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Perspectives on Impacts of the 2002 U.S. Farm Act

Paul C. Westcott

Paper presented at the:

Policy Disputes Information Consortium's
Ninth Agricultural and Food Policy Information Workshop
"Farm Policy Developments and Tensions with NAFTA"
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April 23-26, 2003

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Introduction

The Farm Security and Rural Investment Act of 2002 (2002 farm act) was enacted in the United States in May of 2002. While this new farm law introduced some new policies to the array of agricultural commodity programs, in many ways the 2002 farm act extended provisions of the 1996 farm act and institutionalized provisions of ad hoc emergency spending bills of 1998-2001.

Three key commodity program features of the 2002 farm act are marketing assistance loans, counter-cyclical payments, and direct payments. Marketing assistance loans existed under previous U.S. farm law, direct payments replaced production flexibility contract payments of the 1996 farm act, and counter-cyclical payments are intended to institutionalize the market loss assistance payments of the past several years.

This paper discusses these U.S. farm programs and some of their potential impacts on agricultural markets. An overview of these program features is first presented, along with an illustration of a corn farm's sources of revenues under the new farm act. Then a discussion of some of the impacts of the 2002 farm act is given, commenting on the FAPRI analysis presented by John Kruse. Additional potential impacts of marketing loan provisions of the new law are then discussed, followed by some general comments on potential impacts of counter-cyclical payments, direct payments, and selected additional provisions of the legislation.

Overview of Major Commodity Provisions of the 2002 Farm Act

The three major commodity program features in the 2002 farm act are marketing loans, counter-cyclical payments, and direct payments.

Marketing Loans

Marketing loan provisions of the 2002 farm act extended those of the 1996 farm act. Loan rates were raised for most crops covered under the previous legislation, although loan rates for

soybeans were lowered and loan rates for rice were not changed. Marketing loan provisions were added for new commodities, including peanuts, wool, mohair, dry edible peas, lentils, and small chickpeas. Additionally, implementation of the new farm act introduced different loan rates for 5 classes of wheat.

Marketing loans provide benefits to farmers of loan commodities through loan deficiency payments and marketing loan gains when market prices are low. Marketing loans also reduce revenue risk associated with price variability. Farmers may receive a loan from the Government at a commodity-specific loan rate by pledging their production of the loan commodity as collateral. They may repay the loan at a lower repayment rate at any time during the loan period that market prices are below the loan rate. Alternatively, farmers of commodities covered by the loan programs (except extra-long staple cotton) may choose to receive marketing loan benefits through direct loan deficiency payments (LDP). The LDP option allows the producer to receive marketing loan benefits without having to take out and subsequently repay a commodity loan. The LDP rate is equivalent to the marketing loan gain that farmers could obtain for production placed under loan (Westcott and Price).

Marketing loan benefits are available on all current production of eligible loan commodities, and benefits are linked to market prices. Marketing loans are thus considered to be fully coupled, potentially having a direct effect on production decisions of farmers.

Counter-cyclical Payments

Counter-cyclical payments (CCPs) under the 2002 farm act are available for wheat, feed grains, upland cotton, rice, soybeans, minor oilseeds, and peanuts when market prices are below levels set forth in the legislation. Under the new law, a target price is established for each crop, as well as a fixed payment rate for direct payments (discussed next). When the higher of the loan rate or the season average price plus the direct payment rate is below the target price, a counter-cyclical payment is made, at a rate equal to that difference. Equivalently, CCPs are made when the higher of the loan rate or the season average price is below the target price minus the direct payment rate.

For example, the corn target price for 2003 is $2.60 a bushel, the direct payment rate is $0.28 a bushel, and the loan rate is $1.98 a bushel. If the season average corn price is $2.20 a bushel (which is above the loan rate), the $2.60 target price minus $2.48 ($2.20 price plus the $0.28 direct payment rate) gives a $0.12 CCP payment rate. This payment rate can be alternatively expressed as $2.32 (the $2.60 target price minus the $0.28 direct payment rate) minus the $2.20 season average price. This alternative expression also indicates that the price cutoff where the CCP rate becomes zero is at $2.32, not the $2.60 target price. Thus, when the season average price is above $2.32 (the target price minus the fixed direct payment rate), no counter-cyclical payment is made. When the season average price is below the target price minus the fixed direct payment rate, a counter-cyclical payment is made, with the CCP rate increasing as prices fall. The maximum CCP rate is attained when prices are at or below the loan rate.

CCPs are paid on a portion of historical acreage (85 percent of base acreage) and historically-based CCP program yields and, thus, are not affected by a farmer's current production. Consequently, CCPs are largely decoupled from an individual farmer's planting decisions. However, the link of counter-cyclical payments to market prices may affect revenue risk and may make these payments partly coupled to production decisions.

Direct Payments

Direct payments under the 2002 farm act are similar to production flexibility payments of the 1996 farm act. The payment rate for direct payments is fixed for each crop ($0.28 a bushel for corn, for example) and is not affected by current production or by current market prices. Direct payments to farmers are based on historical acreage (85 percent of base acreage) and on historically-based direct payment program yields. These payments are the most decoupled from planting decisions of the three programs, although there may be some small effects on production through increased wealth and investment.

Illustrations of 2002 Farm Act Income Support Provisions

Corn market revenues and program payments at different price levels illustrate some of the properties of income-support provisions of the new legislation (Figures 1-3). Corn program provisions for the 2003 crop are used in these illustrations. Revenue calculations for Figures 1-3

are for a farm with 100 acres of corn, 100 acres of corn base, corn yields of 135 bushels an acre, a program-payment yield of 103 bushels an acre for direct payments, and an updated payment yield for counter-cyclical payments of 120 bushels an acre. In these illustrations, it is assumed that the farmer has chosen to plant the same crop as the acreage base on 100 acres.

