Loan Deficiency Payments versus Countercyclical Payments: Do We Need Both for a Price Safety Net?

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Executive Summary

The federal government currently runs two major price support programs in agriculture, the marketing loan and countercyclical payment (CCP) programs. While these programs are both targeted at providing producer price protection, they have different political and financial costs associated with them. We outline these costs and project the effects of various loan rate changes on these programs for eight crops (barley, corn, cotton, oats, rice, sorghum, soybeans, and wheat) for 2005. Loan rate changes affect the price support programs by changing the payment rate producers receive when payments are triggered. We find that the crop's relative price strength versus its loan rate and the relationship between CCP base production and 2005 expected production have the largest influence on how loan rate changes affect outlays from the price support programs for the various crops.

Of these crops, cotton is the only one that would be relatively unaffected by loan rate shifts. Corn and soybeans would see the largest declines in overall expenditures from price support programs if loan rates were decreased. Oats and soybeans would experience the largest percentage losses. However, the results also show that the federal government could maintain an agricultural price support structure at a lower cost than it is currently paying. The reduction in cost often comes in situations where the current array of price support programs overcompensates producers for price shortfalls. This shift would also likely find greater acceptance under the World Trade Organization (WTO) agriculture guidelines than would the current structure. For an administration that is looking to rein in deficit spending while at the same time negotiating new WTO guidelines, moving to lower loan rates could be an answer.

Keywords: agricultural loan rates, agricultural marketing loan program, agricultural price supports, countercyclical payments (CCPs), loan deficiency payments (LDPs).

LOAN DEFICIENCY PAYMENTS VERSUS COUNTERCYCLICAL PAYMENTS: DO WE NEED BOTH FOR A PRICE SAFETY NET?

The 2002 farm bill created a new price safety net program based on countercyclical payments (CCPs), and maintained an existing price safety net program using marketing loans. Both programs pay producers when prices are low. However, the programs differ in several respects. Marketing loan benefits (marketing loan gains and loan deficiency payments [LDPs]) are paid on current production, accrue when prices fall below the prescribed loan rates, and are limited only by the size of the crop and the price level. CCPs are paid on a historical base production, accrue when prices are between prescribed target prices and loan rates, and are limited by these government-set prices and the historical base.

Thus, the federal government has set up two programs to cover the same problem and has structured the rules for these programs to minimize the likelihood of both programs paying for the same price drop. But does this structure make sense politically or financially? Politically, the United States has to defend the two programs in the current World Trade Organization (WTO) agricultural negotiations. Both programs are viewed as trade distorting. Under the existing WTO agriculture agreement, both programs are included in the list of programs the United States reports as "amber box" support, or agricultural support that is trade distorting and is limited under the WTO. The latest WTO agriculture framework separates the two programs. CCPs would become "blue box" support, or support that is trade distorting but is paid on a fixed base. Marketing loan benefits would remain in the amber box. From this point on, we will refer to marketing loan benefits as LDPs, as over 90 percent of marketing loan benefits are captured as LDPs. The framework places a cap on blue box support and continues reductions in allowed amber box support from the current agriculture agreement. Blue box support is considered less trade distorting than is amber box support. Thus, CCPs face less virulent opposition from other WTO members than do LDPs, but both programs are opposed by

many WTO members. The United States pays a political price in the WTO to maintain protection for these programs.

The U.S. financial outlook has dramatically changed since the passage of the 2002 farm bill. Going into the 2002 farm bill, the federal government had run budget surpluses in the previous four years (1998-2001). These surpluses offered Congress an opportunity to expand agricultural programs; this opportunity was not missed. All the major farm programs were continued in the bill and two new programs were added: CCPs and the Conservation Security Program. Since the farm bill's passage, budget deficits have returned and reached record levels; Congress has reduced funding for the Conservation Security Program to pay for disaster assistance programs; and President Bush has stated that these deficits will be cut in half by 2009. As discretionary spending on defense and homeland security is unlikely to be cut, spending reductions to reduce the deficit will have to come from other sources, such as agriculture.

In this paper, we examine the interaction between CCPs and LDPs, compute the budget implications of changing these programs, and discuss the ramifications of these changes. To do this, we simulate the expenditures for these programs for the upcoming 2005 crop year for eight major crops: barley, corn, cotton, oats, rice, sorghum, soybeans, and wheat. Expected prices and yields are taken from the Food and Agricultural Policy Research Institute's (FAPRI) November 2004 preliminary baseline. These expectations are used as the mean values in price and yield distributions. Random draws from the distributions are combined with data and formulas from the farm programs to estimate payments from the two programs. We do not consider changes in direct payments because they are not part of the farmer price safety net and they are "green box" with respect to the WTO. However, it could be that some farm groups might consider reducing direct payments in favor of support for LDPs and CCPs. The analysis provided herein gives insight into how much this support might cost.

A Deterministic Outlook for 2005

FAPRI's preliminary baseline for 2005 has crop yields returning to trend yield levels and prices moving accordingly. Table 1 shows the acreage, yield, and production levels

projected for 2005. Barley, oat, sorghum, and wheat acreage increases from 2004 levels, while corn, cotton, rice, and soybean acreage declines. Given the favorable growing conditions in 2004, yields were fairly strong. Several yield records were broken. Projecting 2005 at trend yields leads to lower production in 2005, with the exception of oats, where the acreage increase balances the yield decline.

Table 2 shows the FAPRI preliminary baseline projections for the season-average price for each of the crops. The projected prices are higher than the projected 2004 prices (we are currently in the middle of the marketing season) for barley, corn, cotton, oats, and sorghum. Rice, soybeans, and wheat show price declines for the coming crop year. Two prices are listed for barley, cotton, and rice. These three crops utilize different prices in the CCP and LDP programs. For barley, the all barley price provides a better signal on LDP levels, while the feed barley price is used in CCP rate calculations. For cotton and rice, LDPs are calculated from adjusted world prices and CCPs are calculated from season-average farm prices.

To compute CCP expenditures for 2005, we hold CCP acreage, yields, and base production at crop year 2003 levels, the last year reported. Given these data, the target prices, direct payment rates, national loan rates, and the prices in Table 2, CCP rates and expenditures for 2005 can be projected. Table 3 shows the CCP base production and projected CCP rates and expenditures. The CCP base production in Table 3 is 85 percent of the product of CCP base yields and CCP base acres. Given projected prices, corn and cotton will receive significant CCP outlays, while barley and oats will receive none.

