ANALYSIS OF COMMODITY PROGRAM ADJUSTMENTS FOR U.S. RICE IN STOCHASTIC FRAMEWORK

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ABSTRACT

Potential adjustments in U.S. commodity program for rice are evaluated in this paper using stochastic analysis in a global modeling framework. Corresponding threshold and loss-compensatory increases in target price and loan rates are determined with assumed outright and gradual elimination of direct payments. Results show that if direct payments (DP) are eliminated in 2012, a 23% increase in both the target price (TP) and loan rate (LR) triggers counter-cyclical payments (CCP) 80% of the time; and it will take an increase of 48% in TP and LR to generate CCP enough to compensate for the loss in total DP. If DP is gradually removed over 5 years, the trigger and compensatory increases in TP and LR are 41% and 46%, respectively. Furthermore, if DP is eliminated outright and TP maintained, an increase of 71% in LR triggers loan deficiency payments (LDP) 75% of the time; and it will take an increase of 130% in LR to generate enough LDP to recoup the total loss in DP. Under gradual removal of DP, the trigger and compensatory increases in LR are 71% and 92%, respectively.

Key words: U.S commodity program, threshold and loss-compensatory increases, stochastic analysis

Arkansas Global Rice Model (AGRM)

JEL Code: Q18

INTRODUCTION

In the U.S., government farm program payments are an important component of income for farm businesses. Farm commodity program funding is being targeted for reduction to help decrease the federal budget deficit (Wailes et al., 2011). For the period 2000-2009, the government spent an average of $ 10.8 billion annually on various commodity support programs such as direct payments, marketing loan net outlays, counter-cyclical payments, ACRE payments, and crop market loss assistance. Direct farm program payments account for $5.04 billion or 47.0% of total payments per year. Projected direct payments range from 2.4% to 10.8% of total returns, with the lower end for soybeans and the higher end for rice (FAPRI-MU, 2010).

In this study, we analyze the impact on farm income of potential changes in direct payment rate, target price, and loan rate in rice. The results presented in this paper can be used as inputs in the ongoing discourse on possible provisions of the next U.S. Farm Bill, considering that the current 2008 Farm Bill will expire in 2012.

As specified in the 2008 Farm Act, *direct payments* are fixed payments for eligible historic production of specific crop which is equal to the product of the payment rate for the specific crop, the historical payment acres (85 percent of base acres in CYs 2008 and 2012 and 83.3 percent in CYs 2009-11), and the historical payment yield for the farm. Direct payments are not tied to current production or prices and do not require any commodity production on the land. *Counter-cyclical payments* are available to producers with historic program payment acres and yields of a specific crop, and payments are made whenever the commodity's effective price is less than the target price. The effective price of a commodity is the sum of the direct payment rate, plus either the national commodity loan rate or the national average farm price for the crop year, whichever is higher. The

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counter-cyclical payment amount is calculated as the product of the payment rate, the payment acres (85 percent of base acres in CYs 2008-12), and the payment yield. *Loan deficiency payments*, a provision initiated in the Food Security Act of 1985 that gives the Secretary of Agriculture discretion to provide direct payments for loan commodities to producers who agree not to obtain a commodity loan on their production for a particular crop year. The LDP provision is applicable only if a marketing loan repayment provision has been implemented (i.e., if the market price of a commodity is below the commodity loan rate). The LDP payment amount is determined by multiplying the local marketing loan repayment rate by the amount of the commodity eligible for a loan. Instead of taking out a commodity loan, eligible farmers may choose to receive marketing loan benefits through LDPs when market prices are lower than commodity loan rates. The LDP option allows the producer to receive the benefits of the marketing loan program without having to take out and subsequently repay a commodity loan. The LDP rate is the amount by which the loan rate exceeds the loan repayment rate or prevailing world market price and, thus, is equivalent to the marketing loan gain that could alternatively be obtained for crops under loan (USDA).

METHODOLOGY

We used the Arkansas Global Rice Model (AGRM) in the analysis, with focus on the U.S. sub-model component. AGRM is a multi-country econometric framework which has over 250 equations representing rice supply and demand relationships in 40 countries and 5 regions around the world developed and maintained by the Department of Agricultural Economics and Agribusiness, University of Arkansas in Fayetteville. The theoretical structure and the general equations of the AGRM are available online in the documentation by Wailes and Chavez (2011).

To make the results more useful for alternative policy decision-making, this study makes use of a combination of deterministic and stochastic analyses. Stochastic analysis is useful as it provides information on the possible range of outcomes as opposed to the deterministic analysis which generates only point estimates. The analysis covers the five-year period 2012 through 2016. The specific scenarios include the following:

> **Scenario1a:** Deterministic analysis of removing total direct payments starting in 2012, and determining the common percent increases in target price and loan rate by year that would trigger counter-cyclical payments.
>
> **Scenario 1b:** Stochastic analysis of Scenario 1a.
>
> **Scenario 1c:** Extending scenario 1a and determining the common percent increases in target price and loan rate by year to generate counter-cyclical payments sufficient to fully compensate for the total loss in direct payments.
>
> **Scenario2a:** Deterministic analysis of removing direct payments gradually at 20% per year starting in 2012, resulting in total elimination by 2016, and determining the common percent increases in target price and loan rate by year that would trigger counter-cyclical payments.
>
> **Scenario 2b:** Stochastic analysis of Scenario 2a.
>
> **Scenario 2c:** Extending scenario 2a and determining the common percent increases in target price and loan rate by year to generate counter-cyclical payments sufficient to fully compensate for the total loss in direct payments.
>
> **Scenario 3a:** Deterministic analysis of eliminating total direct payments starting in 2012, and determining the percent increases in loan rate by year that would trigger loan deficiency payments, keeping the target price constant.
>
> **Scenario 3b:** Stochastic analysis of Scenario 3a.

