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Measuring Equity in Farm Support Levels

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Summary

Federal farm law mandates support for, among others, 18 "covered commodities." Support for these agricultural commodities, as specified in the 2002 farm bill (P.L. 107-171) includes direct payments, counter-cyclical payments, and marketing loans. Large disparities in the relative levels of benefit among these commodities have led to questions of equity.

This report compares support rates per unit, total payments, payments per harvested acre, payments as a share of the value of production, and payments as a share of the total cost of production. In addition, price and income support levels are compared to market prices. By all of these measures there has been little equity across commodities. However, farmers often have argued for equity based on cost of production. Economists, on the other hand, would use trend market prices as the basis for setting support prices in order to avoid market distortions and resource misallocations.

There is little or no practical or theoretical justification for equalizing support rates, total payments, or payments per harvested acre. In fact, some critics say the subsidies themselves are not justified. However, to the extent that farm support is a political reality, equity is a consideration. There are times when market prices drop substantially, but temporarily, below trend levels. At these times support may be justified to prevent unnecessary and undesirable resource adjustments. This builds on the concept of a market-based "safety net" that uses market price trends as the key factor in setting support levels.

During the past ten years (1997-2006), monthly average market prices for the major "covered commodities" have been below loan rates 36% of the time, and below effective target prices 59% of the time. However, this frequency has varied substantially across crops. This report calculates adjustments to policy parameters that would put each of the commodities "in the money" an arbitrary 30% of the time with regard to marketing loans and an arbitrary 50% of the time with regard to adjusted target prices.

Compared to market price trends from 1997 through 2006, upland cotton, rice, and sorghum have disproportionately high effective target prices and marketing loan rates relative to the other major covered commodities. Barley, oats, and peanuts have disproportionately lower adjusted target prices and marketing loan rates. The situation is mixed for corn and wheat. Soybean target prices and loan rates are closest to neutral according to the thresholds used in this comparison.

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Farm commodity and income support is mandated for 18 so-called "covered commodities" through direct payments, counter-cyclical payments, and marketing loans.[1] The levels of support under each support system are specified in the law. Questions have been raised as to whether these commodities have been treated equitably. With the benefit of hindsight it is possible to compare support prices and actual payments against several standards to address questions of equity. Across these commodities, this report compares (1) support levels in the law, (2) yearly average program payments, (3) program payments per acre, (4) payments as a share of crop market values, (5) payments as a share of production costs, and (6) support levels with market price trends.

Support Prices

The prescribed levels of commodity support in current law are shown in **Table 1**. They are not equal either as specified in the law (on a volume basis for some and weight basis for others) or when converted to a common one-hundred pound standard. However, equality in absolute price would not be a reasonable standard for equity because the commodities have widely different end uses and market values. For example, there is little reason to expect wheat used to make bread to be supported at the same price as cotton for fabric.

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[1] Sec. 1001(4) of P.L. 107-171 (the 2002 farm bill) defines covered commodities to include wheat, corn, grain sorghum, barley, oats, upland cotton, rice, soybeans, and other oilseeds." Other oilseeds include sunflower seed, rapeseed, canola, safflower, flaxseed, mustard seed, crambe, and sesame seed. Peanuts are not designated as a covered commodity, but are treated like a covered commodity in terms of the support framework and are included in this analysis as a covered commodity. In addition to the 18 "covered commodities," different support systems are mandated for an additional 8 commodities (sugar, milk, dry peas, lentils, chickpeas, wool, mohair, and honey). These commodities are not included in this analysis. The authors recognize also that vegetables, fruits, nuts, and ornamental plants (roughly 50% of the value of U.S. crop production) do not receive direct subsidies. Whether the lack of support for 50% of crop production is equitable is beyond the scope of this analysis. A complete explantation of support program operations is available in CRS Report RL33271, *Farm Commodity Programs: Direct Payments, Counter-Cyclical Payments, and Marketing Loans*.

Table 1. Covered Commodity Support Levels in the 2002 Farm Bill

Commodity & Unit of Support	Direct Payment Rate		Counter-cyclical Target Price		Marketing Loan Price	
	$/unit	$/cwt	$/unit	$/cwt	$/unit	$/cwt
Wheat, bu	0.52	0.87	3.92	6.53	2.75	4.58
Corn, bu	0.28	0.50	2.63	4.70	1.95	3.48
Sorghum, bu	0.35	0.63	2.57	4.59	1.95	3.48
Barley, bu	0.24	0.50	2.24	4.67	1.85	3.85
Oats, bu	0.024	0.08	1.44	4.50	1.33	4.16
Cotton, lb	0.0667	6.67	0.724	72.40	0.52	52.00
Rice, cwt	2.35	2.35	10.50	10.50	6.50	6.50
Soybeans, bu	0.44	0.73	5.80	9.67	5.00	8.33
Other Oilseeds, lb	0.008	0.80	0.101	10.10	0.093	9.30
Peanuts, ton	36.00	1.80	495.00	24.75	355.00	17.75