TABLE 1. Projected 2005 acreage, yield, and production

Crop	Planted Acres	Harvested Acres	Yield	Production
	(million acres)		(bushels per acre)	(million bushels)
Barley	4.6	4.1	61.7	253
Corn	80.5	73.0	146.1	10,666
Oats	4.2	1.9	62.8	118
Sorghum	8.1	6.7	63.4	*422
Soybeans	72.9	71.7	39.4	2,821
Wheat	60.6	51.0	41.8	2,131
			(pounds per acre)	(million pounds)
Cotton	13.2	11.9	704.0	8,357
Rice	3.2	3.2	6,799.0	21,460

TABLE 2. Projected 2005 crop prices

Crop	Price	Secondary Price	Note on Price	Note on Secondary Price
	($ per bushel)			
Barley	2.52	2.04	All Barley Price	Feed Barley Price
Corn	2.21			
Oats	1.51			
Sorghum	2.14			
Soybeans	4.63			
Wheat	3.18			
	($ per pound)			
Cotton	0.436	0.415	Farm Price	Adjusted World Price
	($ per hundredweight)			
Rice	5.96	4.32	Farm Price	Adjusted World Price

TABLE 3. CCP projections for 2005

Crop	CCP Base Production	CCP Rate	CCP Expenditures
	(million bushels)	($ per bushel)	($ million)
Barley	360	0.00	0
Corn	8,446	0.14	1,182
Oats	132	0.00	0
Sorghum	590	0.08	47
Soybeans	1,530	0.36	551
Wheat	2,318	0.22	510
	(million pounds)	($ per pound)	
Cotton	9,998	0.1373	1,373
		($ per hundredweight)	
Rice	19,527	1.65	322

For the LDP expenditures, we calculated the average price gap between the season-average farm price (or adjusted world price for cotton and rice) and the price indicated by average LDP rates historically when average LDP rates are positive. Positive LDP rates indicate prices are below the loan rate at some point during the crop year, and this can occur even when the season-average price is above the loan rate. Given average LDP rates for each year, we can determine a national price representing the average price when LDPs are taken. This is equal to the national loan rate less the average LDP rate. Comparing these prices to the season-average prices for each year, we compute the price

difference between the two and average this difference across all years where average LDP rates are positive. Table 4 shows the calculation of the corn LDP price gap.

We subtract this price gap from the 2005 projected prices to calculate projected prices for LDP utilization. We then subtract these projected prices from the national crop loan rates to determine 2005 projected average LDP rates. Projected LDP expenditures are equal to projected production times the projected average LDP rate. Table 5 shows the LDP price gap and projected LDP rates and outlays by crop. Soybeans and cotton are projected to receive the largest LDP outlays, while corn prices are projected to remain above loan rates.

Another Way to Look at Countercyclical versus Loan Deficiency Payments

The deterministic projections just described provide one measure of how CCPs and LDPs flow to the various crops. But this measure is dependent on the projected price level. Another way to examine the relative value of the programs to each commodity is to compare the payment productions for the programs. The difference in the payment productions is directly related to the difference in payments for a one-cent change in the CCP and LDP rates. Table 6 shows the ratio of CCP base production to 2005 expected production (LDP base production, if you will). With higher levels of expected production, LDPs should be relatively more valuable. Ratios above (below) 100 percent indicate a one-cent change in CCP rates is more (less) valuable than a one-cent change in LDP rates. By this

TABLE 4. Corn LDP price gap calculation

Year	Season-average Price	National Loan Rate	Average LDP Rate	LDP Price Gap
		($ per bushel)		
1998	1.94	1.89	0.14	0.19
1999	1.82	1.89	0.26	0.19
2000	1.85	1.89	0.26	0.22
2001	1.97	1.89	0.12	0.20
2002	2.32	1.98	0.00	
2003	2.42	1.98	0.01	0.45
2004	1.91	1.95	0.24	0.20
Average				0.24

TABLE 5. LDP price gaps and LDP projections for 2005

Crop	LDP Price Gap	LDP Rate	LDP Expenditures
	($ per bushel)		($ million)
Barley	0.72	0.05	13
Corn	0.24	0.00	0
Oats	0.21	0.03	4
Sorghum	0.24	0.05	21
Soybeans	0.27	0.64	1,805
Wheat	0.47	0.04	85
	($ per pound)		
Cotton	0.0140	0.1190	994
	($ per hundredweight)		
Rice	0.24	2.42	519

TABLE 6. Ratio of CCP production to 2005 expected production

Crop	CCP/2005 Expected
Barley	1.42
Corn	0.79
Cotton	1.20
Oats	1.12
Rice	0.91
Sorghum	1.40
Soybeans	0.54
Wheat	1.09

measure, CCPs provide relatively more support for barley, cotton, oats, sorghum, and wheat than do LDPs, while LDPs are relatively more important to corn, rice, and soybeans.

From the Table 6 results, we can see that if producers could exchange one cent of CCP rate for one cent of LDP rate or vice versa, then barley, cotton, oat, sorghum, and wheat producers would give up a penny on LDPs to get a penny on CCPs, while corn, rice, and soybean producers would do the opposite.

Simulating the 2005 Crop Year

In reality, a one-cent change in LDP rates is not necessarily linked to a one-cent change in CCP rates because of the use of different prices and different triggers for payment. To further explore the relationship between CCPs and LDPs, we conduct a Monte Carlo simulation of the 2005 crop year. The random variables for the simulation

are 2005 crop yields and prices. Harvested acreage, target prices, direct payment rates, loan rates, CCP base production, and LDP price gaps are taken as given. Of course we do not know what the 2005 yields and prices will be, so we have to look at all possible likely values and assign each of the values a probability of occurrence. We do this by assuming that crop prices follow lognormal distributions with means at projected baseline levels and volatilities of 15 percent. National crop yields are assumed to follow normal distributions with means at projected levels (trend yields) and volatilities of 7.5 percent. Equally spaced probability draws, from 0.1 percent to 99.9 percent in 0.1 percent increments, are taken from each distribution. Taking draws in this way ensures that the entire distribution is adequately represented. The draws (999 for each variable) are then sorted to achieve correlation among the prices and yields at historical levels using the Iman-Conover procedure. (See their article in *Communication Statistics: Simulation and Computation,* volume 11, 1982, pages 311-334, for more details.) Production, CCP and LDP rates, and CCP and LDP expenditures are then calculated from the simulations.

Table 7 provides the average LDP and CCP rates and expenditures from the simulation. These results differ from the deterministic results in Tables 3 and 5, even though the deterministic prices and yields are the mean values for the simulations. For example, the deterministic results indicate no barley CCPs for 2005, as the projected feed barley price ($2.04/bushel) is above the effective target price for barley. (The effective target price, $2.00/bushel, is equal to the target price less the direct payment rate, $2.24/bushel - $0.24/bushel.) However, there is nearly a 50 percent probability that the feed barley price will fall below the effective target price and trigger CCPs. This probability is reflected in the average CCP for barley from the simulations.

Trading Loan Deficiency Payments for Countercyclical Payments or Vice Versa

The common link between LDPs and CCPs is the national loan rate for each crop. If the federal government wanted to shift to a more WTO-friendly stance while still providing price protection, it would lower commodity loan rates and allow the CCP rate to expand and fill the potential price gap. As CCPs are paid on a fixed base acreage and yield, they

TABLE 7. Simulated average LDP and CCP projections for 2005

Crop	LDP Rate	CCP Rate	LDP Expenditures	CCP Expenditures
	($ per bushel)		($ million)	
Barley	0.16	0.06	42	20
Corn	0.12	0.18	1,355	1,539
Oats	0.11	0.02	13	3
Sorghum	0.15	0.12	69	73
Soybeans	0.72	0.29	2,079	437
Wheat	0.21	0.29	467	664
	($ per pound)			
Cotton	0.1216	0.1333	1,013	1,333
	($ per hundredweight)			
Rice	2.42	1.50	529	292

are considered less trade distorting than are LDPs, which are paid on current production. In forming their opinions about the next farm bill, commodity groups may want to examine the trade-off between CCPs and LDPs. To explore the effects of loan rate changes on both LDPs and CCPs, we varied the national loan rates for each commodity from 0 to 120 percent of the current loan rates. All other variables (target prices, direct payment rates, etc.) are held fixed. We then utilized the 999 simulations of the 2005 crop yields and prices to estimate LDP and CCP expenditures under the various loan rates.