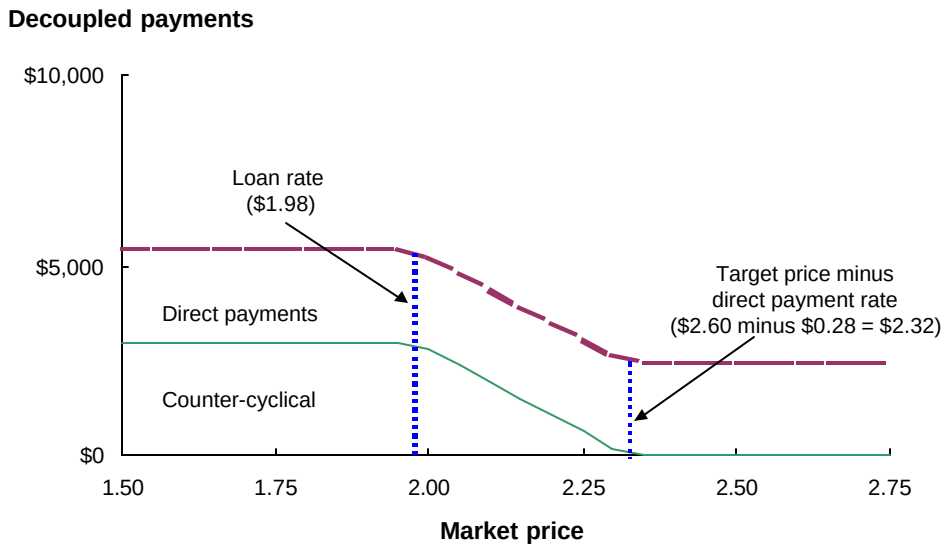
Revenues from Decoupled Payments

Figure 1 focuses on direct payments and counter-cyclical payments. These payments are decoupled from current production because the payments are made on 85 percent of the corn base acreage and on fixed payment yields regardless of whether corn is planted on the land.

CCPs are provided when prices are below the target price minus the fixed direct payment rate ($2.60 minus $0.28, or $2.32, for corn). Payments increase as prices decline below $2.32 until prices reach the loan rate ($1.98 for corn). For prices below the loan rate, counter-cyclical payments are at their maximum and do not change.

Direct payments in Figure 1 are fixed at $0.28 a pound for corn.

Figure 1: Counter-cyclical and direct payments for corn under the 2002 Farm Act



Assumes 100 acres of corn base, 103 bushels/acre direct payment yield, and 120 bushels/acre counter-cyclical payment yield.

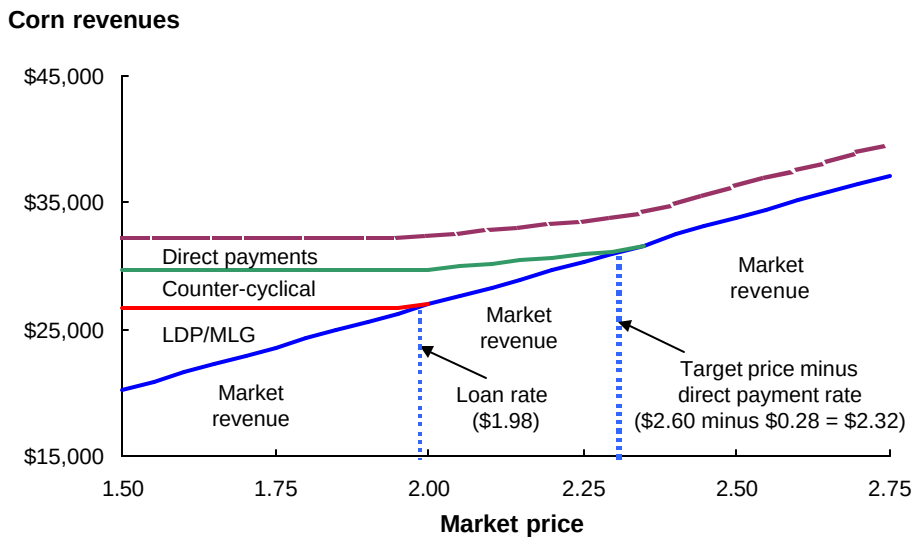
Market Revenues and Program Payments, Basic Case

Figure 2 shows all revenue sources for this corn farm situation in which the farmer is assumed to plant the same crop as the acreage base. In this illustration, market receipts and fully coupled marketing loan benefits for the farm are combined with the decoupled payments of Figure 1. The portions of Figure 2 labeled "Market revenue" represent receipts from the marketplace, which increase as market prices rise.

The triangle labeled "LDP/MLG" in Figure 2 represents marketing loan benefits in the form of loan deficiency payments (LDPs) and/or marketing loan gains (MLGs) that supplement market revenues at market prices below the $1.98 loan rate for corn. As prices fall below the loan rate, marketing loan benefits rise and fully offset declines in market revenues since these program benefits are available for all production.

The area in Figure 2 labeled "Counter-cyclical" represents the counter-cyclical payments under the 2002 farm act. As shown in Figure 1, counter-cyclical payments are linked to market prices, with payments provided when prices are below the target price minus the direct payment rate

Figure 2: Corn revenues under the 2002 Farm Act



Assumes 100 acres of corn, 100 acres of corn base, 135 bushels/acre yield, 103 bushels/acre direct payment yield, and 120 bushels/acre counter-cyclical payment yield.