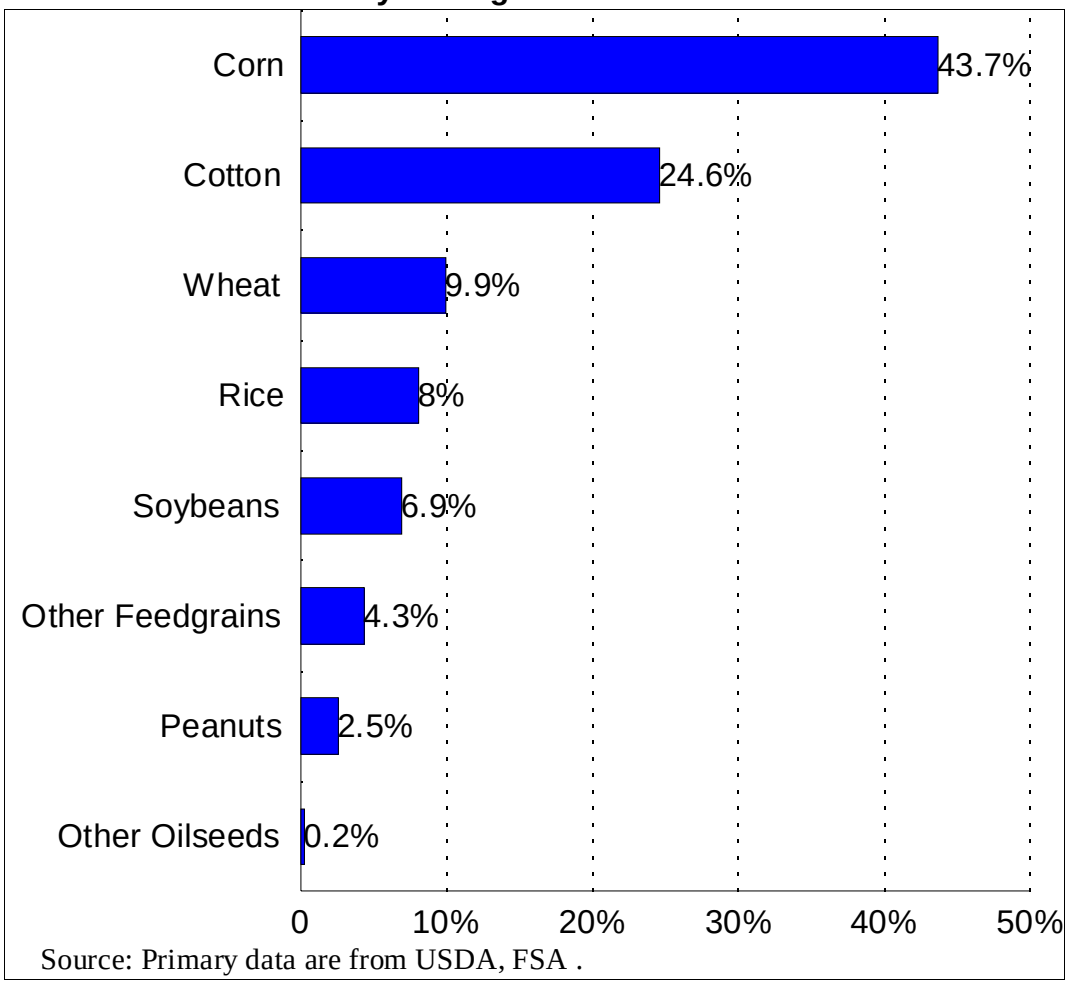
Note: Cotton includes only upland cotton. Minor oilseeds include sunflower seed, rapeseed, canola, safflower, flaxseed, mustard seed, crambe, and sesame seed. Peanuts are not designated a covered commodity, but are treated like a covered commodity in terms of the support framework. Support levels are specified in the law by differing unit measures that have been converted to a uniform hundredweight (cwt) to facilitate comparison.

Source: CRS, compiled from the Farm Security and Rural Investment Act of 2002 (P.L. 107-171), Title I, Sections 1103, 1104, 1202, 1303, 1304, 1307.

Program Payments By Commodity

For the FY2003-FY2006 time period, yearly program support payments to farmers averaged $10.874 billion. The largest share went to corn (43.7%), while the category other oilseeds received 0.2% of the total (**Figure 1**). Again, few would argue that equity would be achieved by dividing the total payments equally among commodities. The allocation of payments among commodities largely is based on historical or current output, which means harvested acreage is a major factor. In 2002 through 2005, farmers annually harvested about 4.3 million acres of other oilseeds, while the corn harvest averaged 72.2 million acres.