Scenario 3c: Extending scenario 3a and determining the percent increases in loan rate by year to generate loan deficiency payments sufficient to fully compensate for the total loss in direct payments.

Scenario 4a: Deterministic analysis of removing direct payments gradually at 20% per year starting in 2012, resulting in total elimination by 2016, and determining the percent increases in loan rate by year that would trigger loan deficiency payments, keeping the target price constant.

Scenario 4b: Extending scenario 4a and determining the percent increases in loan rate by year to generate loan deficiency payments sufficient to fully compensate for the total loss in direct payments.

This analysis is based on the August 2011 AGRM estimates of the U.S. rice season average farm price and average world price, and monthly indices of production, marketing, and announced world price for the period 2002-2009 (excluding 2007 and 2008 when the price spikes occurred). All the changes in the scenarios are relative to the AGRM baseline as of August 2011 (Tables 1a-1d). The baseline projections are based on assumptions of current policies, macroeconomic variables, and average weather conditions.

The stochastic component looks at the probability distribution of outcomes for scenarios 1a, 2a, and 3a. The stochastic framework used in this study is generated using empirical distributions of the variable yield for each country and region in the model, as well as for each of the six rice-producing states in the U.S. Yield is used because it is the variable that not only differs by year and region but is also very sensitive to changes in weather conditions and water availability. A total of 500 random

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draws were implemented using a 28-year empirical distribution of historical yields generated using

the software Simetar (Richardson et. al, 2008).

RESULTS AND DISCUSSION

The detailed results of the analyses are presented in Tables 2a-5b and Figures 1-3.

Scenario 1a: Table 2a shows that if direct payments were to be totally removed starting in 2012,

increasing both the target price and loan rate by 23.23% (to $12.94 and $8.01 per cwt, respectively) in

2012 triggers counter-cyclical payments (CCP).   CCP-triggering percent increases in target prices

and loan rates for the rest of the period range from 20.71% to 27.67%. This is the deterministic

component of scenario 1a analysis.

Scenario 1b: The stochastic analysis for scenario 1a generates percentile probability distribution of

CCP shown in Tables 2b (total in $ million) and 2c ($ per cwt). In other words, it is probable that

80% of the time there will be CCP. For example, 10% of the time there will be CCP higher than

$341.3 million (total) or $1.78 per cwt. Figure 1 shows the CDF and PDF quartile values for this

scenario, showing that zero CCP occurs 25.5% of the time. It is probable that 74.5% of the time the

government will have CCP expenditure of $700K or higher, with maximum of $671.3 million. The

upper quartile shows that 25% of the random draws generate at least $461.9 million.

Scenario 1c: If total direct payments were to be eliminated starting in 2012, both the target price

and loan rate have to be increased by 47.95% (to $15.53 and $9.62 per cwt, respectively) in 2012 to

generate enough counter-cyclical payments to recoup the total loss in direct payments in the same

year. Note that the absolute amount of the negative change in direct payments is the same as the

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positive change in CCP. For the other years, compensatory percent increases in target prices and loan rates range from 45.43% to 52.39% (Table 2d).

Scenario 2a: Table 3a shows that if direct payments were to be gradually removed at 20% per year starting in 2012, increasing both the target price and loan rate by 41.14% (to $14.82 and $9.17 per cwt, respectively) in 2012 triggers counter-cyclical payments (CCP). CCP-triggering percent increases in target prices and loan rates for the rest of the period range from 26.31% to 36.86%.

Scenario 2b: The stochastic analysis for scenario 2a generates percentile probability distribution similar to that of scenario1a but with relatively lower CCP values, as expected (Tables 3b and 3c). Figure 2 also shows values similar to those of scenario 1a, but with slightly higher upper quartile and maximum values.

Scenario 2c: If total direct payments were to be gradually removed at 20% per year starting in 2012, both the target price and loan rate have to be increased by 46.08% (to $15.34 and $9.50 per cwt, respectively) in 2012 to generate enough counter-cyclical payments to recoup the total loss in direct payments in the same year. Again, note that the absolute amount of the negative change in direct payments is the same as the positive change in CCP. For the other years, compensatory percent increases in target prices and loan rates range from 44.50% to 52.39% (Table 3d).

Scenario 3a: Table 4a shows that if direct payments were to be totally removed starting in 2012, increasing the loan rate by 71.00% (to $11.12 per cwt) in 2012 triggers loan deficiency payments (LDP). LDP-triggering percent increases in loan rates for the other years range from 72.78% to 82.36%.

Scenario 3b: The stochastic analysis for scenario 3a generates CDF shown in Figure 3, indicating that there will be no loan deficiency payments 24.6% of the time. It is probable that 75.4% of the time there will be LDP of $20K or higher, with maximum of $448.3 million. The upper quartile indicates that 25% of the random draws result in at least $244.0 million LDP.

Scenario 3c: If total direct payments are eliminated in 2012, the loan rate has to be increased by 129.82% (to $14.94 per cwt) in 2012 to generate enough loan deficiency payments to recoup the loss in direct payments in the same year. Note that the absolute amount of the negative change in direct payments is the same as the positive change in LDP. Other compensatory percent increases in loan rates by year (which range from 129.23% to 131.76%) are presented in the Table 4b.