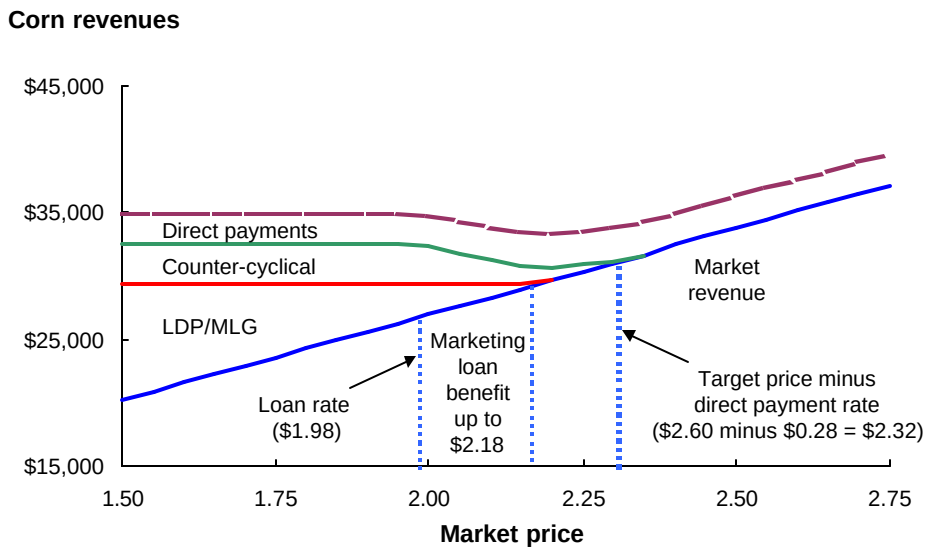
($2.32 a bushel for corn). Again, CCPs change in the price range from the $1.98 corn loan rate to $2.32. Counter-cyclical payments do not fully offset reductions in market revenues as prices fall from $2.32 to $1.98 because payments are on 85 percent of the fixed acreage base and are paid on CCP program yields rather than actual yields.

The area of Figure 2 labeled "Direct payments" are fixed payments of $0.28 a bushel for corn, paid on 85 percent of the acreage base and a direct payment program yield. These payments do not change with market prices or the farm's production.

Marketing Loan Benefits and Counter-cyclical Payments Likely to Overlap

Additional interesting properties of these farm act provisions can also result from the interaction of these income support measures in some price ranges. Figure 3 extends the analysis of Figure 2 to illustrate that counter-cyclical commodity payments are likely to overlap with counter-cyclical aspects of marketing loan benefits in certain price ranges. In Figure 2, marketing loan benefits are assumed only for prices below the loan rate. However, marketing loans have enabled farmers to attain per-unit revenues that, on average, exceed commodity loan

Figure 3: Corn revenues under the 2002 Farm Act, with above-loan-rate marketing loan benefit



Assumes 100 acres of corn, 100 acres of corn base, 135 bushels/acre yield, 103 bushels/acre direct payment yield, and 120 bushels/acre counter-cyclical payment yield. Assumes per-unit revenue facilitated by marketing loans exceeds loan rate by an average of 20 cents/bushel.

rates when prices are relatively low. Many farmers use a two-step marketing procedure in which they receive program benefits when prices are seasonally low (and marketing loan benefits high) and then sell the crop later in the marketing year when prices have risen (Westcott and Price).

Figure 3 includes a representative level of $0.20 a bushel for corn for the expected above-loan-rate revenue facilitated by marketing loans when prices are low, based on the experience of recent years. Realized, average per-unit revenue (market revenue plus the average marketing loan benefit per bushel) for corn was $0.22 above the loan rate for the 2000 crop and $0.20 a bushel above the corn loan rate for the 2001 crop.

If marketing loans for corn continue to provide this level of above-loan-rate revenue when prices are low, counter-cyclical payments overlap with counter-cyclical aspects of marketing loan benefits in the price range from $1.98 to $2.18, in effect providing two counter-cyclical benefits to farmers. As prices rise in this price range, both counter-cyclical payments and marketing loan benefits decline, with total revenues falling in this illustration where the farmer is assumed to plant the same crop as the acreage base.

USDA and FAPRI Analyses of the 2002 Farm Act

John Kruse has done a nice job of presenting the FAPRI analysis of impacts of the 2002 farm act. The general results and implications of the analysis done at USDA do not differ greatly from those of FAPRI. Where the analysis does differ, many times this reflects differences in the underlying baseline projections rather than differences in impacts if we started from the same baselines. In particular, whether baseline-projected prices are in the range where marketing loan benefits exist is important for determining impacts of the new legislation. For example, if one baseline has prices above where marketing loan benefits exist, there may be no supply response impact for a change in loan rates, while in another baseline with lower prices that are in the range of marketing benefits, changes in loan rates will influence planting choices. Additionally, some differences reflect different assumptions regarding implementation of the 2002 farm act, such as enrollment in the Conservation Reserve Program.

The USDA analysis of the 2002 farm act was conducted shortly after enactment of the new law using then-current baseline projections. Importantly, baseline projections at that time did not reflect the subsequent increases in 2002/03 market prices for many crops. Additionally, to be comparable to the FAPRI analysis, the USDA analysis discussed here assumes that commodity loan rates under the 1996 farm act were held at their maximum levels permitted under that legislation. This assumption differs from that used in the main 2002 farm act analysis discussed in Westcott, Young, and Price, which assumed market-price-based formula loan rates in the 1996 farm act reference scenario, but corresponds to the alternative loan rate assumption used in a second 1996 farm act reference scenario used for comparison purposes in measuring impacts of the 2002 farm act summarized elsewhere (page 24) in that USDA publication.

Overall, the USDA analysis of the 2002 farm act is similar to the FAPRI analysis. Impacts of the new farm act on commodity markets in the initial years are mostly a result of the changes in the loan rates under the marketing loan program, a reflection of these benefits being fully coupled to production decisions. In the near term years, prices are low enough that marketing loan benefits exist, so changes in loan rates make a difference in producer marginal revenues, thereby affecting planting decisions. Impacts on 2002 plantings were assumed to be muted in the USDA analysis due to the timing of enactment of the new legislation. Thus, the largest impact of loan rate changes on overall plantings of eight major field crops is in 2003, at about 0.8 million acres (Figure 4). This increase in overall plantings is relatively small at less than 0.5 percent, partly reflecting an inelastic aggregate acreage response in the sector where plantings change proportionately less than the economic incentives provided by prices and net returns. Despite an increase in own-price and cross-price responsiveness facilitated in recent years under nearly full planting flexibility (Lin et al.), individual responses remain inelastic and tend to have partly offsetting effects on aggregate acreage responsiveness.