When the market price is well above the loan rate, a one-cent change in loan rates has no impact on either the LDP or CCP rates and associated expenditures. When the market price is below the loan rates, a one-cent change in loan rates translates into a direct one-cent impact on the CCP and LDP rates. For prices just above the loan rates, a one-cent movement in loan rates will likely impact LDP rates without affecting CCP rates. This is because LDP rates are based on daily prices. With a season-average price close to the loan rate level, it is likely that prices would all below the loan rate for some part of the marketing year and producers could utilize the LDP program. Thus, a loan rate change is more likely to affect LDP rates than to affect CCP rates. The size of this impact can be seen in the following analysis.

Figure 1 shows aggregate LDP and CCP expenditures for the eight crops as the loan rates are varied from 60 percent below to 20 percent above today's levels. A key assumption that we make throughout the remainder of this analysis is that acreage is held fixed at the 2005 projected baseline levels.[1] Overall, expenditures decline as loan rates are

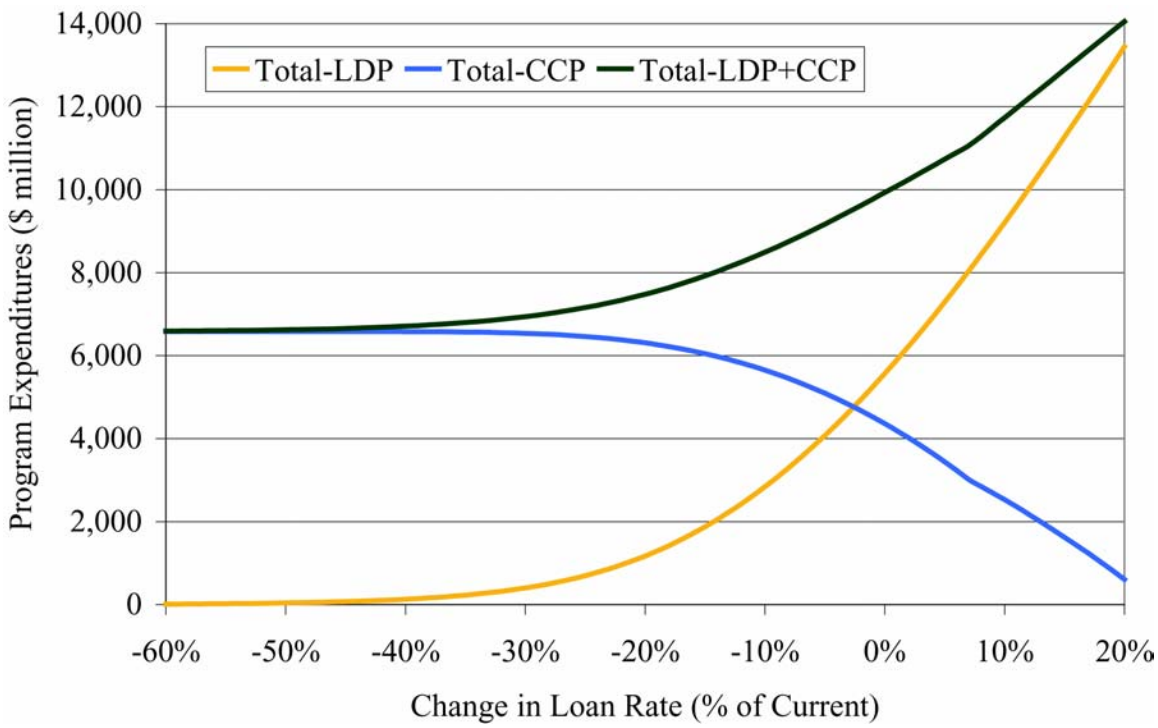

FIGURE 1. LDP and CCP expected outlays for the eight major crops

reduced to a point at which further reductions have no effect. At current loan rates, LDP and CCP expenditures are projected to be nearly $10 billion. If loan rates were increased to 120 percent of current levels, the expenditures would increase to $14 billion. Lowering loan rates by 6 percent would decrease expected total outlays by approximately $1 billion. Reducing loan rates by 20 percent would lower LDP and CCP expenditures to $7.5 billion. Reducing loan rates to 60 percent (or below) of current levels would drop outlays to $6.7 billion.

Figures 2-9 show the LDP and CCP expenditures by crop. For seven of the eight crops, combined expenditures for LDPs and CCPs decline as loan rates decrease. The exception is cotton. Combined expenditures for cotton are quite insensitive to changes in loan rates. There are two reasons for this insensitivity. First, the projected cotton price is far below the loan rate. Thus, a drop in the loan rate does not result in a large decrease in the probability that LDPs will be received. Second, the CCP base production is larger than expected production. Thus, CCPs increase at about the same rate that LDPs decrease. The pattern is not just an artifact of cotton program settings, as barley, oats, sorghum, and wheat would exhibit similar patterns if their prices were as far below their