Scenario 4a: If direct payments are removed gradually at 20% per year as shown in Table 5a, the same loan rate trigger results as in scenario 3a are obtained. For this reason, no stochastic analysis is done for this scenario—as results would have been similar to those of scenario 3b.

Scenario 4b: If direct payments are removed gradually at 20% per year, the loan rate has to be increased by 91.83% (to $12.47 per cwt) in 2012 to generate enough loan deficiency payments to match the loss in direct payments in the same year. Again, note that the absolute amount of the negative change in direct payments is the same as the positive change in LDP. Table 5b shows the annual percent compensatory increases in loan rates by year (which range from 103.00% to 133.61%).

Counter-cyclical payments are decoupled, i.e., the producers do not have to produce rice to receive payments. This is the reason why there is no supply and demand response to scenarios 1b and 2b as loan rates and target prices are increased substantially. Loan deficiency payments, on the other hand,

are coupled which means that the producers have to produce rice to receive the payment benefits.

This explains why scenarios 3b and 4b which increase loan rates substantially generate supply and

demand responses (Tables 4b and 5b). Area, production, exports and stocks increase while domestic

consumption and prices change only marginally.

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Table 1a. U.S. Rice Baseline Program Particulars

Variable	Units / Year	2012	2013	2014	2015	2016
YIELD (rough basis)	(lb/ac)	7228.23	7284.02	7340.52	7394.63	7458.18
Program-Direct Payment Yield	(lb/ac)	4818.00	4818.00	4818.00	4818.00	4818.00
Program-Counter-Cyclical Payment Yield	(lb/ac)	5131.00	5131.00	5131.00	5131.00	5131.00
Program Area/Contract Area	(1000 ac)	4390.00	4390.00	4390.00	4390.00	4390.00
Total Harvested Area	(1000 ac)	2921.50	2896.55	2912.04	2978.32	3016.31

Table 1b. U.S. Rice Baseline Supply and Utilization

Variable	Units / Year	2012	2013	2014	2015	2016
Production	(mil. cwt)	211.17	210.98	213.76	220.24	224.96
Beginning Stocks	(mil. cwt)	24.33	23.75	23.94	20.70	24.19
Imports	(mil. cwt)	18.95	18.22	18.05	18.36	18.98
Domestic Use	(mil. cwt)	136.55	138.16	139.95	141.58	142.93
Exports	(mil. cwt)	102.76	101.16	106.42	108.21	110.17
Ending Stocks	(mil. cwt)	23.75	23.94	20.70	24.19	30.15

Table 1c. U.S. Rice Baseline Prices

Variable	Units / Year	2012	2013	2014	2015	2016
Loan Rate	(US$/cwt)	6.50	6.50	6.50	6.50	6.50
Season Ave. Farm Price	(US$/cwt)	12.94	12.96	12.67	12.79	13.40
Long Grain Farm Price	(US$/cwt)	12.13	12.17	11.73	11.87	13.17
Medium Grain Farm Price	(US$/cwt)	15.18	15.36	15.63	15.72	16.29
Target Price	(US$/cwt)	10.50	10.50	10.50	10.50	10.50
Export Price, FOB Houston (U.S. No. 2)	(US$/cwt)	23.30	23.42	24.01	24.53	24.68
Medium Grain Price, FOB CA (U.S. No. 2)	(US$/cwt)	34.86	34.94	35.23	35.55	36.10

Table 1d. Detailed U.S. Rice Baseline Payments and Income

Variable	Units / Year	2012	2013	2014	2015	2016
Direct Payment	(US$/cwt)	2.35	2.35	2.35	2.35	2.35
Counter-Cyclical Payment	(US$/cwt)	0.00	0.00	0.00	0.00	0.00
Average World Price	(US$/cwt)	11.85	11.98	12.26	12.64	12.61
INCOME FACTORS						
Production Market Value	(mil. US$)	2732.29	2734.37	2709.17	2817.26	3128.00
Direct Payments	(mil. US$)	497.05	497.05	497.05	497.05	497.05
Marketing Loan Gains/LDPs	(mil. US$)	0.00	0.00	0.00	0.00	0.00
Counter-Cyclical Payments	(mil. US$)	0.00	0.00	0.00	0.00	0.00
Income from Commodity Payments	(mil. US$)	497.05	497.05	497.05	497.05	497.05
Total Income	(mil. US$)	3229.34	3231.42	3206.22	3314.30	3625.05

Table 2a. Level changes for Scenario 1a (triggers for counter-cyclical payments)

Variable	Units / Year	2012	2013	2014	2015	2016
1. Total elimination of direct payments starting in 2012						
2. Percent increases in target price and loan rate that will trigger counter-cyclical payments						
Percent Increases		**23.23%**	**23.43%**	**20.71%**	**21.83%**	**27.67%**
Rice Target Price	(US$/cwt)	12.94	12.96	12.67	12.79	13.41
Rice Loan Rate	(US$/cwt)	8.01	8.02	7.85	7.92	8.30
Level Changes:						
Loan Rate	(US$/cwt)	1.51	1.52	1.35	1.42	1.80
Target Price	(US$/cwt)	2.44	2.46	2.17	2.29	2.91
Direct Payment Rate	(US$/cwt)	-2.35	-2.35	-2.35	-2.35	-2.35
Counter-Cyclical Payment Rate	(US$/cwt)	0.00	0.00	0.00	0.00	0.00
Total Direct Payments	(mil. US$)	-497.05	-497.05	-497.05	-497.05	-497.05
Total Loan Deficiency Payments	(mil. US$)	0.00	0.00	0.00	0.00	0.00
Total Counter-Cyclical Payments	(mil. US$)	0.10	0.02	0.11	0.03	0.15