In general, the USDA impacts by commodity are similar to FAPRI's as well. Raising loan rates for most commodities increases plantings of those crops, increasing the year-specific impacts of marketing loans as well as extending the duration of marketing loan impacts across additional years. The largest acreage increases are for corn and wheat (Figures 5-6). Additionally, a relatively large increase in sorghum plantings (Figure 7) results from the increase of its loan

Figure 4: Planted area, eight major crops

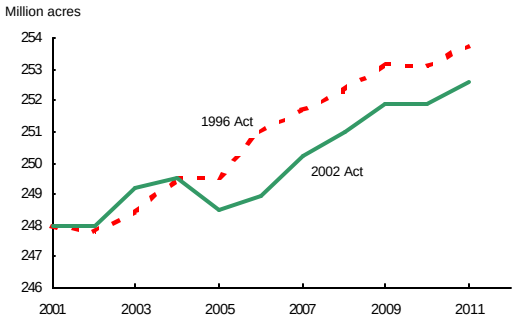


Figure 5: Planted area, wheat

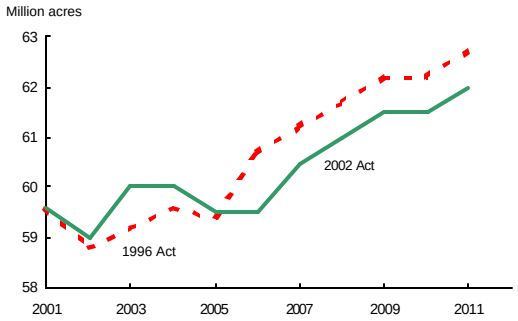


Figure 6: Planted area, corn

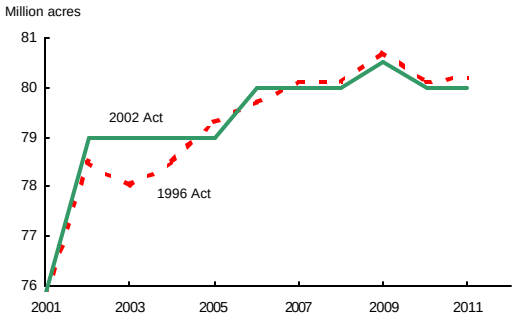


Figure 7: Planted area, sorghum

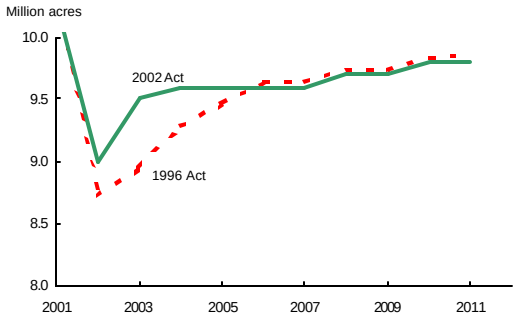


Figure 8: Planted area, soybeans

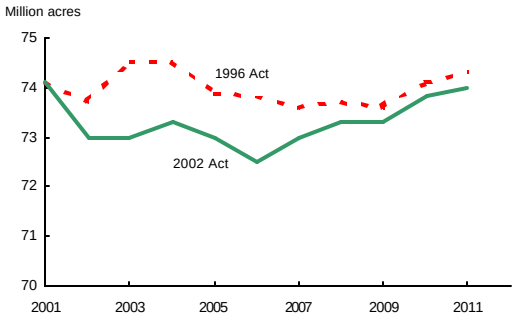
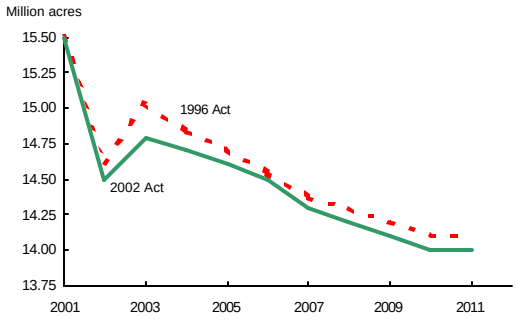


Figure 9: Planted area, upland cotton



rate to a par value with corn. In contrast, with soybean loan rates reduced and upland cotton loan rates raised only slightly, plantings for those crops are reduced under the new farm law (Figures 8-9).

In later years of the analysis, market prices are stronger and have generally moved above the range of marketing loan benefits for most crops. Thus, in the longer run, other program provisions of the 2002 farm act have relatively stronger roles in the impacts. First, the increase in the maximum acreage enrollment in the Conservation Reserve Program (CRP) affects plantings of field crops. The CRP is permitted to increase to 39.2 million acres under the 2002 farm act, up from the maximum of 36.4 million acres allowed under the 1996 farm act. Only a portion of the 2.8 million acre increase would be allocated to the major program crops, assumed at 1.7 million acres, and about two-thirds of that increase, or about 1.1 million was assumed to displace plantings. Further, this impact on plantings was assumed to be a gross impact, with the net impact lower because of the endogenous response of plantings to market price changes.

The second additional program effect that was assumed to have an impact on plantings of major field crops was an increase in acreage planted to dry peas and lentils in response to the new marketing loan programs for those crops. With loan rates for these crops to be implemented based on feed grade for dry peas and number 3 grade for lentils, total plantings of these two crops were projected to rise from recent levels of 0.4-0.5 million acres to about 1.2 million acres, with the increase assumed to displace plantings of wheat. Similar to the impacts of increased CRP enrollment, this effect on wheat plantings was assumed to be a gross impact, with the net impact reflecting the response to resulting changes in market prices.