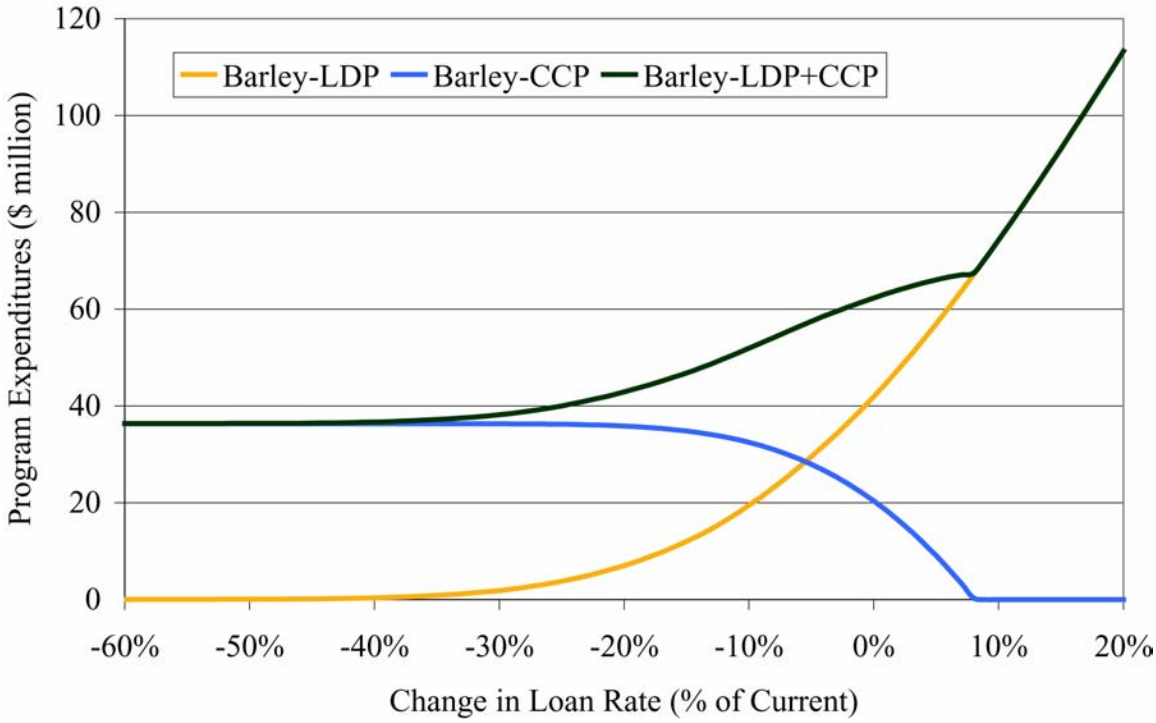

FIGURE 2. LDP and CCP expected expenditures for barley

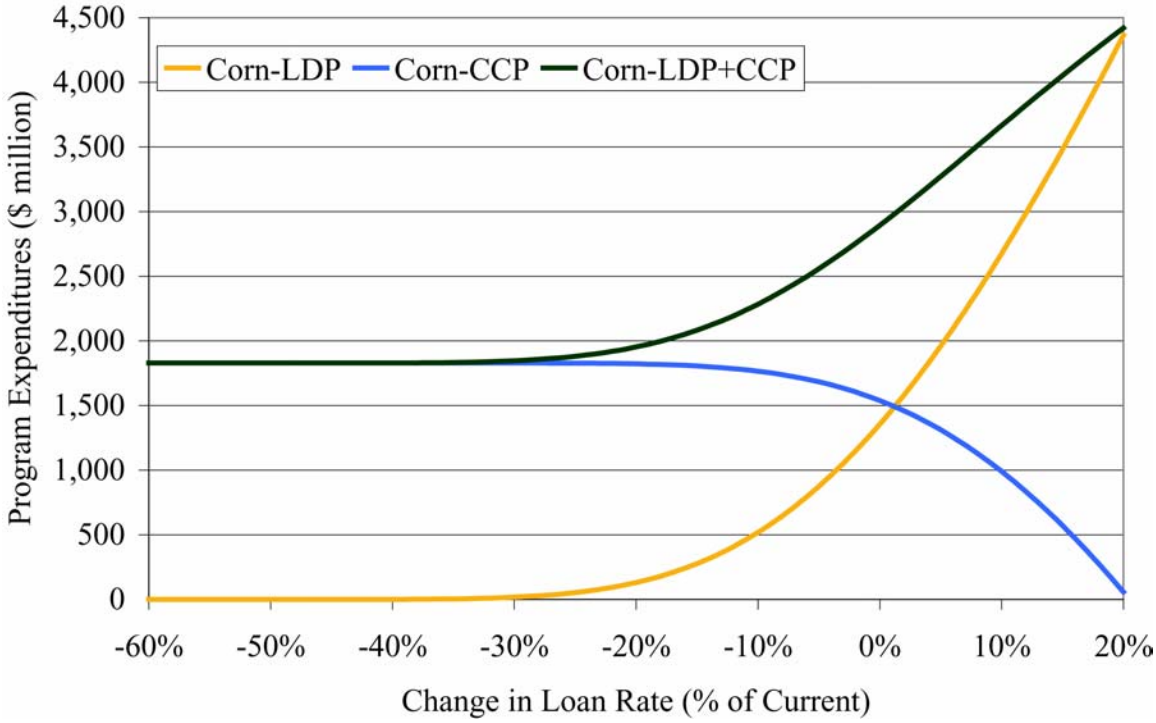

FIGURE 3. LDP and CCP expected expenditures for corn

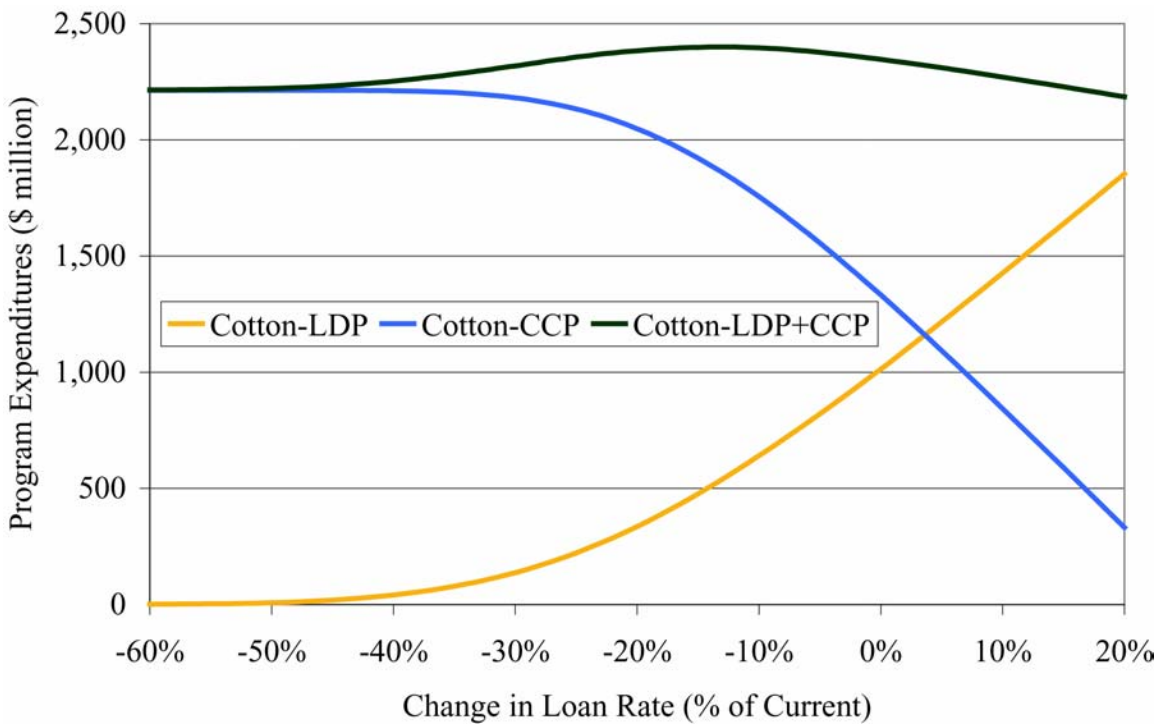

FIGURE 4. LDP and CCP expected expenditures for cotton

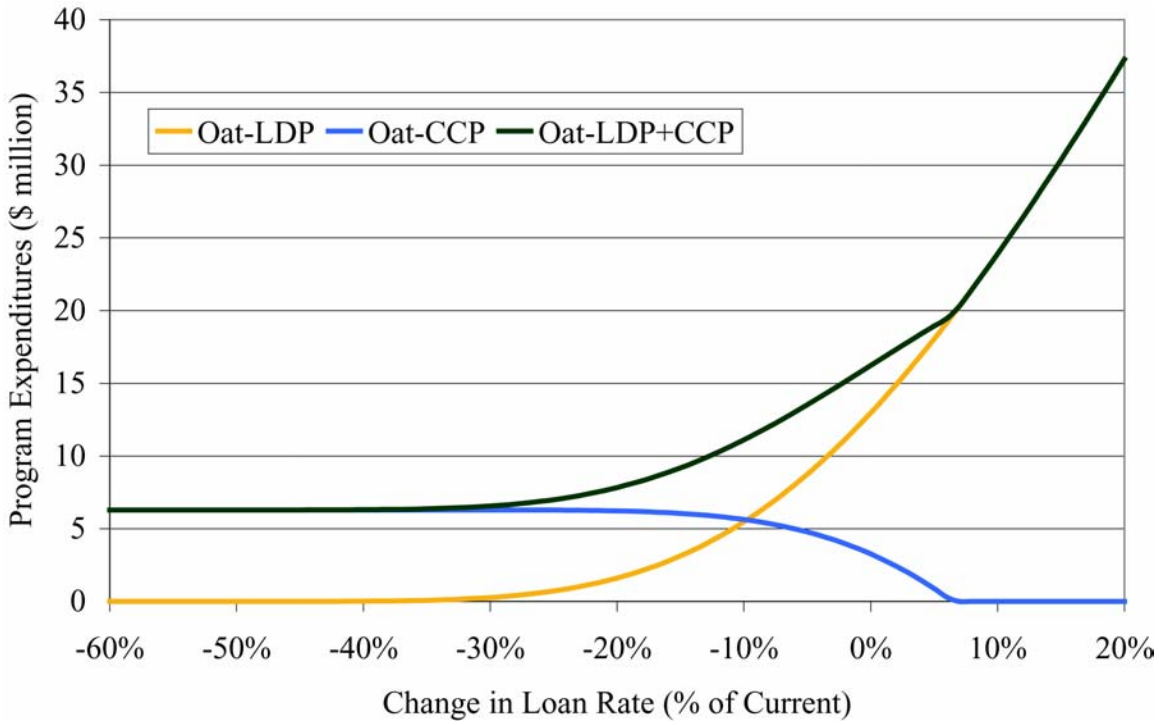

FIGURE 5. LDP and CCP expected expenditures for oats

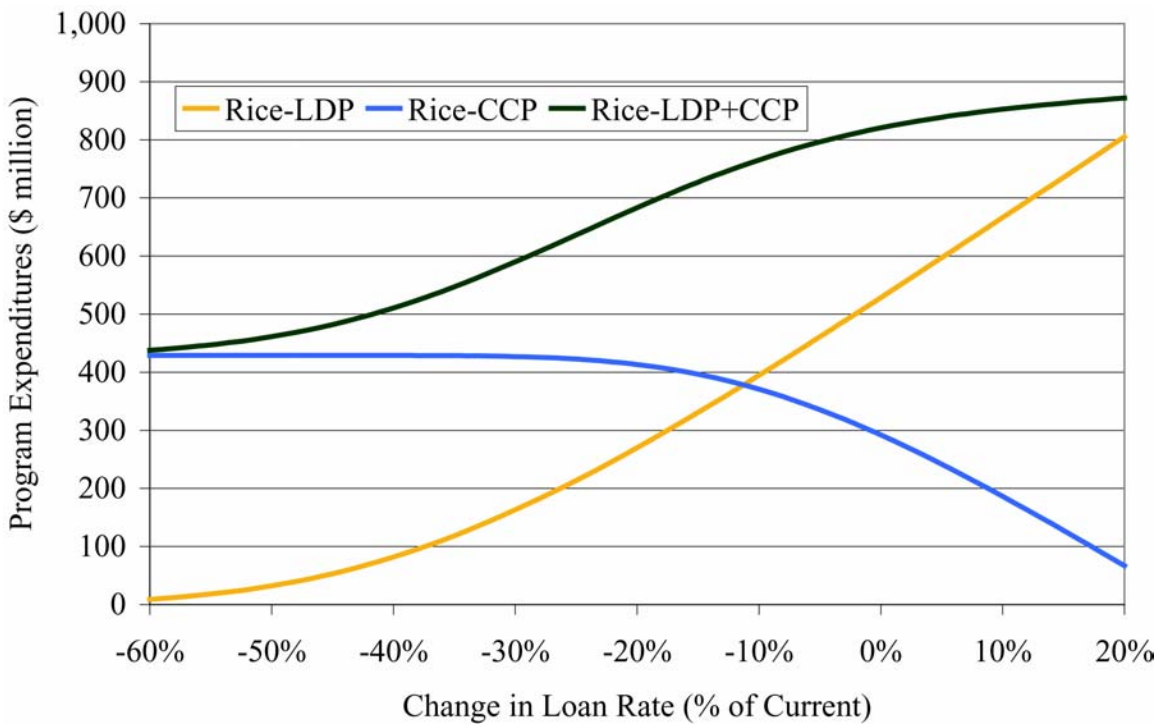

FIGURE 6. LDP and CCP expected expenditures for rice

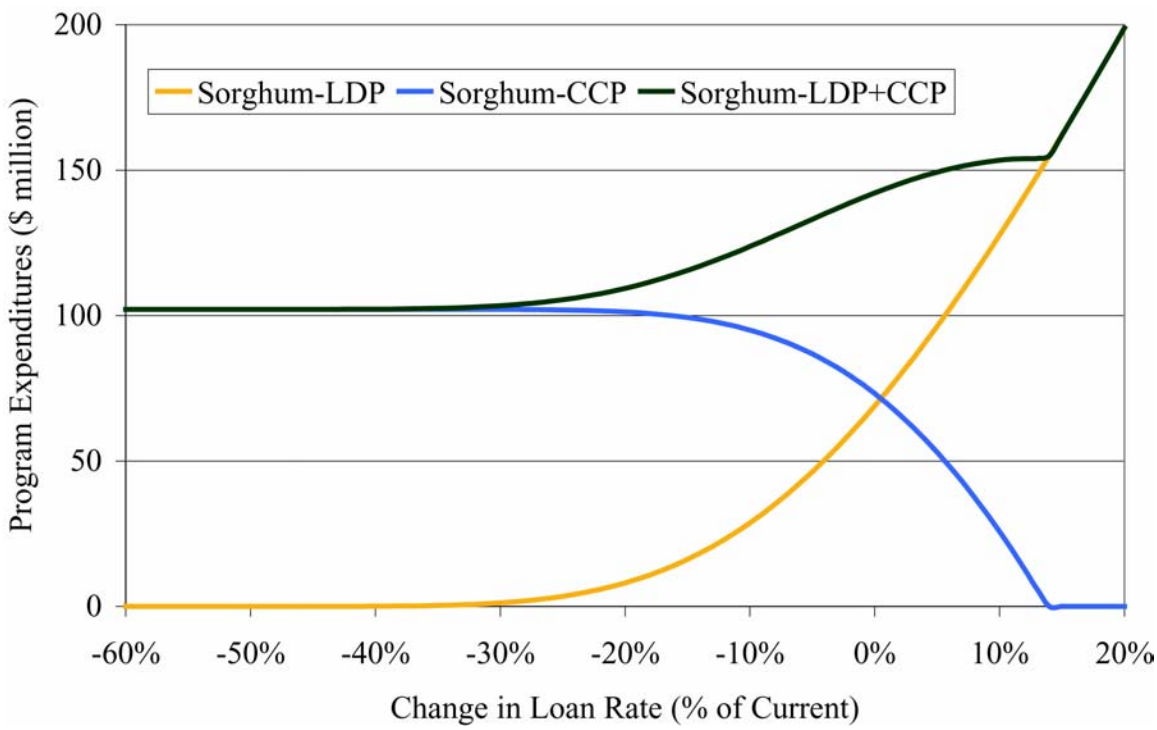

FIGURE 7. LDP and CCP expected expenditures for sorghum

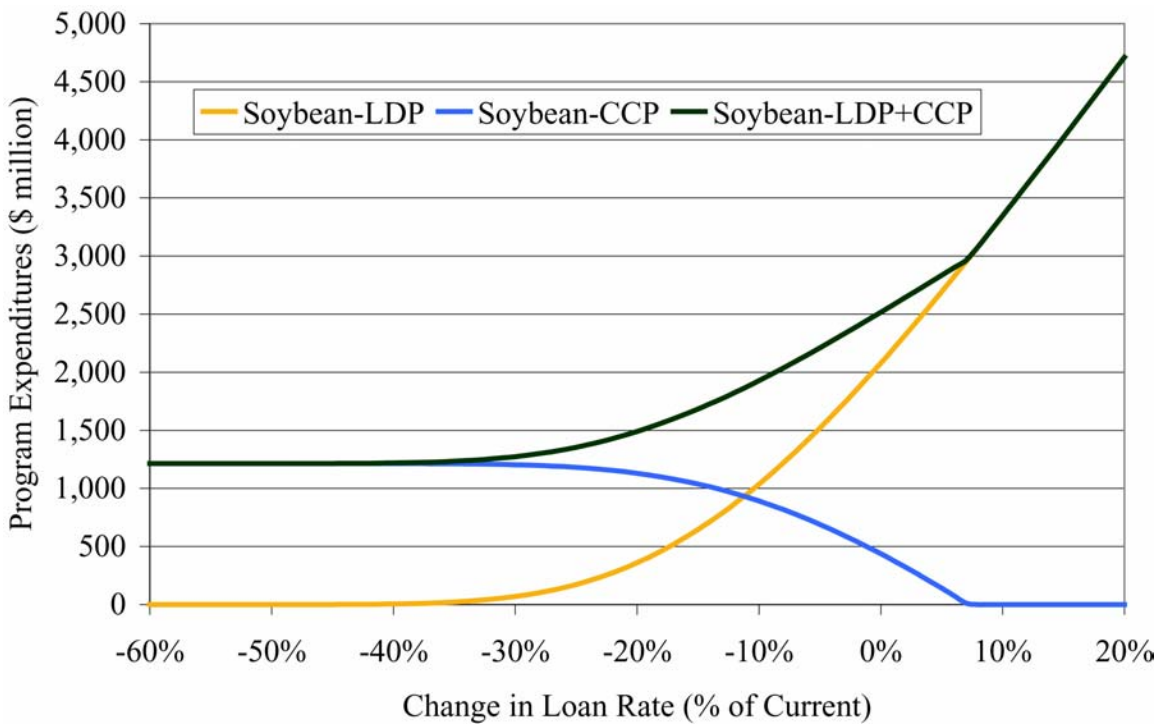

FIGURE 8. LDP and CCP expected expenditures for soybeans

