ECONOMIC ANALYSIS OF THE AGRICULTURAL MARKET VOLATILITY RELIEF PROGRAM

EXECUTIVE SUMMARY

The Campaign for Family Farms and the Environment (CFFE) is a coalition of state and national organizations including the Missouri Rural Crisis Center, Iowa Citizens for Community Improvement, Dakota Rural Action, the Land Stewardship Project, Food & Water Watch and the Institute for Agriculture and Trade Policy. CFFE works to support family farms, rural communities and a fair and decentralized food and agriculture system, as well as oppose federal and state policies that prop up corporate factory farms (concentrated animal feeding operations, CAFOs) that drive out independent family farmers, hollow out our rural communities, treat animals inhumanely and pollute our land, water and air.

CFFE convened a series of discussions with key farmer members to map out policy changes to dismantle the harmful factory farm system. In addition to leveling the playing field for independent family farm livestock producers through competition reform and enforcing existing environmental laws, our farmer members returned repeatedly to how overproduction of corn and soybeans fuels the factory farm system.

The farm economy has long been plagued with overproduction, whether of corn, soybeans or milk. Punishing boom-and-bust cycles mean successful growing seasons that yield big harvests can actually do harm, as a glut of crops hit the market and drive down the price paid to farmers. And, because farmers have few options when prices decline year after year, they often grow more to make up in production what they can't get in price, even planting on vulnerable land or implementing intensive practices that damage soil and water quality. In years where weather conditions lead to poor yields, those farmers with something to sell can benefit from the higher prices caused by tight supplies. However, while these higher prices might be beneficial to those producers who had some crop to put on the market, higher prices will harm consumers of those crops, especially those who face food insecurity.

Today, there are no mechanisms in federal farm policy to prevent crop prices from falling and staying below what crops cost to produce, and no way for farmers to coordinate reductions in supply that could improve prices. Similarly, there are no reserves to tap in times of scarcity to protect consumers from price spikes. The result is a trend of mostly below cost prices for crops that drives overproduction and then creates tremendous pressure to find outlets for huge quantities of corn and soybeans — as ingredients in highly processed foods, ethanol or biodiesel for automobile fuel, exports

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that often undermine producers around the world and feed for animals on factory farms. This gap in farm policy also leaves the United States vulnerable to climate and political disruptions to agriculture markets and supply chains and creates often overwhelming, immediate obstacles for farmers interested in transitioning to new crops and methods of production.

A Better Approach

As markets inevitably change — whether for livestock feed, processed food inputs, ethanol or export markets — U.S. commodity crop producers will need policy tools to help them have an orderly transition to a more diverse, resilient system. There are proven policies to better balance supply and demand, and ensure a fair price for farmers that covers the cost of production and basic living costs.

We envision a modernized version of supply management policies that:

- Address past discrimination in the design and implementation of supply management programs and avoid the features that allowed tenant and socially disadvantaged farmers to be treated unfairly.
- Incorporate conservation programs and longer crop rotations to support more regenerative, climate-resilient and economically-resilient systems.
- Ensure a fair price for farmers that removes dramatic price volatility so that farmers can invest in more sustainable crop rotations and diversified operations that return livestock to the land.

A modernized grain reserve program based on price levels that are tied to farmers' cost of production would moderate prices at either extreme, ensure that farmers could generate viable incomes from the market rather than government payments, and protect consumers from periods of damaging high prices. To keep grain stocks held in reserve from getting too large and too costly for the government, a set aside program would keep production at a level that does not depress prices once the reserves have been filled, and to also serve as a short- and medium-term reserve in the form of idle production capacity, which could be tapped when supplies are low.

Making the types of changes envisioned in this report will require more than just the establishment of grain reserves and a set aside program. For these policies to succeed, many other farm policies must also be overhauled. Comprehensive reforms would be needed in U.S. Department of Agriculture (USDA) conservation programs, agricultural research and extension programs, regional food processing infrastructure, trade policy and other areas. Long-standing failures in USDA's civil rights infrastructure would have to be addressed to ensure that a new generation of programs are available to all producers and that past discrimination is not repeated.

Economic Analysis

This report analyzes the impact of grain reserve and set aside policy mechanisms using a POLYSYS[1] agricultural policy simulation model. POLYSYS is an agricultural model that is structured as a system of interdependent modules simulating county-level crop supply for the continental U.S., national crop demands and prices, national livestock supply and demand, and agricultural income. This simulation compares two policy scenarios using reserves and set asides to a baseline scenario of projected results with no interventions, and also analyzes the performance of the policy instruments under alternative and extreme conditions of yields and exports.