Thus, plantings of major field crops in the near term are higher under the 2002 farm act due to the general increase in loan rates, with the commodity mix shifted away from soybeans because of its loan rate reduction, and away from upland cotton because of its relatively small loan rate increase. Then, in the longer run, as projected prices are high enough that marketing loan benefits are mostly gone, plantings for the major field crops are generally reduced under the 2002 farm act due to the increased CRP enrollment and, for wheat, the switch of some land to dry peas and lentils.

Potential Additional Marketing Loan Impacts Under Alternative Loan Rates

An additional feature of marketing loan provisions of the 2002 farm act that could potentially have additional impacts on commodity markets is that the Secretarial discretion for setting loan rates using market-price-based formulas was not continued. Instead, commodity loan rates for each year are specified in the law. Under the 1996 farm act, loan rates for corn, wheat, soybeans, and upland cotton could be set using 85 percent of a 5-year "olympic" average of farm-level prices (omitting the highest price and the lowest price from the average), subject to legislated maximum specified for these crops and minimums specified for upland cotton and soybeans. Although this provision of the 1996 farm act had not been used in recent years (since the 1996 soybean loan rate), the elimination of this discretionary authority adds the potential of additional commodity market impacts if prices for these crops fall to low levels again. (While this may currently seem extreme, with relatively high 2002/03 prices for many crops following the 2002 production shortfalls, prices over the duration of the 1996 farm act were also initially high and then fell below loan rates.)

Alternative Loan Rate Scenarios

To provide an indication of the potential market impacts of having pre-set, fixed loan rates under the 2002 farm act, acreage impacts, based on expected net returns, are derived for alternative loan rate determination mechanisms in a market setting where prices are lower. The analysis is conducted for 2001 planting decisions, using assumptions for loan rates, yields, production costs, and plantings for 2001, and lagged (2000) market prices from USDA's February 2001 baseline as a an initial scenario. These assumptions provide a lower-price environment to assess potential additional market impacts of fixed loan rates in the 2002 farm act should lower crop prices return.

Commodity loan rates in this 2001 baseline scenario are at the maximum levels allowed under the 1996 farm act and are shown in Table 1 (first column) for corn, wheat, and soybeans. Additional scenarios are then derived for 3 alternative assumptions for commodity loan rates (Table 1, second through fourth columns). The first alternative assumes the 2002 farm act loan rates as specified for 2002 and 2003 crops. The second alternative assumes that loan rates for 2001 crops were based on the formulas set forth in the 1996 farm act. In this scenario, the

Table 1. Alternative loan rate assumptions, 2001 market conditions

Crop	Loan rates at 1996 act caps (2001 baseline)	2002 act loan rates for 2002 & 2003	Loan rates using 1996 act formulas *	Loan rates using unconstrained 1996 act formulas **
		$ per bushel		
Wheat	2.58	2.80	2.43	2.43
Corn	1.89	1.98	1.76	1.76
Soybeans	5.26	5.00	4.92	4.62

* Soybean loan rate at 1996 farm act legislative floor.
** Assumes no floor for soybean loan rate.

Table 2. Supply response effects: Planted acreage estimates with alternative loan rates, 2001 market conditions

Crop	Loan rates at 1996 act caps (2001 baseline)	2002 act loan rates for 2002 & 2003	Loan rates using 1996 act formulas	Loan rates using unconstrained 1996 act formulas
		Million acres		
Wheat	62.0	63.1	61.4	61.5
	---	(1.1)	(-0.6)	(-0.5)
Corn	78.5	79.5	78.0	78.5
	---	(1.0)	(-0.5)	(0.0)
Soybeans	75.0	73.5	74.7	73.8
	---	(-1.5)	(-0.3)	(-1.2)
3-crop total	215.5	216.1	214.1	213.8
	---	(0.6)	(-1.3)	(-1.8)
8-crop total	253.5	254.7	251.9	251.5
	---	(1.2)	(-1.6)	(-2.0)

Numbers in parentheses are differences from 1996 act capped loan rate scenario.

formula loan rate for soybeans would be below the minimum level allowed in the 1996 farm act, so that loan rate is set at its legislative floor under the 1996 farm act of $4.92 per bushel. In the third alternative scenario, the soybean loan rate floor under the 1996 farm act is assumed to be relaxed, permitting a reduction to the formula-determined level of $4.62 a bushel.

Alternative Loan Rate Impacts on Plantings

Plantings for corn, wheat, and soybeans, as well as 3-crop and 8-crop totals are shown in Table 2 for the different loan rate assumptions. The first column indicates baseline projected acreage levels, corresponding to loan rates being held at their legislative maximum levels under the 1996 farm act. These plantings provide a reference point from which to compare the other scenarios.

In the first alternative, the 2002 farm act loan rate impacts indicate the generally higher level of plantings discussed earlier for the new farm legislation, with the exception of the reduction of soybean plantings. Total plantings for the 8 major field crops are up 1.2 million acres, a somewhat larger impact in this lower price setting than presented earlier for the higher price environment in which the 2002 farm act analysis was conducted.

In the second alternative scenario, loan rates are assumed to fall from their maximums of the 1996 farm act to formula-based levels, although the loan rate reduction for soybeans is limited by the minimum of $4.92 specified in the 1996 law. With lower loan rates and expected per-unit revenues, plantings are reduced, with the 8-crop total down 1.6 million acres. Importantly, the limitation on the reduction of the soybean loan rate holds the decline in soybean plantings to 0.3 million acres. Nonetheless, the overall reduction of plantings of 1.6 million acres exceeds the impact estimated for the 2002 farm act.