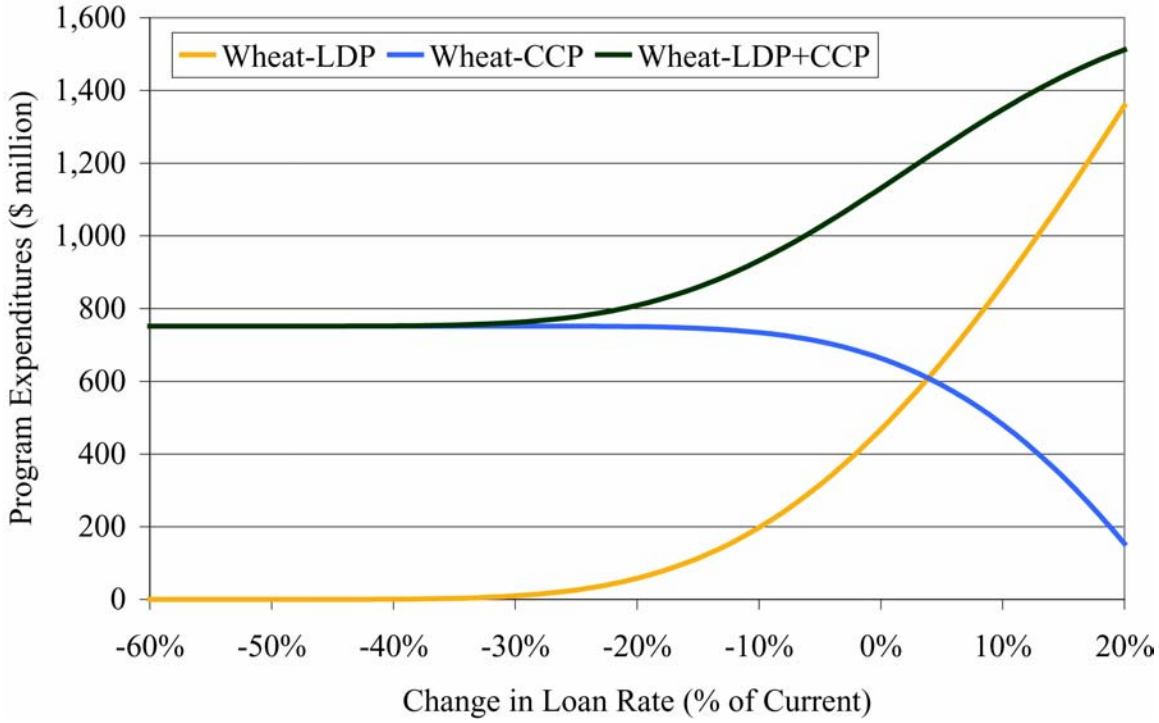

FIGURE 9. LDP and CCP expected expenditures for wheat

loan rates as cotton. These crops all have CCP base production that exceeds 2005 expected production.

For barley, oats, sorghum, and soybeans, higher loan rates would effectively shut off CCPs, as the loan rates would exceed effective target prices. For oats, this happens at 107 percent of the current loan rate; for barley, sorghum, and soybeans, this happens at 109, 114, and 108 percent, respectively. For the other crops, CCPs still exist with higher loan rates, but the expenditures would be greatly reduced.

To provide some additional perspective on farm program costs, in Table 8 we show projected payments for the direct payment (DP) program, along with the LDP and CCP programs. Because CCPs and DPs share base acreage but differ in base yields, their marginal value is fairly similar. Their total values differ because of payment rates. Besides the loan rate, Congress could adjust target prices or DP rates to create a desired balance of support between income support via DPs and price support via LDPs and CCPs. Target price adjustments would only affect CCPs, while DP rate adjustments would affect both DPs and CCPs. As Table 8 shows, barley and sorghum heavily rely on DPs, while cotton, oats, and soybeans derive most of their farm program support from the price support programs.