1 POLYSYS is an agricultural policy analysis simulation model, initially developed by Daryll E. Ray and extended by Daniel De La Torre Ugarte and Chad Hellwinckel. https://arec.tennessee.edu/wp-content/uploads/sites/17/2021/03/POLYSYS_documentation_1_overview.pdf

HOW AN AGRICULTURE MARKET VOLATILITY RELIEF PROGRAM WORKS

HIGH PRICES

Low yields or supply disruptions lead to high prices that drive unsustainable land use and lack of crop diversity

OVERSUPPLY

Supports meat industry's factory farm system with cheap feed

Supports processed food industry

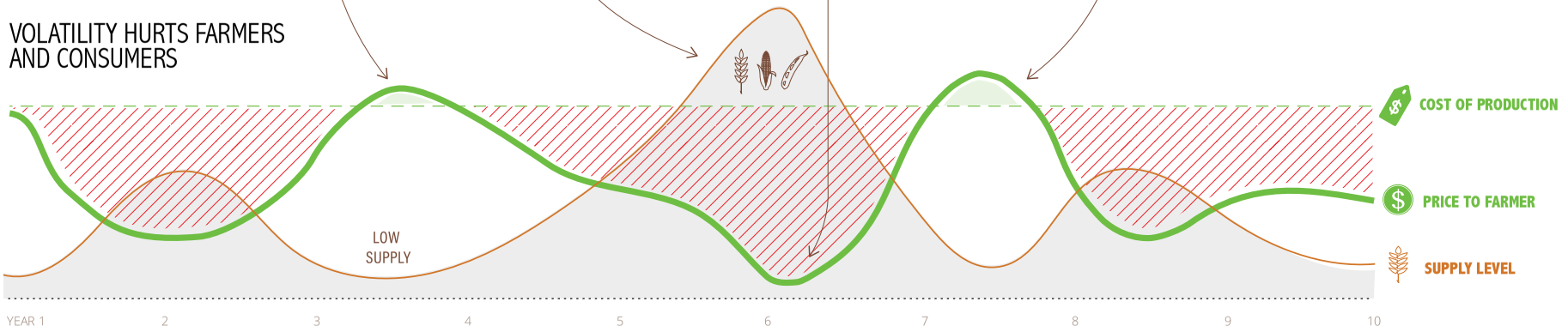
PRICE DROPS

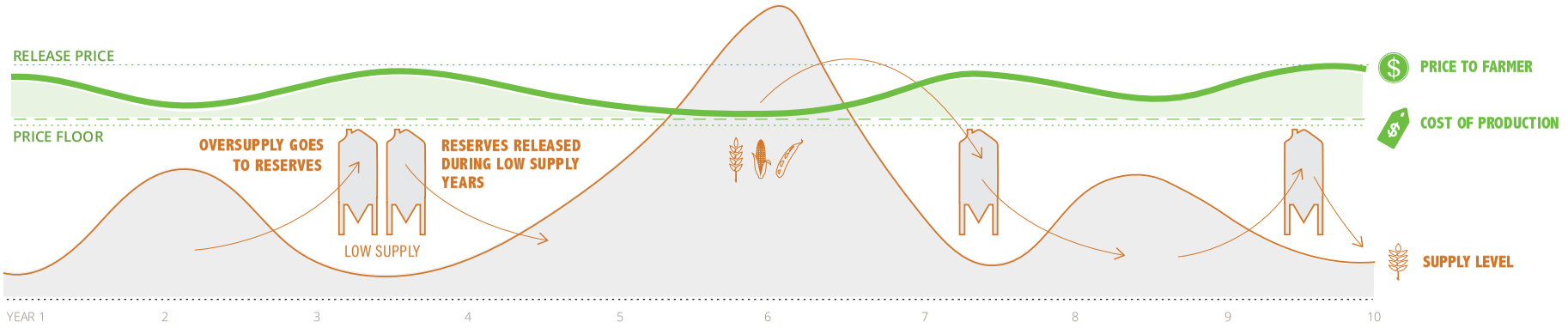
Most years, farmers are paid below cost of production, leading to higher government payments

PRICE SPIKES

Harms consumers, increases food insecurity for vulnerable populations

VOLATILITY HURTS FARMERS AND CONSUMERS





RESERVES REDUCE VOLATILITY

IMPORTS AND EXPORTS MANAGED
to keep prices fair for farmers

TRANSITION ASSISTANCE
to shift to pastured livestock and diverse crop mixes

STABLE PRICES
Reserves lead to price stability, furthering food security, fairly paid farmers and land conservation practices

FINDINGS

The model shows that a combination of reserves and set asides effectively supports prices, provides a reliable supply of commodities to consumers, increases realized net farm income, and reduces price and income variability.