Table 2b. Percentile Probability Distribution of Total Counter-Cyclical Payments for Scenario 1b, in Million Dollars

Year		2012	2013	2014	2015	2016	Average
				\$ Million			
Stochastic Average		157.1	182.4	133.0	107.0	89.6	133.8
Percentiles:							
	5%	0.0	0.0	0.0	0.0	0.0	0.0
	10%	0.0	0.0	0.0	0.0	0.0	0.0
	20%	0.0	0.0	0.0	0.0	0.0	0.0
	30%	34.2	5.4	0.0	0.0	0.0	7.9
	40%	90.3	96.3	39.4	0.0	0.0	45.2
	50%	126.5	148.4	90.8	33.6	11.6	82.2
	60%	186.2	220.3	149.0	97.3	67.8	144.1
	70%	236.1	282.1	199.7	160.8	122.9	200.3
	80%	290.6	338.0	251.8	222.0	184.1	257.3
	90%	361.9	427.5	339.6	309.2	268.2	341.3
	95%	411.9	528.2	428.2	400.7	364.2	426.6

Table 2c. Percentile Probability Distribution of Counter-Cyclical Payments for Scenario 1b, in Dollars Per Hundredweight

Year		2012	2013	2014	2015	2016	Average
				$ Per CWT			
Stochastic Average		0.82	0.95	0.69	0.56	0.47	0.70
Percentiles:							
	5%	0.00	0.00	0.00	0.00	0.00	0.00
	10%	0.00	0.00	0.00	0.00	0.00	0.00
	20%	0.00	0.00	0.00	0.00	0.00	0.00
	30%	0.18	0.03	0.00	0.00	0.00	0.04
	40%	0.47	0.50	0.21	0.00	0.00	0.24
	50%	0.66	0.78	0.47	0.18	0.06	0.43
	60%	0.97	1.15	0.78	0.51	0.35	0.75
	70%	1.23	1.47	1.04	0.84	0.64	1.05
	80%	1.52	1.77	1.32	1.16	0.96	1.34
	90%	1.89	2.23	1.77	1.61	1.40	1.78
	95%	2.15	2.76	2.24	2.09	1.90	2.23

Table 2d. Level changes for scenario 1c (compensatory counter-cyclical payments for total loss in direct payments)

Year		2012	2013	2014	2015	2016	Average

1. Total elimination of direct payments starting in 2012

2. Percent increases in target price and loan rate to generate counter-cyclical payments to compensate for the total loss in direct payments

		2012	2013	2014	2015	2016	
Percent Increases			47.95%	48.16%	45.43%	46.56%	52.39%
Rice Target Price	(US$/cwt)		15.53	15.56	15.27	15.39	16.00
Rice Loan Rate	(US$/cwt)		9.62	9.63	9.45	9.53	9.91
Level Changes:							
Loan Rate	(US$/cwt)		3.12	3.13	2.95	3.03	3.41
Target Price	(US$/cwt)		5.03	5.06	4.77	4.89	5.50
Direct Payment Rate	(US$/cwt)		-2.35	-2.35	-2.35	-2.35	-2.35
Counter-Cyclical Payment Rate	(US$/cwt)		2.60	2.60	2.60	2.60	2.60
Total Direct Payments	(mil. US$)		-497.05	-497.05	-497.05	-497.05	-497.05
Total Loan Deficiency Payments	(mil. US$)		0.00	0.00	0.00	0.00	0.00
Total Counter-Cyclical Payments	(mil. US$)		497.06	497.19	497.07	497.19	497.11

Table 3a. Level changes for scenario 2a (triggers for counter-cyclical payments)

Variable	Units / Year	2012	2013	2014	2015	2016
1. Remove direct payments over 5 years starting in 2012 at 20% equal reductions per year						
2. Percent increases in target price and loan rate that will trigger counter-cyclical payments						
Percent Increases		**41.14%**	**36.86%**	**29.66%**	**26.31%**	**27.67%**
Rice Target Price	(US$/cwt)	14.82	14.37	13.61	13.26	13.41
Rice Loan Rate	(US$/cwt)	9.17	8.90	8.43	8.21	8.30
Level Changes:						
Loan Rate	(US$/cwt)	2.67	2.40	1.93	1.71	1.80
Target Price	(US$/cwt)	4.32	3.87	3.11	2.76	2.91
Direct Payment Rate	(US$/cwt)	-0.47	-0.94	-1.41	-1.88	-2.35
Counter-Cyclical Payment Rate	(US$/cwt)	0.00	0.00	0.00	0.00	0.00
Total Direct Payments	(mil. US$)	-99.41	-198.82	-298.23	-397.64	-497.05
Total Loan Deficiency Payments	(mil. US$)	0.00	0.00	0.00	0.00	0.00
Total Counter-Cyclical Payments	(mil. US$)	0.10	0.06	0.17	0.12	0.06

Table 3b. Percentile Probability Distribution of Total Counter-Cyclical Payments for Scenario 2b, in Million Dollars