To see the relative impact of the loan rate changes across crops, we have graphed in Figure 10 the percent changes in combined expenditures. The base for the percent changes is the 2005 projected expenditures, given current loan rates. The percent change for expenditures across the eight crops is also shown.

TABLE 8. LDP, CCP, and DP projections for 2005

Crop	LDP	CCP	DP
		($ million)	
Barley	42	20	85
Corn	1,355	1,539	2,117
Cotton	1,013	1,333	631
Oats	13	3	3
Rice	529	292	431
Sorghum	69	73	201
Soybeans	2,079	437	608
Wheat	467	664	1,152

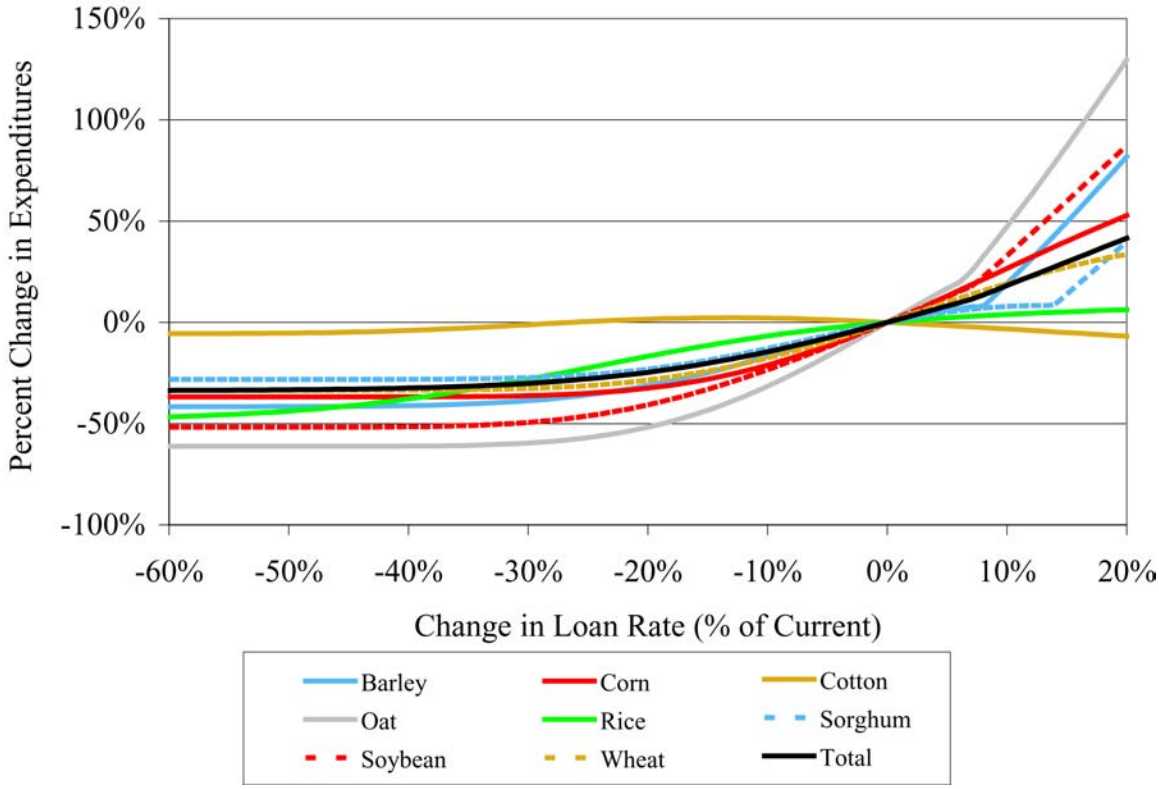

FIGURE 10. Percent changes in price support program expenditures

The effects of loan rate reductions vary dramatically across crops. Cotton would actually receive more payments with a 10 percent reduction in loan rates because of its large CCP base production and because projected cotton prices are well below the current loan rate. Rice payments fall but by only a small amount with a 10 percent reduction because the projected rice price is below the loan rate. Rice CCP base production is less than expected production so total rice expenditures do fall. With larger loan rate reductions, rice expenditures are reduced similarly to the other program crops. Oats and soybeans would experience the greatest percentage loss of support with loan rate declines. Soybean outlays fall dramatically with a decline in loan rates even though the projected soybean price is well below the loan rate because soybean CCP base production is only 54 percent of expected production. Thus, CCPs only increase by half of the drop in LDPs.

When Would Cost Savings Occur?

In the previous section, we examined the effects of loan rate changes on CCP and LDP expenditures. The results showed that for all crops except cotton, a reduction in the

commodity loan rate would reduce the total support coming from price support programs. But would this reduction severely limit the effectiveness of price support programs? To explore this, we calculate market revenues, LDP and CCP expenditures under the current structure, and CCP expenditures when the loan rate is set to zero for each of the simulations. We then compare revenue under three scenarios relative to a target amount. For the target revenue, we choose the product of 2005 production at trend yields and the effective target price from the current CCP program. This target represents a revenue floor that Congress has chosen to defend via the price support programs. The three revenue scenarios are revenues derived strictly from the market, revenues from the market and the current price support programs, and revenues from the market and a modified CCP program in which the loan rate is set to zero.

Figures 11 and 12 show the revenues that would flow to corn and cotton producers, respectively, under the three scenarios for given production levels. In the figures, "Market+CCP+LDP" refers to the current price support program structure and "Market+AdjCCP" refers to the modified CCP program in which the loan rate is set to zero. As can be seen from Figures 11 and 12, either of the government program scenarios maintains or raises revenues above the targeted level for a wide range of production levels. In fact, for cotton, revenues would fall well short of the targeted level only with no government programs.

Figures 11 and 12 also show where the payment reductions would occur for the two crops. For corn, the simulation analysis indicates that corn price support payments would fall by 37 percent if the loan rate was reduced to zero. Figure 11 shows that this reduction would occur when production exceeded 9.5 billion bushels, and the largest impacts would occur at the highest production levels. For the vast majority of these cases, the reductions occur when revenues would exceed the targeted level under the current set of current programs. Thus, in terms of meeting the goal of stabilizing corn revenues at the targeted level, a modified CCP program would do a better job for a lower cost. Figure 11 also shows that the current combination of CCPs and LDPs tends to overshoot the target and overcompensates producers when production is high. This overcompensation can be significant. For example, if corn production in 2005 is 12 billion bushels, the average revenue from the