Figure 1. Commodity Payment Shares, Yearly Average FY2003-FY2006

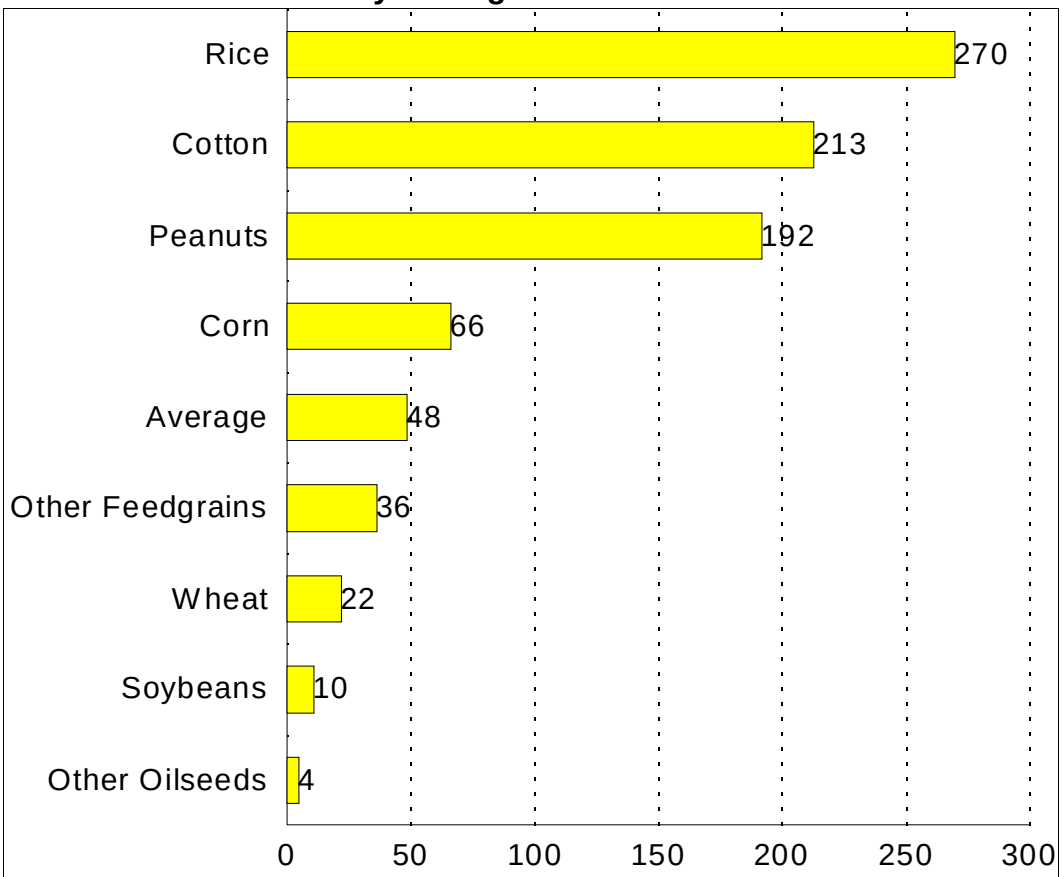


Source: Primary data are from USDA, FSA .

Program Payments Per Acre

With land being a common base for crop production, one might ask how support payments compare on a per acre basis. **Figure 2** shows actual yearly average commodity support spending for the FY2003-FY2006 time frame per harvested acre. Yearly support spending averaged $10.874 billion. If this had been distributed equally over all acreage, the payments would have been about $48 per acre. Payments actually ranged from a high of about $270 per acre for rice to a low of about $4 per acre for the other oilseeds. Overlooked by this comparison is the fact that an acre of rice had a market value of about $463 compared to corn at $318 or wheat at $142. Therefore, few farmers, economists, or policy makers contend that equal payments per acre would be an equitable distribution of support benefits.

Figure 2. Commodity Payments Per Harvested Acre, Yearly Average FY2003-FY2006

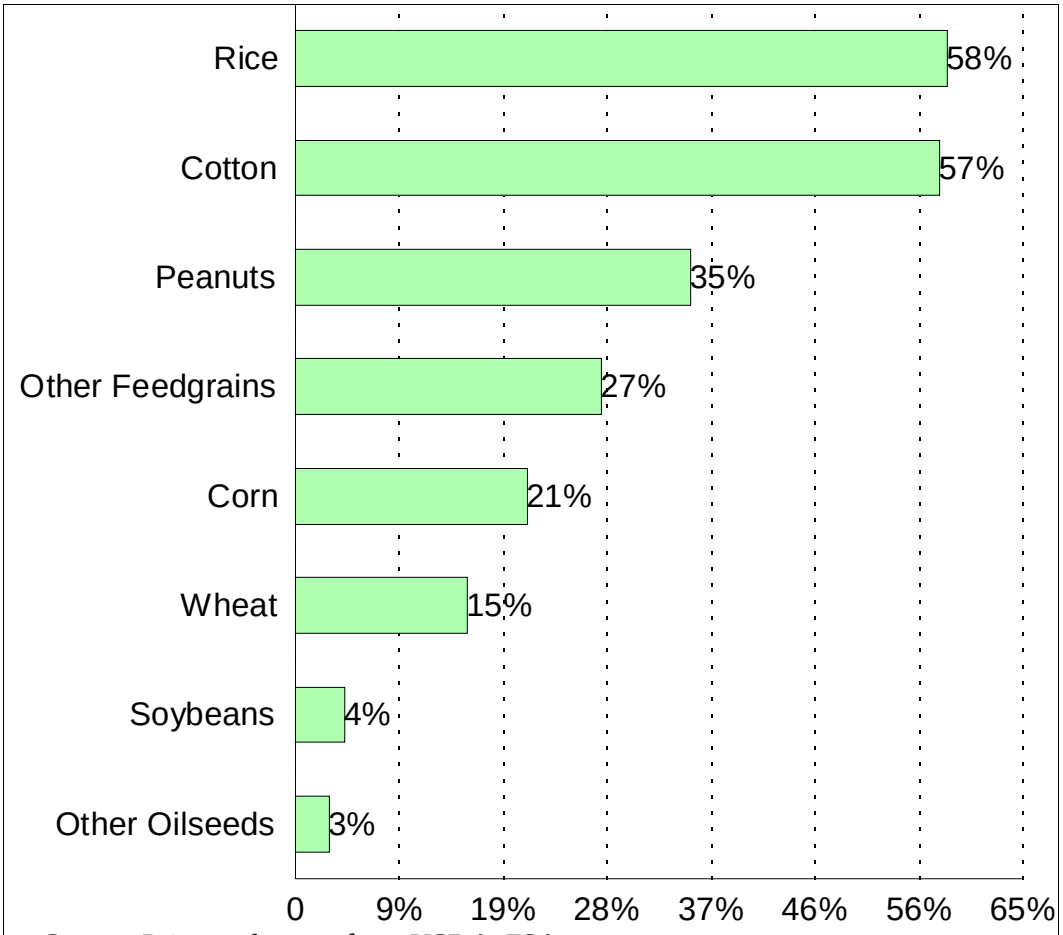


Source: Primary data are from USDA, FSA and NASS. Harvest period is crop years 2002-05.

Program Payments as a Share of Crop Market Values

Some might expect that support payments for each crop measured as a share of each crop's market value would be similar over time if the support rates were set equitably. This outcome would be expected if the forces that cause variation in market prices equally impact all of the commodities. Examination of **Figure 3** shows that at one extreme support payments for rice amounted to 58% of the value of production for the FY2003-FY2006 period. In contrast, payments for other oilseeds amounted to 3% of the crop value.