Year		2012	2013	2014	2015	2016	Average
				$ Million			
Stochastic Average		153.1	176.5	128.0	101.7	85.4	128.9
Percentiles:							
	5%	0.0	0.0	0.0	0.0	0.0	0.0
	10%	0.0	0.0	0.0	0.0	0.0	0.0
	20%	0.0	0.0	0.0	0.0	0.0	0.0
	30%	31.4	3.7	0.0	0.0	0.0	7.0
	40%	86.4	92.3	33.1	0.0	0.0	42.4
	50%	124.9	142.2	83.0	25.7	10.5	77.2
	60%	181.3	209.5	139.6	89.1	60.7	136.0
	70%	228.2	267.8	192.4	147.4	120.0	191.1
	80%	285.7	327.8	245.1	215.5	180.0	250.8
	90%	356.1	417.3	334.8	304.3	261.9	334.9
	95%	405.5	496.7	416.8	376.7	342.7	407.7

Table 3c. Percentile Probability Distribution of Counter-Cyclical Payments for Scenario 2b, in Dollars Per Hundredweight

Year		2012	2013	2014	2015	2016	Average
				$ Per CWT			
Stochastic Average		0.80	0.92	0.67	0.53	0.45	0.67
Percentiles:							
	5%	0.00	0.00	0.00	0.00	0.00	0.00
	10%	0.00	0.00	0.00	0.00	0.00	0.00
	20%	0.00	0.00	0.00	0.00	0.00	0.00
	30%	0.16	0.02	0.00	0.00	0.00	0.04
	40%	0.45	0.48	0.17	0.00	0.00	0.22
	50%	0.65	0.74	0.43	0.13	0.05	0.40
	60%	0.95	1.09	0.73	0.47	0.32	0.71
	70%	1.19	1.40	1.00	0.77	0.63	1.00
	80%	1.49	1.71	1.28	1.13	0.94	1.31
	90%	1.86	2.18	1.75	1.59	1.37	1.75
	95%	2.12	2.59	2.18	1.97	1.79	2.13

Table 3d.   Level changes for scenario 2c (compensatory counter-cyclical payments for total loss in direct payments)

Variable	Units / Year	2012	2013	2014	2015	2016
1. Remove direct payments over 5 years starting in 2012 at 20% equal reductions per year						
2. Percent increases in target price and loan rate to generate counter-cyclical payments to compensate for the total loss in direct payments						
Percent Increases		**46.08%**	**46.75%**	**44.50%**	**46.09%**	**52.39%**
Rice Target Price	(US$/cwt)	15.34	15.41	15.17	15.34	16.00
Rice Loan Rate	(US$/cwt)	9.50	9.54	9.39	9.50	9.91
Level Changes:						
Loan Rate	(US$/cwt)	3.00	3.04	2.89	3.00	3.41
Target Price	(US$/cwt)	4.84	4.91	4.67	4.84	5.50
Direct Payment Rate	(US$/cwt)	-0.47	-0.94	-1.41	-1.88	-2.35
Counter-Cyclical Payment Rate	(US$/cwt)	0.52	1.04	1.56	2.08	2.60
Total Direct Payments	(mil. US$)	-99.41	-198.82	-298.23	-397.64	-497.05
Total Loan Deficiency Payments	(mil. US$)	0.00	0.00	0.00	0.00	0.00
Total Counter-Cyclical Payments	(mil. US$)	99.51	198.88	298.40	397.76	497.11

Table 4a. Level changes for scenario 3a (triggers for loan deficiency payments)

Variable	Units / Year	2012	2013	2014	2015	2016
1. Total elimination of direct payments starting in 2012						
2. Percent increases in loan rate that will trigger loan deficiency payments; no change in target price						
Percent Increases		**71.00%**	**72.78%**	**76.82%**	**82.36%**	**81.92%**
Rice Target Price	(US$/cwt)	10.50	10.50	10.50	10.50	10.50
Rice Loan Rate	(US$/cwt)	11.12	11.23	11.49	11.85	11.82
Level Changes:						
Loan Rate	(US$/cwt)	4.62	4.73	4.99	5.35	5.32
Target Price	(US$/cwt)	0.00	0.00	0.00	0.00	0.00
Direct Payment Rate	(US$/cwt)	-2.35	-2.35	-2.35	-2.35	-2.35
Counter-Cyclical Payment Rate	(US$/cwt)	0.00	0.00	0.00	0.00	0.00
Total Direct Payments	(mil. US$)	-497.05	-497.05	-497.05	-497.05	-497.05
Total Loan Deficiency Payments	(mil. US$)	0.02	0.02	0.02	0.02	0.02
Total Counter-Cyclical Payments	(mil. US$)	0.00	0.00	0.00	0.00	0.00