In the third alternative scenario, with the soybean loan rate dropping 30 cents per bushel more, soybean plantings fall by another 0.9 million acres. Cross-commodity effects result in some of that acreage switching to other crops, with corn plantings increasing 0.5 million acres and wheat increasing 0.1 acres from plantings in the second alternative scenario. Nonetheless, marketing loan benefits are lower in this scenario, so overall plantings are down more than in the second

alternative scenario and are down about 2 million acres from the 1996 capped loan rate scenario. Again, the overall reduction of plantings exceeds the impact estimated for the 2002 farm act.

Alternative Loan Rate Implications

The analysis of plantings under alternative loan rates in a low price setting illustrates that fixing loan rates when market-price-based, formula loan rates would be lower results in land being held in production that otherwise might not be planted. Even when loan rates are based on formulas that use past historical prices, if loan rate barriers are encountered that prevent the long-run market price signals from being transmitted to producers (such as the 1996 act minimum set for soybeans), planting decisions are affected with land resources shifted and economic efficiency reduced.

Overall, if commodity markets return to a lower price environment, additional market impacts of eliminating the discretionary authority to link loan rates to historical market prices are potentially larger than the impacts of the loan rate changes in the 2002 farm act from the capped levels of the 1996 farm act.

Counter-cyclical Payment Effects

Counter-cyclical payments do not affect producer net returns at the margin, but may influence production decisions because their link to market prices may reduce revenue variability and risk.

CCPs Do Not Affect Marginal Revenues

Counter-cyclical payments under the 2002 farm act do not change with a farmer's current production since they are paid on a constant, pre-determined quantity for the farm (equal to a 85 percent of a fixed acreage base times a fixed CCP payment yield). The expected marginal revenue of a farmer's additional output is the expected market price (augmented by marketing loan benefits when prices are relatively low), so counter-cyclical payments do not affect production directly through expected net returns. Thus, production decisions at the margin are based on market price signals, and are not directly influenced by the counter-cyclical payments.

Revenue Risk Reduction Effects of CCPs May Affect Supply Response

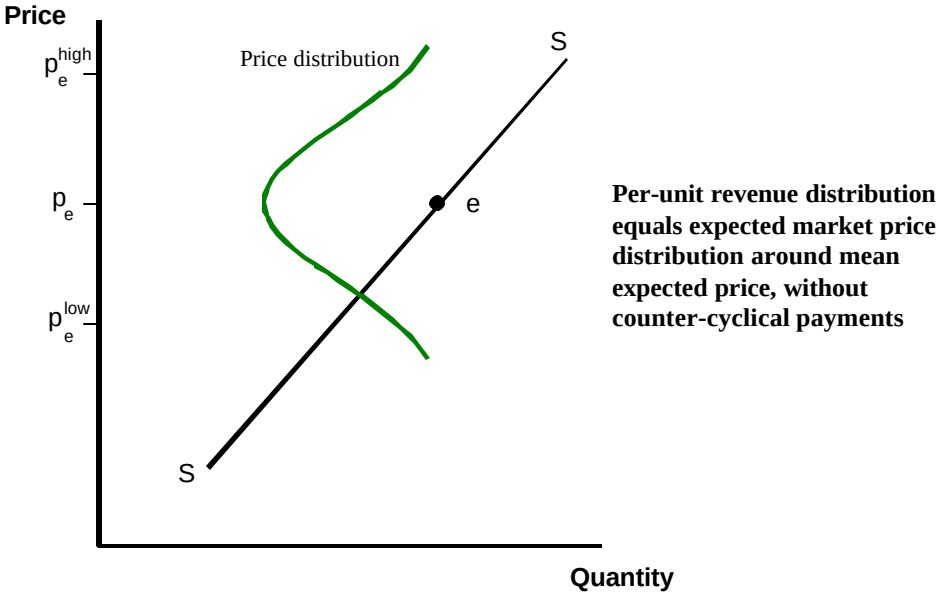
However, because counter-cyclical payments are linked to market prices, they may influence production decisions indirectly by reducing total and per-unit revenue risk associated with price variability in some situations. In the price range from the loan rate up to the target price minus the direct payment rate, changes in producer revenues due to changes in market prices are partly offset by the counter-cyclical payments if the base acreage crop is planted (or a crop with highly correlated prices with the base acreage crop), thereby reducing total revenue risk associated with price variability.

Analytical Framework for Counter-Cyclical Payments. A simplified representation of this revenue risk reduction aspect of counter-cyclical payments is shown in Figures 10 and 11. In these depictions, the farmer is assumed to plant the same crop as the base acreage crop on the farm and prices are assumed to be in the range where CCPs vary (from the loan rate up to the target price minus the direct payment rate). Also, the price and per unit revenue distributions shown in the figures are hypothetical, used only to illustrate concepts related to counter-cyclical payments.

Figure 10 represents the situation with no counter-cyclical payments, such as under the 1996 farm act. The supply curve is SS and the expected price of p_e gives a supply response at point e on SS. Implicitly associated with any point on the supply curve is a distribution of price outcomes around the mean expected price. This is represented by the "Price distribution" curve in Figure 10, showing price expectations within some level of probability ranging from a low of p_e^{low} to a high of p_e^{high}.