Figure 3. Commodity Payments as Share of Crop Market Values, FY2003-FY2006



Source: Primary data are from USDA, FSA .

Program Expenditures Compared to Cost of Production

Farmers have long endorsed the concept of basing support on the cost of production because costs have to be covered to stay in business. In fact, the permanent legislative authority for commodity support programs, the Agricultural Adjustment Act of 1938 (P.L. 75-430), used prices paid for production inputs as a key determinant of support prices. As recently as the 1977 farm bill, costs of production were built into the formula for annually adjusting target prices. No longer is cost of production explicitly included as a determinant of support. Economists argue against basing support on production costs, first because they contend it is economically indefensible and second because there is no single cost of production (production costs are different for every farmer). The indefensibility argument arises because the specialized nature of some farm inputs (particularly land, buildings, machinery) makes their cost dependent on the value of the farm output. This means that when earnings are above market levels because of a subsidy, the gains will be capitalized into the prices of the specialized inputs, thereby raising the subsequent cost of production and leading to calls for additional subsidies.[2] Then there is the problem of choosing which cost categories and levels should be covered — only variable costs and only at a level of the low cost highly efficient farmers, national average variable costs, or total costs for all farmers.

In spite of the theoretical opposition of economists, farmers make a politically appealing argument to policy makers when they plead for support to cover their costs of production. How do current levels of support compare to production costs across commodities. **Figure 4** shows effective target prices (the target price minus the direct payment)[3] as a share of national average (2002-2005) per unit costs of production. At the high end, the effective target price for peanuts amounts to 101% of the total cost of production. At the low end, the effective target price for sorghum amounts to 47% of the total cost of production. Economists Groenewegen and Clayton argued in a professional journal that the "rationale for price support prices should be to allow immediate, or cash, expenditures to be met. .... Price supports should not provide owners of fixed agricultural resources the opportunity costs of those resources."[4] Following this line of economic reasoning, total costs of production may not be a sound basis for designing support, but they do facilitate a comparison that shows a wide disparity of support between effective target prices for some commodities.

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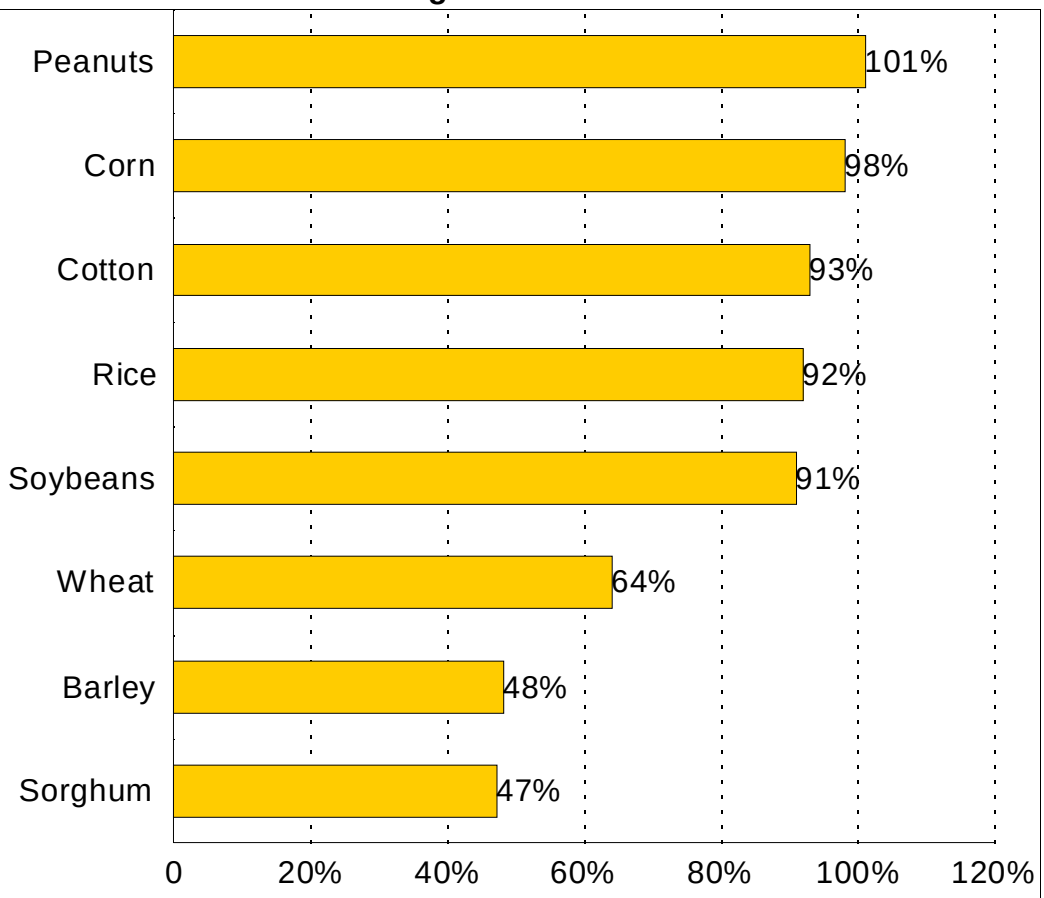
[2] This argument was explained by E.C. Pasour, "Cost of Production: A Defensible Basis for Agricultural Price Supports?" *American Journal of Agricultural Economics*, May 1980, pp. 244-248.

[3] The maximum counter-cyclical payment made to farmers when market prices are below target prices is the difference between the higher target price and the lower sum of the loan rate and direct payment rate. Therefore, the target price less the direct payment rate yields what is called the effective target price.

[4] John R. Groenewegen and Kenneth C. Clayton, "Agricultural Price Supports and Cost of Production", *American Journal of Agricultural Economics*, May 1982, p.271.