Table 4b. Level changes for scenario 3c (compensatory loan deficiency payments for total loss in direct payments)

| Variable	Units / Year	2012	2013	2014	2015	2016
1. Total elimination of direct payments starting in 2012						
2. Percent increases in loan rate to earn loan deficiency payments to compensate for the total loss in direct payments; no change in target price						
Percent Increases		**129.82%**	**129.23%**	**130.02%**	**131.76%**	**129.78%**
Rice Target Price	(US$/cwt)	10.50	10.50	10.50	10.50	10.50
Rice Loan Rate	(US$/cwt)	14.94	14.90	14.95	15.06	14.94
Level Changes:						
Total Harvested Area	(1000 ac)	0.00	144.35	249.14	320.77	364.67
Production	(mil. cwt)	0.00	9.88	17.07	22.04	25.13
Domestic Use (rough basis)	(mil. cwt)	0.00	0.23	0.42	0.57	0.59
Beginning Stocks	(mil. cwt)	0.00	0.00	5.87	13.47	21.43
Imports	(mil. cwt)	0.00	0.03	0.07	0.11	0.12
Exports	(mil. cwt)	0.00	3.93	9.28	13.81	16.69
Ending Stocks	(mil. cwt)	0.00	5.87	13.47	21.43	29.61
PRICES:						
Loan Rate	(US$/cwt)	8.44	8.40	8.45	8.56	8.44
Season Ave. Farm Price	(US$/cwt)	0.00	-0.08	-0.24	-0.44	-0.39
Long Grain Farm Price	(US$/cwt)	0.00	-0.03	-0.14	-0.31	-0.22
Medium Grain Farm Price	(US$/cwt)	0.00	-0.15	-0.43	-0.69	-0.76
Export Price, FOB Houston (U.S. No. 2)	(US$/cwt)	0.00	-0.04	0.46	1.09	1.65
Medium Grain Price, FOB CA (U.S. No. 2)	(US$/cwt)	0.00	-0.29	-0.62	-0.82	-0.87
Direct Payment Rate	(US$/cwt)	-2.35	-2.35	-2.35	-2.35	-2.35
Average World Price (US$/cwt)	(US$/cwt)	0.00	-0.03	-0.13	-0.27	-0.28
INCOME FACTORS:						
Production Market Value	(mil. US$)	0.00	111.16	159.96	174.61	252.75
Total Direct Payments	(mil. US$)	-497.05	-497.05	-497.05	-497.05	-497.05
Total Loan Deficiency Payments	(mil. US$)	497.08	497.15	497.15	497.07	497.06
Total Income	(mil. US$)	0.03	111.27	160.06	174.63	252.76

*Table 5a. **Level changes for scenario 4a** (triggers for loan deficiency payments)*

Variable	Units / Year	2012	2013	2014	2015	2016
1. Remove direct payments over 5 years starting in 2012 at 20% equal reductions per year						
2. Percent increases in loan rate that will trigger loan deficiency payments; no change in target price						
Percent Increases	**Percent**	**71.00%**	**72.78%**	**76.82%**	**82.35%**	**81.92%**
Rice Target Price	(US$/cwt)	10.50	10.50	10.50	10.50	10.50
Rice Loan Rate	(US$/cwt)	11.12	11.23	11.49	11.85	11.82
Level Changes:						
Loan Rate	(US$/cwt)	4.62	4.73	4.99	5.35	5.32
Target Price	(US$/cwt)	0.00	0.00	0.00	0.00	0.00
Direct Payment Rate	(US$/cwt)	-0.47	-0.94	-1.41	-1.88	-2.35
Counter-Cyclical Payment Rate	(US$/cwt)	0.00	0.00	0.00	0.00	0.00
Total Direct Payments	(mil. US$)	-99.41	-198.82	-298.23	-397.64	-497.05
Total Loan Deficiency Payments	(mil. US$)	0.02	0.02	0.02	0.01	0.02
Total Counter-Cyclical Payments	(mil. US$)	0.00	0.00	0.00	0.00	0.00

Table 5b. Level changes for scenario 4b (compensatory loan deficiency payments for total loss in direct payments)

| Variable	Units / Year	2012	2013	2014	2015	2016
1. Remove direct payment over 5 years starting in 2012 at 20% equal reductions per year						
2. Percent increases in loan rate to earn loan deficiency payments to compensate for the total loss in direct payments; no change in target price						
Percent Increases		**91.83%**	**103.00%**	**115.48%**	**127.74%**	**133.61%**
Rice Target Price	(US$/cwt)	10.50	10.50	10.50	10.50	10.50
Rice Loan Rate	(US$/cwt)	12.47	13.20	14.01	14.80	15.18
Level Changes:						
Total Harvested Area	(1000 ac)	0.00	28.88	79.67	143.80	211.77
Production	(mil. cwt)	0.00	1.98	5.47	9.91	14.66
Beginning Stocks	(mil. cwt)	0.00	0.00	1.16	3.78	7.97
Imports	(mil. cwt)	0.00	0.01	0.02	0.04	0.06
DOMESTIC USE (rough basis)	(mil. cwt)	0.00	0.05	0.13	0.26	0.36
EXPORTS	(mil. cwt)	0.00	0.81	2.79	5.62	8.61
ENDING STOCKS	(mil. cwt)	0.00	1.16	3.78	7.97	13.88
PRICES:						
Loan Rate	(US$/cwt)	5.97	6.70	7.51	8.30	8.68
Season Ave. Farm Price	(US$/cwt)	0.00	-0.02	-0.07	-0.19	-0.24
Long Grain Farm Price	(US$/cwt)	0.00	-0.01	-0.04	-0.14	-0.15
Medium Grain Farm Price	(US$/cwt)	0.00	-0.03	-0.12	-0.29	-0.42
Export Price, FOB Houston (U.S. No. 2)	(US$/cwt)	0.00	-0.01	0.09	0.32	0.66
Medium Grain Price, FOB CA (U.S. No. 2)	(US$/cwt)	0.00	-0.06	-0.19	-0.36	-0.51
Direct Payment Rate	(US$/cwt)	-0.47	-0.94	-1.41	-1.88	-2.35
Average World Price (US$/cwt)	(US$/cwt)	0.00	-0.01	-0.03	-0.10	-0.14
INCOME FACTORS:						
Production Market Value	(mil. US$)	0.00	22.27	53.57	82.38	146.71
Total Direct Payments	(mil. US$)	-99.41	-198.82	-298.23	-397.64	-497.05
Total Loan Deficiency Payments	(mil. US$)	99.46	198.85	298.26	397.76	497.10
Total Income	(mil. US$)	0.05	22.30	53.60	82.50	146.76

