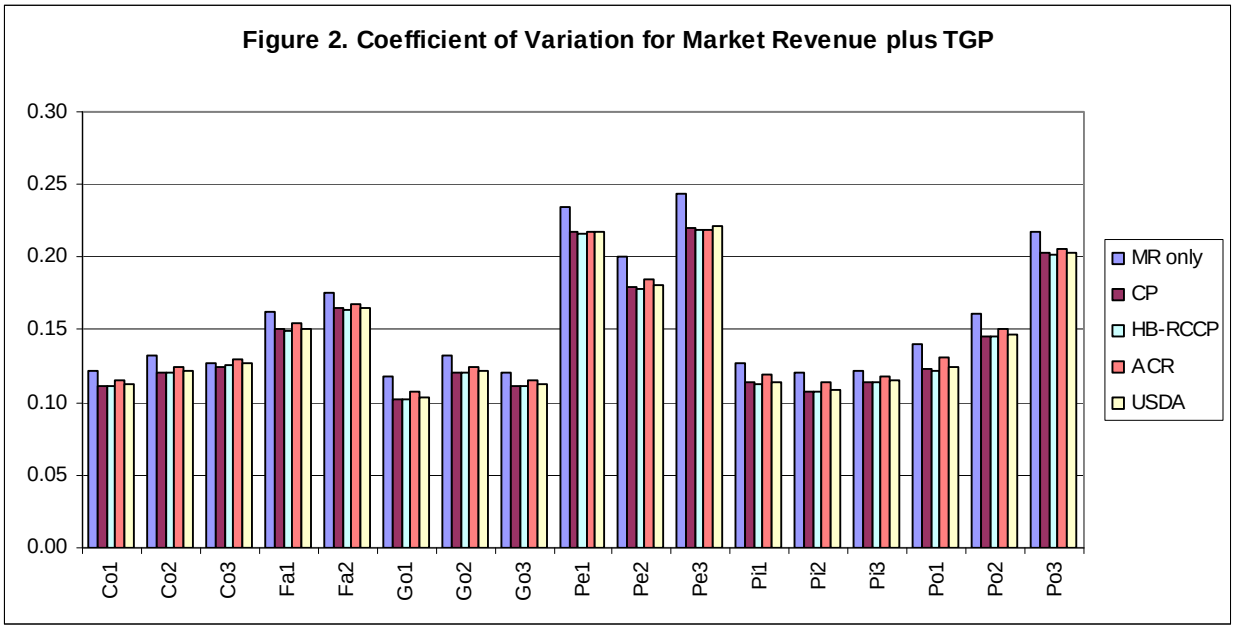


For the corn and soybean example farms in southern Minnesota, the HB-RCCP and USDA proposals generate very similar levels of total government payments (TGPs) compared to

current policy. HB-RCCP provides a slightly higher expected TGP than CP for all example farms except for one and higher TGP than USDA for all farms. ACR is estimated to provide lower TGP for all example corn and soybean farms. For the example wheat and soybean farms in northwest Minnesota, the results are mixed. Compared to the other three proposals, ACR provides higher TGP for 2 of the 6 example farms.

These averages and expected levels camouflage the variability of the actual prices and yields that may occur in any specific year. To understand better the impact of this variability and the ability of each proposal to reduce the resulting variability in a farm's total revenue, we also calculated the coefficient of variation (CV) which measures the variability or potential dispersion of total revenue compared to the average or expected total revenue. When TGP is added to a farm's total receipts from the marketplace, each proposal's ability to reduce risk is shown by the reduction in the CV compared to the CV from receiving only market receipts. A lower CV means lower risk for the farmer. And, assuming that risk reduction is one goal of farm policy, a lower CV means a better achievement by that proposal.

Using the FAPRI price projections, each of the proposals does reduce risk as measured by CV (Figure 2). This can be seen in the lower bars for the market revenue only (MR) compared to the lower bars for every proposal on every farm. Although each of the four proposals produces a similar reduction in risk as measured in CV, we note ACR is not quite as efficient at risk reduction except for two wheat/soybean farms in northwest Minnesota. This risk reduction is estimated at current high price levels.



CLOSING COMMENTS

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For the corn and soybean example farms in southern Minnesota, the HB-RCCP and USDA proposals generate similar levels of TGPs compared to current policy. ACR is estimated to provide lower TGP for all example corn and soybean farms. For the example wheat and soybean farms in northwest Minnesota, the results are mixed. Compared to the other three proposals, ACR provides higher TGP for 2 of the 6 example farms. Each of the proposals does reduce risk as measured by CV.

REFERENCES

Palisade Corporation. 2006. @RISK. Ithaca, New York.

United States Department of Agriculture (USDA). 2007. USDA Farm Bill Proposals. Accessed at http://www.usda.gov/documents/07finalfbp.pdf on January 31, 2007.