Figure 4. Effective Target Price as Share of 2002-2005 Average Total Cost of Production



Source: Primary data are from USDA, ERS and P.L. 107-171. Effective target price is target price less the direct payment.

Support Levels Compared to Market Prices

The argument that Groenewegen and Clayton made in 1982 seems equally valid today that "... the level of price support should be established below trend market prices."[5] One can think of the trend market price as reflecting the long-run equilibrium market price. The logic of providing a "safety net" may be used to set support prices at some level below the long-run equilibrium price. Currently, the law specifies fixed support levels without consideration for market price trends (and questionable economic equity by the previous analysis in this report). Paraphrasing from Groenewegen and Clayton, trend market prices as a reference point should not cause the support program to attract additional resources into the sector but will provide a cash flow to farmers when market prices deviate substantially and temporarily below trend levels. Possibly in recognition of this logic, the USDA's farm bill proposal to the Congress in January 2007 suggested that marketing assistance loan rates be set "at 85% of the five-year Olympic average with maximum loan rates as established in the House-passed version of the 2002 farm bill."[6]

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[5] Ibid.

[6] USDA, *2007 Farm Bill Proposals*, undated but released January 2007.

How do support prices vary across commodities in comparison to market price trends? One approach is to evaluate the relative equality of commodity loan prices and target prices against benchmark market prices. Commodity loan prices are the basis for making loan deficiency payments (LDPs) and target prices are the basis for making counter-cyclical payments (CCPs). Market price trends for grain and oilseed crops in this analysis are monthly average farm prices (MAFP). Market price trends for cotton and rice are adjusted world prices (AWP).[7] These market price data are used, first, to examine the current level of price and income "safety-net" support; and second, to evaluate the degree of adjustment to current policy parameters (i.e., loan rates and target prices) needed to obtain equal levels of "safety-net" price and income protection across program crops.

Comparison of Loan Rates. A comparison, by commodity, of monthly average market prices with the marketing loan rate provides a general sense of the level of relative price support across program crops.[8] The frequency market prices fall below the loan rate suggests how often a particular commodity is "in the money"(i.e., eligible for loan deficiency payments to offset low market price). When such market conditions occur, the marketing loan rate is above the equilibrium market price and acts as a floor or support price. Using a monthly average price smooths out daily and regional variation from grain and oilseed data (these crops rely on daily posted county prices for determining actual loan repayment rates), and provides only a general approximation for how often a commodity actually has been "in the money." Since cotton and rice both use a calculated weekly adjusted world price, only temporal smoothing occurs under monthly averaging for their price data.

Based on 120 monthly data points for the 1997 through 2006 period, market prices dropped below their corresponding loan rates 36% of the time for nine program commodities (**Figure 5**). However, wide variation appeared across commodities. For example, upland cotton prices were below the cotton loan rate 77% of the time. In contrast, the barley market price was below the barley loan rate 3% of the time.

A simple approach to equalizing the level of loan support across crops is to adjust the loan rates so that not more than an arbitrary 30% of the observed market

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[7] A comparison based on market prices necessarily assumes that the markets for these commodities are efficient and fully reflect all of the market information embodied in both the U.S. and international marketplaces. The United States is generally viewed as having a global comparative and competitive advantage in grain and oilseed production. As a result, U.S. grain and oilseed prices are generally viewed as representative of world market prices. USDA recognizes this by using posted county prices (terminal prices adjusted for transportation costs from the county to the terminal) as reference prices for operating its grain and oilseed marketing loan repayment provisions. The situation is very different for cotton and rice. In their case, world prices are determined in markets outside the United States. Therefore, to operate the marketing loan repayment provisions for cotton and rice, USDA first converts their international reference prices to a U.S. location by adjusting for transportation costs. Then, these "adjusted world prices" (AWPs) for cotton and for rice are used for operating the cotton and rice marketing loan repayment provisions.

[8] MAFPs are used for grains and oilseeds; AWPs are used for cotton and rice. The analytical results based on cotton and rice MAFPs are included for comparative purposes.

prices for the period fall below the loan rates (**Figure 6**). The barley loan rate must be raised 17% to $2.16/bu. to achieve this *ad hoc* policy goal. The wheat and peanut loan rates would be increased by 4%. The corn and oats loan rates would remain essentially unchanged. In contrast, loan rates for rice and cotton would have to be lowered by 41% and 25%, respectively, to $3.81/cwt. and 39.15¢/lb. The sorghum loan rate would need a 9% cut, while the soybean loan rate would be reduced by a modest 2%.

Comparison of CCP Support. Counter-cyclical payments (CCPs) are based on national annual average prices, rather than monthly prices. As a result, a comparison of the monthly market price with the effective target price for each commodity provides a stylized representation of counter-cyclical income support provided across program crops.