Figure 1. CDF of Counter-Cyclical Payments for Scenario 1b, 2012-16 Average
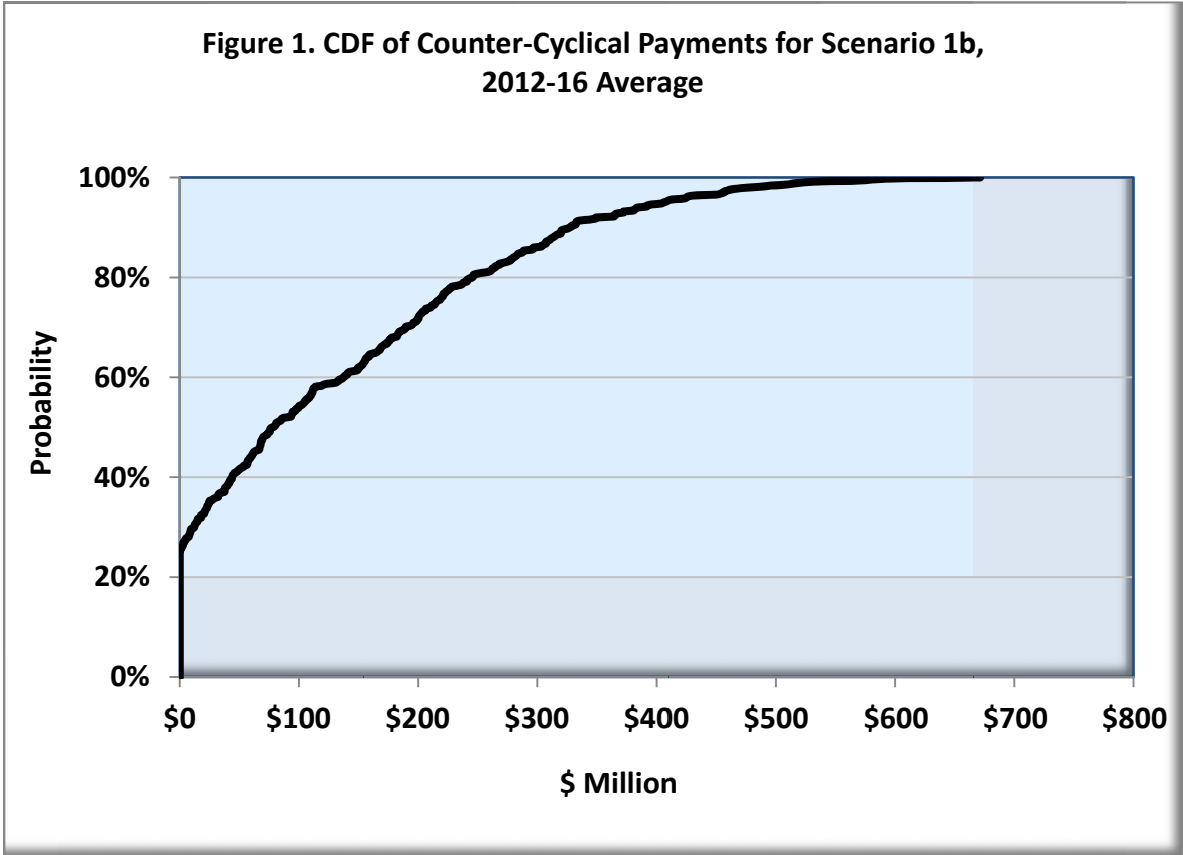
PDF Approximation:

|		
Lower Quartile	$0.0	
Average	$128.9	Million
Upper Quartile	$461.9	Million
Start	$0.0	
Threshold (Trigger), 25.5%	$0.7	Million
End	$671.3	Million