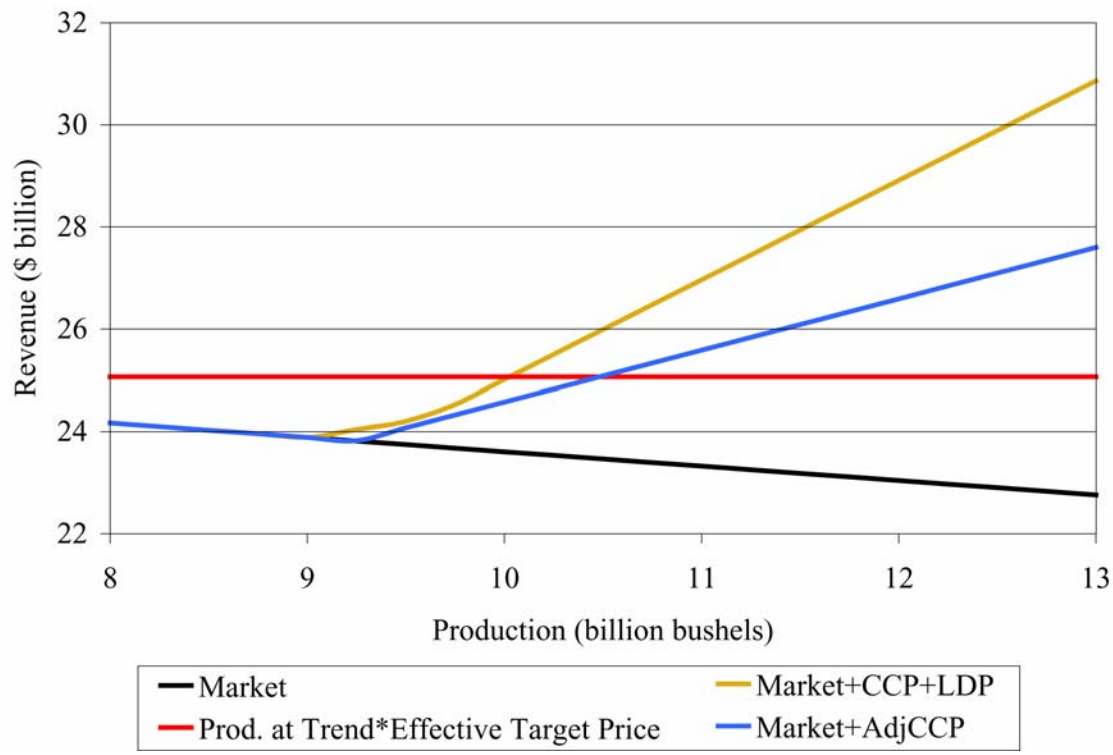

FIGURE 11. Corn revenues under various production and program scenarios

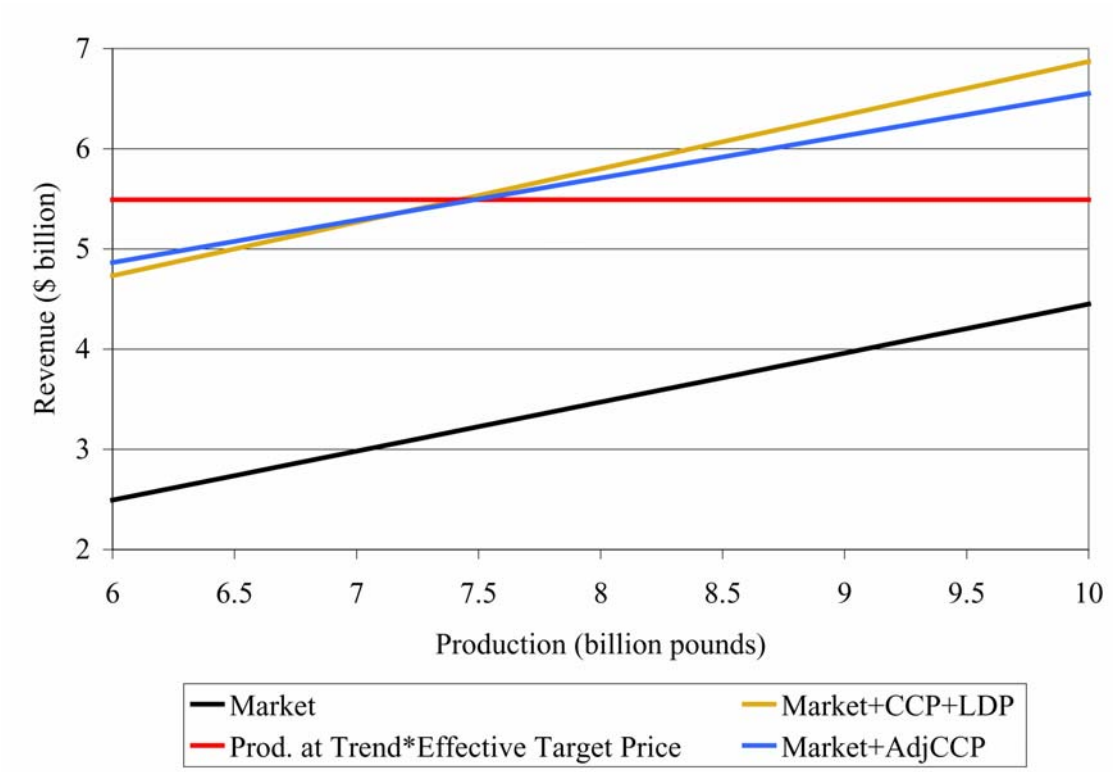

FIGURE 12. Cotton revenues under various production and program scenarios

market and current price support programs would be $29 billion; roughly $6 billion of this would come from CCPs and LDPs. So the price support programs would overshoot the targeted revenue level by $4 billion. For the modified CCP program, the overshoot would still occur, but the amount would be smaller, at roughly $2 billion.

For cotton, the simulation analysis indicated that cotton price support payments would fall by 6 percent if the loan rate was reduced to zero. Figure 12 shows that this reduction would occur when production exceeded 7.5 billion bushels, and the largest impacts would occur at the highest production levels. But again, a modified CCP program would do a better job of maintaining revenues at the targeted level for a lower cost. For cotton, all the savings occur when revenues are above the target level. Given these results for corn and cotton, one could argue that the price safety net would not be diminished by a switch from the current programs to a modified CCP program, even as the cost to maintain the safety net declines.

Concluding Remarks

The federal government currently runs two major price support programs in agriculture, the marketing loan and CCP programs. While these programs are both targeted at providing producers price protection, they have different political and financial costs associated with them. In this paper, we outline those costs and project what various loan rate changes would mean to these programs for 2005. Loan rate changes affect the price support programs by changing the payment rate producers receive in the programs when payments are triggered. We find that the impacts differ by crop for several reasons. The crop's relative price strength versus its loan rate and the relationship between CCP base production and 2005 expected production have the largest influence on how loan rate changes affect outlays for the various crops. Cotton is the only crop that would be relatively unaffected by loan rate shifts. Corn and soybeans would see the largest declines in overall expenditures from price support programs if loan rates were decreased. Oats and soybeans would experience the largest percentage losses.

However, the results also show that the federal government could maintain an agricultural price support structure through greater reliance on CCPs and less on LDPs at a lower cost than it is currently paying. The reduction in cost often comes in situations in

which the current array of price support programs is overcompensating producers for price shortfalls. This shift would also likely find greater acceptance under the WTO agriculture guidelines than does the current structure. For an administration that is looking to rein in deficit spending while at the same time negotiating new WTO guidelines, moving to lower loan rates could be an answer.

Endnote

1. Acreage effects from loan rate changes depend on a number of key factors, including the magnitude of the loan rate change and whether all loan rates are changed at the same time and the same magnitude, or whether a single loan rate is changed. The objective of this briefing paper is to explore the trade-offs that would occur between LDPs and CCPs, not to analyze a specific policy proposal. Hence, accounting for acreage effects is beyond the scope of this paper.