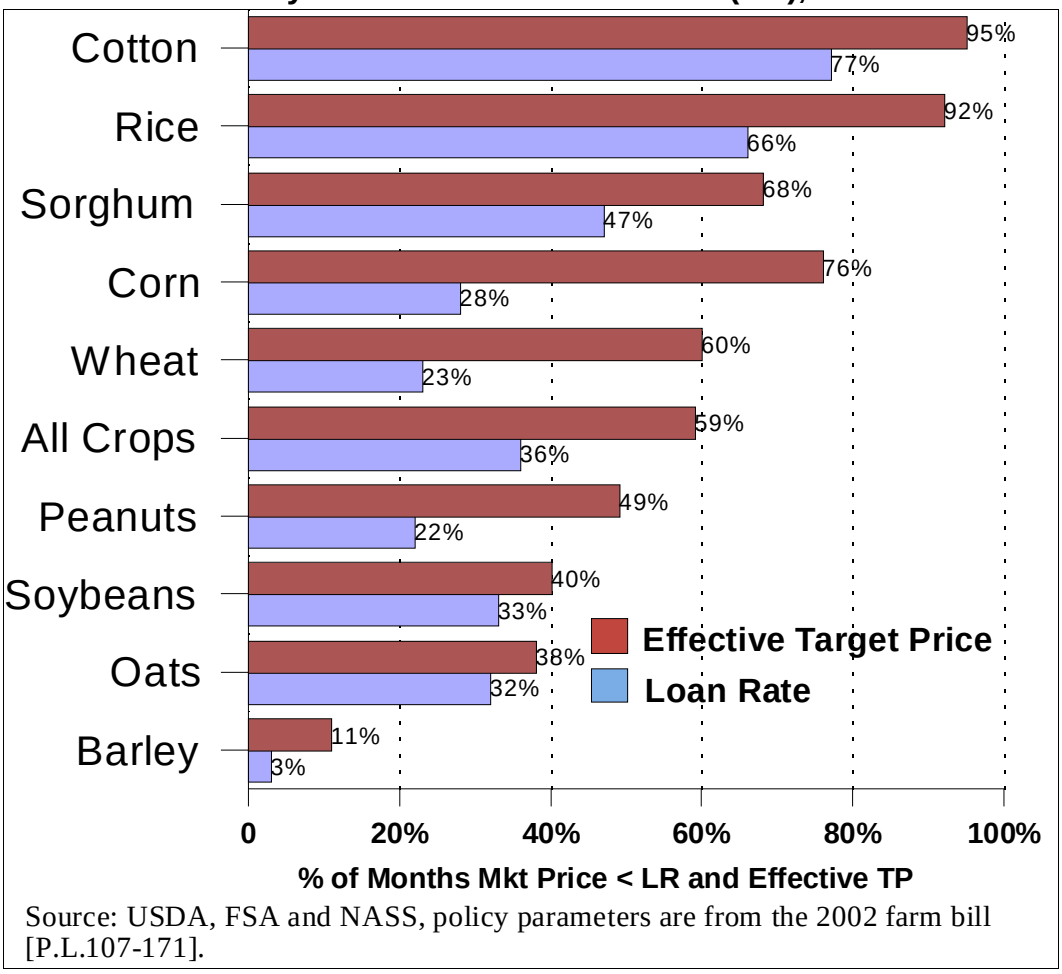
A comparison and hypothetical adjustment is used to evaluate the relative levels of CCP support across major program crops, again using monthly price data for the 1997 through 2006 period. For all commodities over the entire period, market prices were below their corresponding effective target prices 59% of the time (**Figure 5**). The range included a low of 11% for barley and a high of 95% for upland cotton.

CCP support levels can be equalized by adjusting target prices (or direct payments) upward or downward until the observed market prices for the period fall below their respective effective target prices not more than an arbitrary 50% of the time (**Figure 7**). As with the loan rate exercise, the largest adjustment is needed for upland cotton. The cotton target price would have to be lowered by 31% (to 50.05¢/lb.) to achieve the threshold of market prices falling below the effective target price in not more than 50% of the observed months. Target prices for rice, corn, and sorghum also would have to be lowered by respectively 24%, 11%, and 8% to achieve equity. Wheat (with a 2% lower target price) and soybeans (with a 3% higher target price) would require the smallest adjustments. In contrast, target prices for barley, oats, and peanuts would have to be raised by 17%, 12%, and 4%, respectively.

To the extent that the 1997 through 2006 time period reflects long-run market conditions, this exercise suggests that upland cotton, rice, and sorghum growers receive a disproportionately high level of both CCP and marketing loan support relative to the other major covered commodities. Barley, oats, and peanuts receive disproportionately lower CCP and marketing loan support. The situation is mixed for corn and wheat. Soybean loan rates and target prices are the closest to neutral.

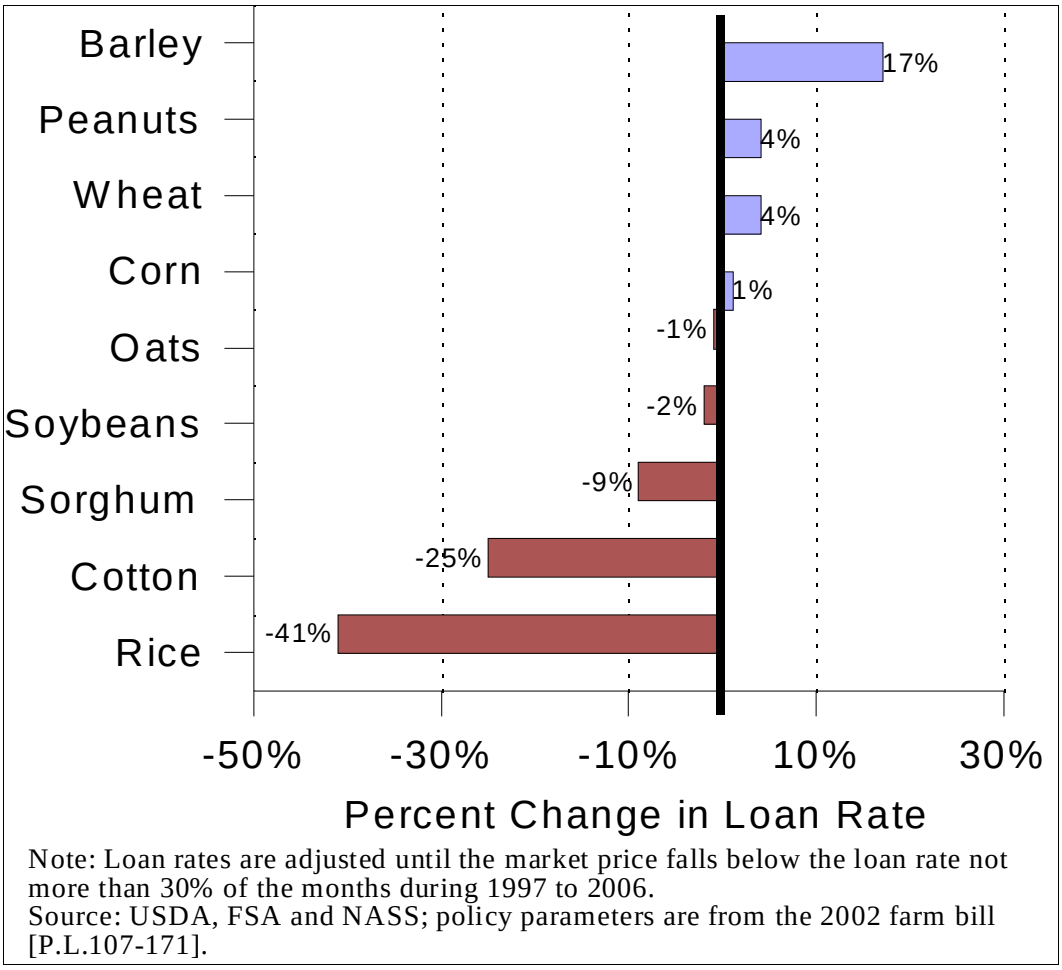
While the choice of loan rate and target price levels used in this analysis that would put the commodities in the money (30% of the time for loan deficiency payments and 50% of the time and counter-cyclical payments 50%) are arbitrary. However, the relative outcome remains the same under other choices. Furthermore, the levels used in this analysis are roughly the in-the-money averages for all crops under current law.