Figure 2. CDF of Counter-Cyclical Payments for Scenario 2b, 2012-16 Average
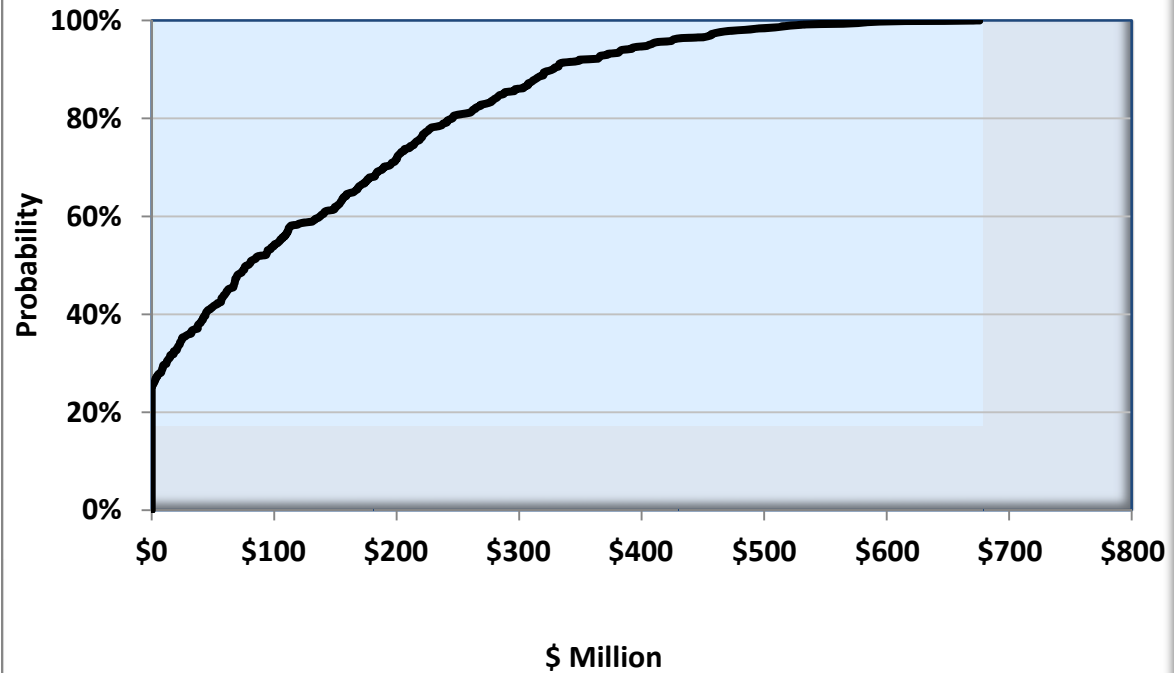
PDF Approximation:

Lower Quartile	$0.0	
Average	$128.9	Million
Upper Quartile	$463.3	Million
Start	$0.0	
Threshold		
(Trigger), 25.5%	$0.7	Million
End	$675.8	Million

Figure 3. CDF of Loan Deficiency Payments for Scenario 3b, 2012-16 Average
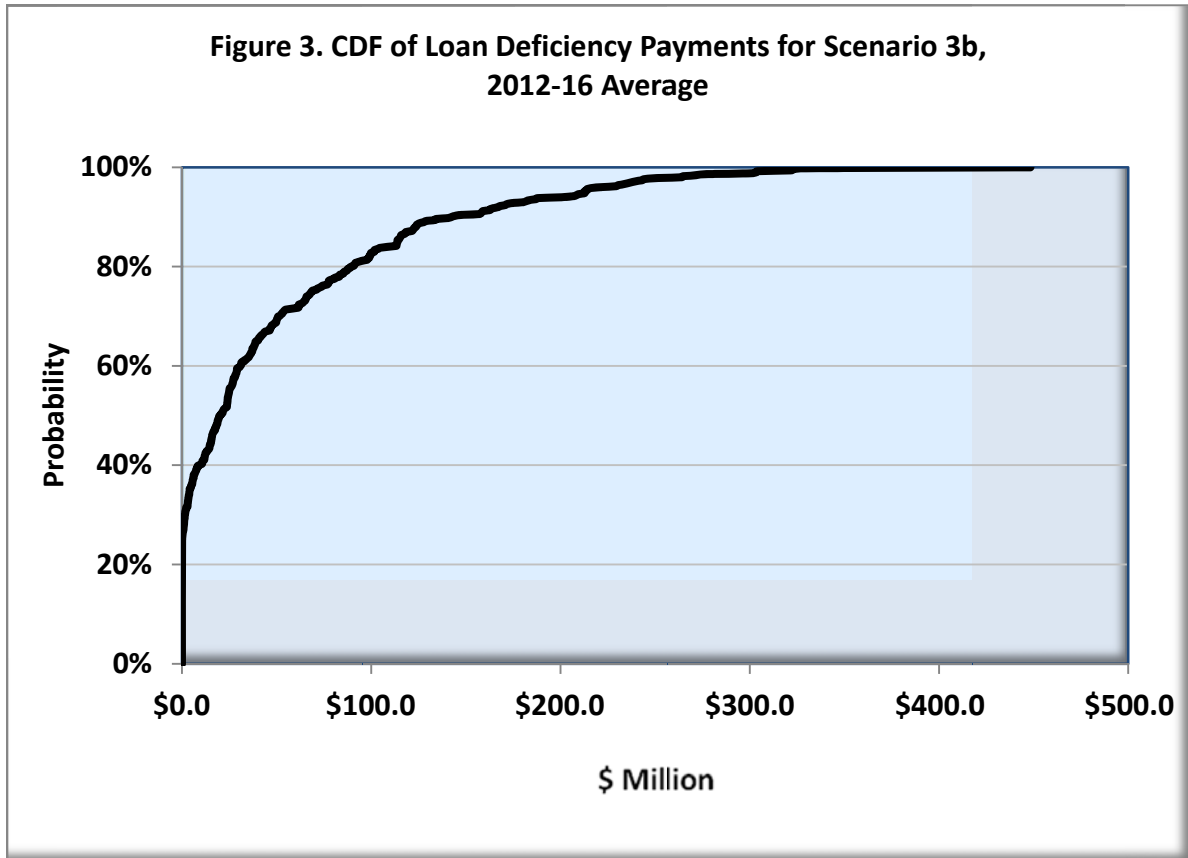
PDF Approximation:

Lower Quartile	$0.0	
Average	$49.1	Million
Upper Quartile	$244.0	Million
Start	$0.0	Million
Threshold (Trigger), 24.6%	$0.02	Million
End	$448.3	Million