- **Without intervention, prices will not cover cost of production.** USDA projections indicate that in many years, prices will sink below farmers' cost of production (Table 1, Figures 1-3).

Table 1. Crop Prices Needed to Cover Full Cost of Production vs. Projected Baseline Average Market Prices ($/bu.)

		2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Corn	**Cost of production**	**4.04**	**4.67**	**4.58**	**4.3**	**4.08**	**3.98**	**3.94**	**3.92**	**3.92**	**3.91**	**3.91**
	Projected avg market price	5.95	6.65	3.64	4.17	4.68	3.82	3.78	4.09	4.08	3.95	4
Wheat	**Cost of production**	**7.4**	**7.83**	**7.75**	**7.46**	**7.17**	**7.03**	**6.98**	**6.98**	**7**	**7.02**	**7.03**
	Projected avg market price	7.63	10.49	5.45	5.1	5.28	5.42	5.51	5.54	5.32	5.31	5.29
Soybeans	**Cost of production**	**9.92**	**10.89**	**10.72**	**10.51**	**10.28**	**10.14**	**10.07**	**10.02**	**10**	**9.99**	**9.98**
	Projected avg market price	13.35	14.4	11.74	9.75	9.27	10.18	10.36	9.8	9.89	10.22	10.2

Figure 1. Crop Prices Needed to Cover Full Cost of Production vs. Projected Baseline Average Market Prices (Corn)

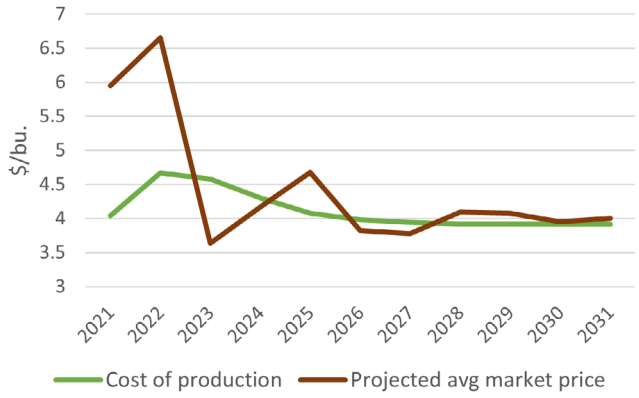


Figure 2. Crop Prices Needed to Cover Full Cost of Production vs. Projected Baseline Average Market Prices (Wheat)

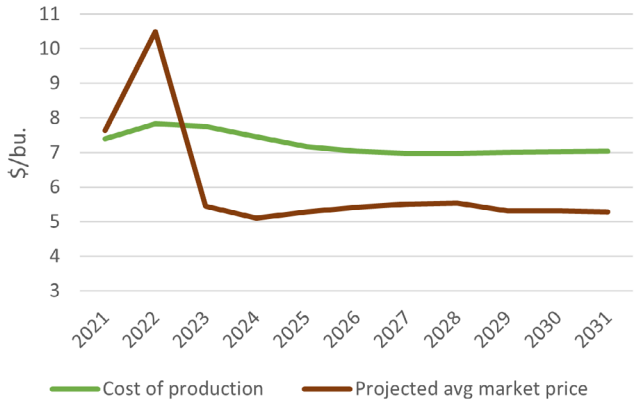


Figure 3. Crop Prices Needed to Cover Full Cost of Production vs. Projected Baseline Average Market Prices (Soybeans)