Figure 5. Frequency Selected Covered Commodities Are "In the Money" Due to Low Market Prices (MP), 1997-2006



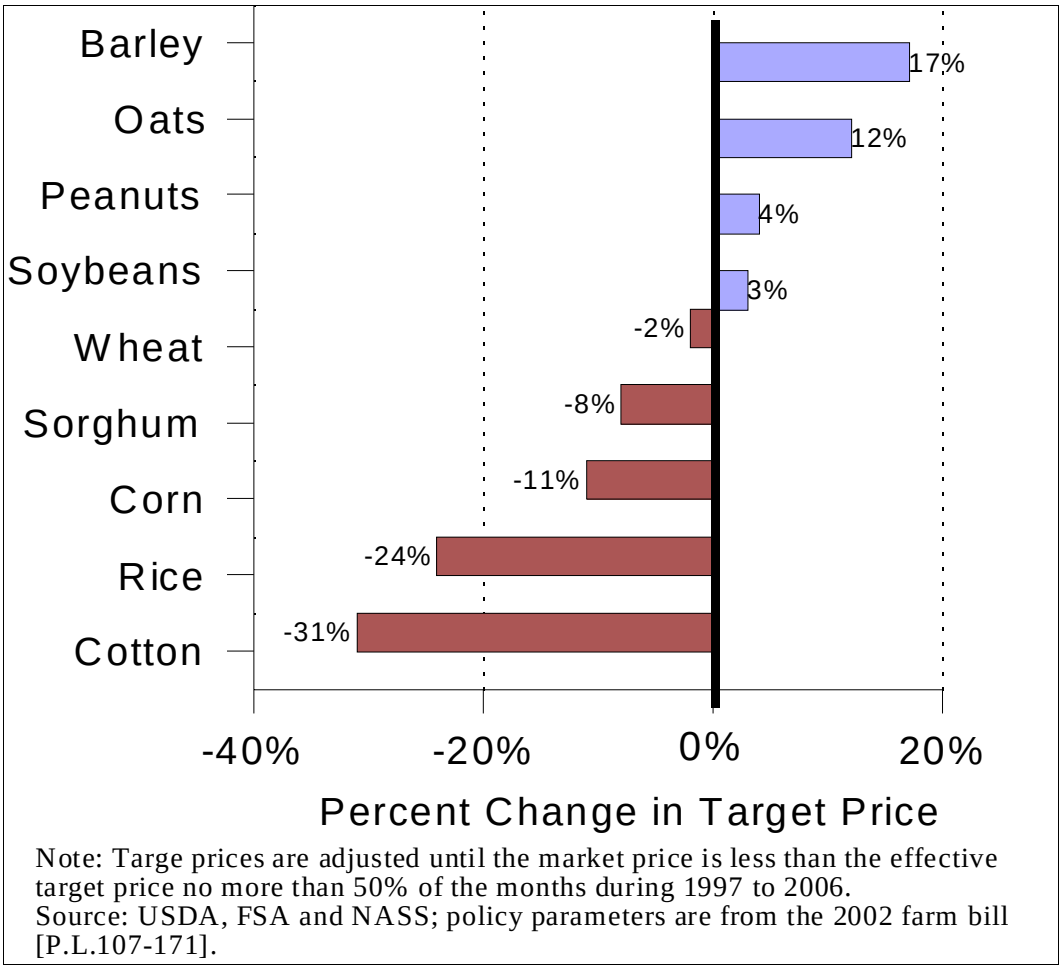
Source: USDA, FSA and NASS, policy parameters are from the 2002 farm bill [P.L.107-171].

Figure 6. Adjustments Needed to Equalize Loan Rates for Selected Covered Commodities Based on Market Prices, 1997-2006



Note: Loan rates are adjusted until the market price falls below the loan rate not more than 30% of the months during 1997 to 2006.
Source: USDA, FSA and NASS; policy parameters are from the 2002 farm bill [P.L.107-171].

Figure 7. Adjustments Needed to Equalize Effective Target Prices for Selected Covered Commodities Based on Market Prices, 1997-2006



Note: Targe prices are adjusted until the market price is less than the effective target price no more than 50% of the months during 1997 to 2006.
Source: USDA, FSA and NASS; policy parameters are from the 2002 farm bill [P.L.107-171].