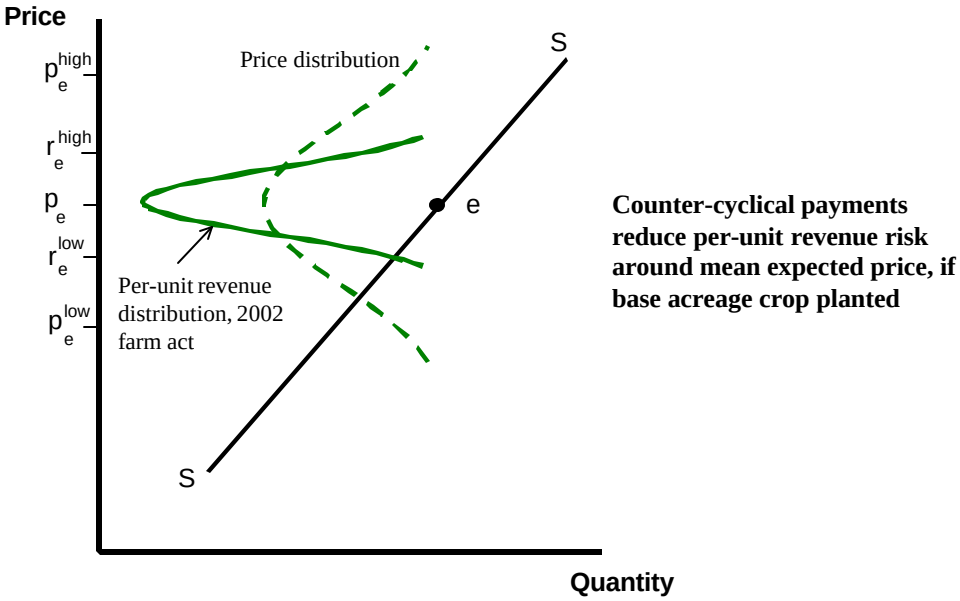
With no counter-cyclical payments in Figure 10, there is a direct correspondence between changes in market prices and changes in revenues if prices are in the assumed range where the new CCPs vary. As a result, market price variability represented by the price distribution curve in Figure 10 also represents per unit revenue variability. For example, if the production decision for a corn producer is based on a price expectation of $2.15 a bushel, but the actual price turns out to be $2.10 a bushel, the reduction in realized revenues from the initial mean expected

Figure 10: Supply curve and price (per-unit revenue) risk under the 1996 farm act (without counter-cyclical payments)



Note: Price distribution shown is hypothetical.

Figure 11: Supply curve and reduced per-unit revenue risk under the 2002 farm act (with counter-cyclical payments)



Note: Price and per-unit revenue distributions shown are hypothetical. They are used here to illustrate concepts related to counter-cyclical payments in the price range where these payments vary.

revenue reflects the full 5-cent-per-bushel market price decline. Similarly, if the actual price is $2.20, revenues reflect the full 5-cent gain in prices.

The situation with counter-cyclical payments of the 2002 farm act is depicted in Figure 11, with the expected price again at p_e and supply response at point e on SS. With counter-cyclical payments, however, price changes do not directly change per unit revenues by a like amount. For example, for farmers who plant their corn base acreage to corn, about three-fourths of any change in revenues from expected levels due to a change in the price from the initial expected price would be offset by a change in the counter-cyclical payment, which is paid on 85 percent of base acreage and on a payment yield that would be lower than expected actual yields.

While the distribution of expected market prices is the same as in Figure 10, the distribution of the farmer's expected per unit revenues is much narrower in Figure 11, as represented by the "Per unit revenue distribution" curve. Per unit revenue expectations covering the same level of probability as is used for the price distribution range from a low of r_e^{low} to a high of r_e^{high}. This narrower distribution represents the reduced per unit revenue risk because of the counter-cyclical payments. Using the example above where the expected corn price at planting time is $2.15 a bushel but the actual price is $2.10, the reduction in realized market revenues from the initial expected revenue is now partly offset by an increase in counter-cyclical payments, so the reduction in total revenues (market receipts plus counter-cyclical payments) reflects, on average, only part of the 5-cent-per-bushel market price decline. Alternatively, if the actual price is $2.20, only part of the 5-cent increase is reflected in total revenues.

CCP Implications for Production and for Risk Management. If there is value to the farmer in reducing the variability of expected revenues (such as for a risk-averse producer or their risk-averse lender), then the negative correlation between the expected counter-cyclical payments for the program crop and the expected market revenues for the same crop (or for a highly price-correlated alternative crop) may have some influence on production choices. This revenue stabilization consideration would supplement the typical profit maximization incentive underlying planting decisions. For risk-averse producers, planting decisions would partly reflect the amount of revenue risk the producer is willing to carry, with their resulting equilibrium level

of production reflecting the joint consideration of profit maximization and revenue stabilization concerns.

The revenue risk reduction of CCPs provides a new risk management instrument to farmers, which may lead to adjustments in their use of alternative farm and nonfarm risk management strategies. For risk-averse farmers, the revenue risk reduction provided by counter-cyclical payments may, in some cases, encourage farmers to plant the program crop for which they have base acreage (or a crop for which prices are highly correlated to those of the program crop). If the base acreage crop is planted, the season average market price of the crop produced would be the same price used to determine the counter-cyclical payment, so the reduction in variability of total revenues due to CCPs is most direct. Alternatively, because CCPs reduce overall revenue risk, a farmer may switch some land to riskier crops that provide higher mean expected returns but also higher variability of those returns.

While this discussion provides qualitative arguments for counter-cyclical payments to have some influence on agricultural production, the magnitude of the effects is an empirical issue and a topic for further research. Although expected net returns would likely remain a dominant consideration in cropping choices for most situations, revenue risk reduction provided by counter-cyclical payments could have some potential to affect production choices for risk-averse producers.

Direct Payment Effects

Direct payments are largely decoupled since program benefits do not depend on the farmer's production or market conditions, and the payments do not affect per-unit returns. However, direct payments are tied to acreage so these benefits will be capitalized into farmland values, thereby increasing aggregate producer wealth. Mechanisms for direct payments to potentially affect production decisions are (1) a direct wealth effect through risk aversion reduction and (2) a wealth-facilitated increased investment effect reflecting reduced credit constraints and/or reduced costs of capital.

Direct payments increase farmers' wealth, reflecting gains in farm sector equity that result from the capitalization of expected future farm program benefits into the value of farmland. These payments may affect production somewhat if the changes in wealth influence farmers' perception of, attitudes towards, and responses to potential financial risks associated with production alternatives. If payments raise producers' wealth and lower their risk aversion, they may take on more risk in their production choices. This may entail a choice to increase overall production and may also change the mix of production, perhaps switching to riskier crops with higher mean (but more variable) expected returns.