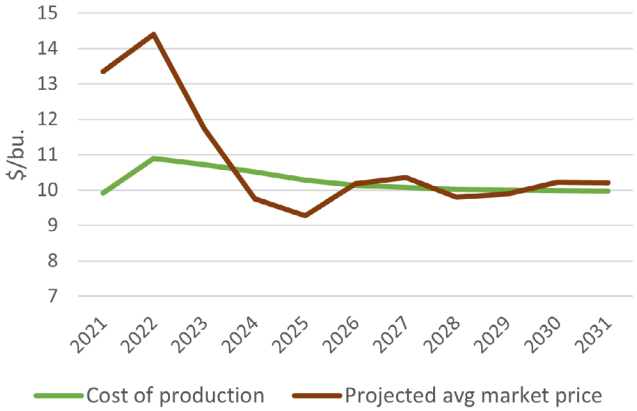


Table 7. Impact of Reserves and Set Asides on Price

Year	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Baseline: Expected Price Relative to Cost of Production with No Policy Intervention											
Corn	147%	142%	79%	97%	115%	96%	96%	104%	104%	101%	102%
Grain Sorghum	123%	120%	65%	75%	75%	71%	71%	71%	71%	70%	70%
Oats	66%	81%	43%	41%	42%	40%	39%	39%	39%	39%	38%
Barley	67%	105%	79%	69%	62%	58%	60%	63%	66%	67%	67%
Wheat	103%	134%	70%	68%	74%	77%	79%	79%	76%	76%	75%
Soybeans	135%	132%	110%	93%	90%	100%	103%	98%	99%	102%	102%
Cotton	109%	99%	72%	77%	81%	82%	83%	83%	83%	82%	83%
Rice	119%	123%	115%	105%	98%	94%	94%	93%	94%	94%	93%
Scenario 50-50: Expected Price Relative to Cost of Production with 50% Short Term and 50% Medium Term Set Aside											
Corn	147%	142%	100%	106%	107%	105%	105%	109%	109%	110%	108%
Grain Sorghum	123%	120%	76%	80%	82%	79%	79%	81%	80%	80%	78%
Oats	66%	81%	44%	45%	45%	45%	45%	48%	49%	50%	49%
Barley	67%	105%	76%	74%	74%	72%	73%	81%	85%	90%	89%
Wheat	103%	134%	101%	100%	102%	103%	99%	118%	102%	113%	96%
Soybeans	135%	132%	106%	101%	103%	102%	103%	107%	108%	109%	107%
Cotton	109%	99%	70%	75%	81%	83%	83%	85%	85%	85%	85%
Rice	119%	123%	101%	98%	100%	101%	101%	102%	103%	102%	100%
Scenario 70-30: Expected Price Relative to Cost of Production with 70% Short Term and 30% Medium Term Set Aside											
Corn	147%	142%	100%	106%	107%	105%	105%	109%	108%	109%	115%
Grain Sorghum	123%	120%	76%	80%	82%	79%	79%	81%	80%	80%	83%
Oats	66%	81%	44%	45%	45%	45%	45%	48%	48%	50%	54%
Barley	67%	105%	76%	74%	74%	72%	73%	81%	83%	88%	110%
Wheat	103%	134%	101%	100%	102%	103%	99%	118%	93%	123%	114%
Soybeans	135%	132%	106%	101%	103%	102%	103%	107%	107%	108%	112%
Cotton	109%	99%	70%	75%	81%	83%	83%	85%	85%	85%	88%
Rice	119%	123%	101%	98%	100%	101%	101%	102%	102%	102%	102%

- For the three crops that directly received the policy interventions, the average market prices were equal or above the full national average full cost of production for the 10-year period modeled (Table 7).

- The direct and indirect effects of the implementation of the two policy instruments resulted in substantially higher than baseline average market prices for all commodities and show a lower degree of variability

- For corn, wheat and soybeans, the reserves provide a higher than baseline level of stocks, with a lower degree of price variability. Significant improvement in the level of ending stocks and in the stock-to-use ratios are an indication that there would be an improved level of access for consumers to these commodities in times of market disruptions because of the existence of the reserves (Table 9).

- For the other major crops (sorghum, oats, barley, cotton and rice) the level of stocks were lower than the baseline because higher prices helped close the gap between full cost of production and the market price. Only in the case of rice were the indirect effects large enough to drive the price to the level of the full cost of production.