Appendix: Data Tables

Table 2. "Covered Commodity" Payments, Harvested Acres, and Crop Values

Covered Commodity	Commodity Payments, Yearly Average FY03-06		Harvested Acres, Crop Year Average 2002-05		Payments Per Harvested Acre	Value of Crop Production, Annual Average 2002-05	
	Mil. $	% of Total	Mil. Acres	% of Total	$	Bil. $	% of Total
Corn	4,747	43.7	72.225	32	65.73	22.966	20.7
Cotton	2,677	24.6	12.586	6	212.69	4.659	57.5
Wheat	1,078	9.9	49.750	22	21.67	7.057	15.3
Rice	869	8.0	3.221	1	269.79	1.492	58.2
Soybeans	750	6.9	72.575	32	10.34	17.131	4.4
Other Feedgrains	465	4.3	12.790	6	36.33	1.703	27.3
Peanuts	270	2.5	1.407	1	191.63	0.764	35.3
Other Oilseeds	19	0.2	4.254	2	4.35	0.625	3.0
All Commodities	10,874	100	228.807	100	47.53	56.397	19.3

Source: Primary data are from USDA, FSA, NASS, and ERS. Calculations are by the authors.

Table 3. Effective Target Prices Compared to Total Cost of Production for Selected "Covered Commodities"

Commodity and Unit of Measure	Total Cost of Production[a/]	Effective Target Price[b/]	Effective Target Price as Share of Total Cost of Production
	$/Unit	$/Unit	%
Peanuts (lb)	$0.23	$0.23	101%
Corn (bu)	$2.40	$2.35	98%
Cotton (lb)	$0.70	$0.66	93%
Rice (cwt)	$8.89	$8.15	92%
Soybeans (bu)	$5.92	$5.36	91%
Wheat (bu)	$5.34	$3.40	64%
Barley (bu)	$4.13	$2.00	48%
Sorghum (bu)	$4.77	$2.22	47%

[a/] Cost of production data are averaged over the 2002-2005 time frame.
[b/] The effective target price is the target price less the direct payment.

Source: Cost of production data are from USDA, ERS. Effective target prices are based on target prices and direct payments enacted in P.L. 107-171.

Table 4. Policy Comparison Based on Monthly Market Price Data[a]

Average	All Wheat	Corn	Sorghum	All Barley	Oats	Upland Cotton MAFP	Upland Cotton AWP	Rice MAFP	Rice AWP	Soybeans	Peanuts
Percent of Observations where: (MAFP or AWP) < Loan Rate[b]											
36%	23%	28%	47%	3%	32%	61%	77%	40%	66%	33%	22%
Percent of Observations where: (MAFP or AWP) < Effective Target Price[b]											
59%	60%	76%	68%	11%	38%	86%	95%	60%	92%	40%	49%

[a] The data period covers January 1997 through December 2006 for a total of 120 months. MAFP = monthly average farm prices received; AWP = adjusted world price.

[b] Loan rates and target prices established for 2004-2007 period for major program crops are compiled from Farm Security and Rural Investment Act of 2002 (P.L. 107-171), Title I, Sections 1103, 1104, and 1202. For more information, see CRS Report RS21999, *Farm Commodity Policy: Farm Bill Issues*, by Jim Monke.

Table 5. Loan Rate Adjustments Needed to Equalize Policy Outcomes Across Commodities

	All Wheat	Corn	Sorghum	All Barley	Oats	Upland Cotton MAFP	Upland Cotton AWP	Rice MAFP	Rice AWP	Soybeans	Peanuts
	$/bu.	$/bu.	$/bu.	$/bu.	$/bu.	¢/lb.	¢/lb.	$/cwt.	$/cwt.	$/bu.	¢/lb.
Loan Rate (LR)	2.75	1.95	1.95	1.85	1.33	52.00	52.00	6.50	6.50	5.00	17.75
Equalized Loan Rate[a]	2.85	1.96	1.77	2.16	1.32	45.10	39.15	5.72	3.81	4.88	18.50
Percent change	4%	1%	-9%	17%	-1%	-13%	-25%	-12%	-41%	-2%	4%

[a] Loan rates are equalized by adjusting them until the MAFP (or AWP for cotton and rice) falls below the LR in not more than 30% of monthly observations. The Loan Rate (LR) is adjusted to obtain this result and is referred to as the Equalized Loan Rate. The data period covers January 1997 through December 2006 for a total of 120 months. MAFP = monthly average farm prices received; AWP = adjusted world price.

Table 6. Target Price Adjustments Needed to Equalize Policy Outcomes Across Commodities

	All Wheat	Corn	Sorghum	All Barley	Oats	Upland Cotton		Rice		Soybeans	Peanuts
						MAFP	AWP	MAFP	AWP		
	$/bu.	$/bu.	$/bu.	$/bu.	$/bu.	¢/lb.	¢/lb.	$/cwt.	$/cwt.	$/bu.	¢/lb.
Target Price (TP)	3.92	2.63	2.57	2.24	1.44	72.40	72.4	10.50	10.50	5.80	24.75
Equalized Target Price [a]	3.83	2.34	2.37	2.62	1.61	55.17	50.05	9.72	8.00	5.97	25.80
Percent Change Needed to Equalize Target Prices	-2%	-11%	-8%	17%	12%	-24%	-31%	-7%	-24%	3%	4%

[a] Equalization is defined as setting the effective target price at a level where the monthly average farm price (MAFP) for grains, soybeans and peanuts and the adjusted world price (AWP) for cotton and rice fall below it in more than 50% of the monthly observations. The target price (TP) is adjusted to obtain this result and is referred to as the Equalized Target Price. The data period covers January 1997 through December 2006, for a total of 120 months.