Higher cash flow provided by direct payments and higher wealth through capitalization of future benefits into land values may also facilitate additional agricultural production through increases in agricultural investment if farmers otherwise face credit constraints or limited liquidity. Some of the payments are likely to go to consumption, savings, and nonagricultural investments, with the largest share typically going to consumption. However, agricultural investment can also rise for farmers who were credit constrained, as lenders may be more willing to make loans to farmers with higher guaranteed incomes, higher farm equity, and lower risk of default. Greater loan availability facilitates additional agricultural production by allowing these farmers to more easily invest in profitable opportunities on their farm operations. Additionally, the reduced risk of default could lead to lower interest rates on loans to farmers, also facilitating an increase in investment in farm operations.

For some farmers, increased liquidity provided by the payments also may reduce the need for obtaining loans for short-term operating costs or for longer term farm-related investments. While there would be opportunity costs associated with self-financing and using these funds in the farm operation, those opportunity costs would be lower than commercial loan expenses. This lower cost of capital could lead to an increase in the overall size of the current operation and could raise the level of investment in the farm, both of which could increase farm output.

These potential production influences of direct payments would be expected to be small in aggregate because of the multitude of alternative uses for the payments. This is particularly the case when one considers the farm household as the decision-making entity, which has a wide

array of consumption, savings, nonagricultural and agricultural investment, and off-farm and on-farm labor allocations that may adjust in response to the payments (USDA, ERS). Additionally, to the extent that direct payments influence production through these wealth and investment mechanisms, they would do so similarly to the decoupled production flexibility contract payments under the 1996 farm act. Using farm household survey data, the USDA, ERS study concludes that production flexibility contract payments improved the well-being of recipients, enabling increased consumption, savings, investment, and leisure by households, but with minimal effects on agricultural production. Further, since the overall average annual magnitudes of direct payments and production flexibility contract payments are comparable at about $5 billion, no new effects are anticipated under the 2002 farm act.

Effects of Updating Base Acreage and Payment Yields

The 2002 farm act permitted the updating of base acreage used for determining direct and counter-cyclical payments. Additionally, for those who updated their base acreage, there were various options provided in the legislation for updating payment yields used for counter-cyclical payments.

These base acreage and program yield updates may have potential production influences if farmers now expect further opportunities in the future to update these program parameters for their farms. Such expectations would affect expected net returns for program crops and could thereby affect current production decisions. For example, farmers may not fully use planting flexibility to move from historically-planted and supported crops if they expect future farm programs to permit an updating of their base acreage, which forms the foundation for many payments. Instead, farmers would have incentives to build and maintain a planting history for program crops to use for possible future base acreage updating, thereby constraining their response to current market signals. Similarly, use of nonland inputs that affect current yields may be influenced if farmers expect that future farm legislation will permit an updating of payment yields.

Allowing acreage bases and payment yields to be updated could reduce economic efficiency in production if producers do not fully respond to signals from the marketplace, but instead respond

to market signals augmented by expected benefits of future programs and future program changes. Such influences would depend on market prices, which would affect the expected value of future farm program benefits.

Conclusions

Policy changes of the 2002 U.S. farm act include changing loan rates and expanding the marketing loan program, adding counter-cyclical payments, and replacing production flexibility contracts payments with direct payments. These programs may each affect agricultural commodity markets, although impacts vary due to the degree to which the programs are coupled to farmers' production decisions. While marketing loan benefits are fully coupled, less direct market impacts may result from the other income support programs. Some of the issues in assessing effects of the 2002 farm act relate to whether various types of income-support programs that provide program benefits that are decoupled from a producer's current levels of production may, nonetheless, provide indirect incentives that influence production decisions and overall output.

USDA Web Sites for 2002 Farm Act Information

- USDA Farm Act homepage
  - http://www.usda.gov/farmbill
- Side by side comparison of 1996 and 2002 Farm Acts, with selected analyses
  - http://www.ers.usda.gov/features/farmbill
- Frequently asked questions
  - http://www.fsa.usda.gov/pas/farmbill/fbfaqhome.asp
- Economic analysis and impacts of the 2002 Farm Act
  - http://www.ers.usda.gov/publications/aib778

Similar to FAPRI's results, USDA analysis of the new legislation indicates that loan rate changes under the marketing loan program have the largest potential to affect production choices, mostly in the initial years of the analysis when prices are low enough that marketing loan benefits exist. Nonetheless, impacts are relatively small (less than 0.5 percent) due in part to the relative inelasticity of supply response in the sector. The elimination of discretionary authority to lower loan rates based on historical market prices could result in additional impacts of the marketing loan program if commodity markets return to lower prices during the years covered by the 2002 farm act.

Counter-cyclical payments may influence production choices because of their link to market prices, which can lower risks to producers by reducing the variability of revenues in some price ranges. Direct payments are the least coupled of these programs, but may influence production through wealth and investment effects. Although qualitative arguments suggest that these decoupled payments could have some indirect influences on production, those effects are likely to be relatively small. This is particularly the case when one considers the farm household as the decision-making entity, rather than only the farm operation, with a wide array of consumption, savings, nonagricultural and agricultural investment, and off-farm and on-farm labor allocations that may adjust in response to these payments (USDA, ERS).

Other features of the 2002 farm act that affect planting decisions include the expansion of the Conservation Reserve Program and the addition of marketing loans for dry peas and lentils. Further, provisions for updating base acreage and program yields may also have some influence on production if farmers now expect there to be future opportunities to update these items for their farms.

Disclaimer

The views expressed in this paper are those of the author and do not necessarily reflect the views of the U.S. Department of Agriculture.

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