Table 9. Total Ending Stock to Use Ratio

Year	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Baseline Level of Stocks with No Policy Intervention											
Corn	13%	14%	21%	17%	15%	18%	18%	16%	17%	17%	17%
Grain Sorghum	7%	13%	8%	8%	9%	11%	10%	9%	8%	8%	7%
Oats	20%	19%	29%	33%	32%	36%	37%	36%	35%	36%	36%
Barley	20%	28%	31%	46%	56%	59%	57%	53%	48%	46%	46%
Wheat	37%	39%	41%	39%	37%	35%	34%	34%	34%	34%	35%
Soybeans	4%	7%	3%	9%	10%	5%	5%	7%	6%	5%	5%
Cotton	16%	26%	28%	22%	19%	19%	19%	18%	18%	18%	18%
Rice	21%	11%	9%	13%	17%	19%	20%	19%	18%	18%	18%
Scenario 50-50											
Corn	12%	14%	19%	21%	23%	24%	25%	25%	26%	26%	27%
Grain Sorghum	6%	12%	9%	6%	6%	7%	6%	4%	3%	3%	3%
Oats	19%	18%	27%	25%	25%	24%	23%	19%	18%	15%	16%
Barley	18%	28%	34%	40%	41%	40%	39%	30%	22%	14%	16%
Wheat	42%	45%	59%	78%	96%	114%	128%	124%	131%	122%	130%
Soybeans	3%	5%	5%	8%	9%	11%	12%	12%	13%	14%	16%
Cotton	15%	26%	30%	23%	19%	18%	18%	17%	17%	16%	17%
Rice	20%	10%	13%	15%	16%	15%	15%	15%	14%	14%	15%
Scenario 70-30											
Corn	12%	14%	19%	21%	23%	24%	25%	25%	26%	26%	26%
Grain Sorghum	6%	12%	9%	6%	6%	7%	6%	4%	3%	3%	4%
Oats	19%	18%	27%	25%	25%	24%	23%	19%	19%	16%	14%
Barley	18%	28%	34%	40%	41%	40%	39%	30%	24%	16%	15%
Wheat	42%	45%	59%	78%	96%	114%	128%	124%	130%	133%	109%
Soybeans	3%	5%	5%	8%	9%	11%	12%	12%	14%	15%	14%
Cotton	15%	26%	30%	23%	19%	18%	18%	17%	17%	16%	15%
Rice	20%	10%	13%	15%	16%	15%	15%	15%	14%	14%	14%

Table 12. Value of Export and Realized Net Farm Income (% Change from Baseline)

Year	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Scenario 50-50											
Value of Exports	100%	100%	105%	103%	100%	99%	98%	100%	98%	98%	96%
Realized Net Farm Income	100%	100%	109%	115%	109%	109%	110%	111%	110%	111%	109%
Scenario 70-30											
Value of Exports	100%	100%	105%	103%	100%	99%	98%	100%	98%	99%	98%
Realized Net Farm Income	100%	100%	109%	115%	109%	109%	110%	111%	108%	112%	112%

- Under the policy interventions, although the volume of exports might decline in the face of higher prices and less production in some years, the value of exports for the total eight crops was at around baseline levels (Table 12).
- Realized net farm income for farmers growing commodities was above baseline nearly every year.

Table 2. Level of Crop Reserves by Scenario (mill bu.)

Year	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Scenario 50-50											
Corn	0	0	709	854	998	1166	1336	1454	1575	1683	1820
Wheat	88	0	755	1097	1388	1701	2000	1973	2000	1913	2000
Soybeans	0	0	59	128	200	274	347	402	455	504	562
Scenario 70-30											
Corn	0	0	709	854	998	1166	1336	1454	1587	1704	1781
Wheat	88	0	755	1097	1388	1701	2000	1973	2000	2000	1646
Soybeans	0	0	59	128	200	274	347	402	460	512	546

- The level of storage payments is capped because the maximum levels of reserves are also capped. The maximum level of storage payments could reach $2.4 billion per year. [According to the Congressional Budget Office, current commodity programs are expected to generate payments of more than $44 billion for the eight major commodity crops from 2023 through 2032.]
- Realized net farm income levels were substantially above baseline levels with a lower degree of variability for both scenarios. (Table 26)
- The analysis included two different levels of annual and medium-term set asides. The larger the proportion of medium-term set asides, the less flexibility the sector has to adjust to annual disturbances, and the higher price and income variability becomes.
- The results of the analysis show that farmers would get higher prices and realized net farm income overall, while giving up the probability of high price spikes in exchange for a lower probability of facing very low prices and realized net farm income.
- The results of the analysis show that consumers would face on average higher price levels than the baseline, but in exchange, they will avoid very high prices and get access to commodities at reasonable prices in the event of global disruptions.

Table 26. Realized Net Farm Income by Scenario: Probability Distribution (list Mean, Min, Max)

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
BASELINE											
Mean (Bill $)	134.1	130.2	102.5	81.8	77.6	75.3	73.5	72.5	71.8	75.4	77.7
Standard Deviation	2.8	4.6	9.2	12.6	11.3	12.2	13.7	14.2	15.9	14.5	14.4
SD as % of Mean (CV)	2.05	3.5	8.99	15.42	14.56	16.17	18.63	19.59	22.08	19.18	18.6
Minimum	127.4	120.9	84.6	49.0	47.2	48.1	43.3	38.8	37.6	42.7	42.1
10% Prob less/Eq to	130.4	124.2	92.9	67.8	63.4	59.6	55.9	55.5	53.2	58.2	59.2
25% Prob less/Eq to	132.7	126.3	95.6	72.9	69.5	67.7	64.8	62.6	59.9	65.3	67.6
33% Prob less/Eq to	132.9	127.6	97.9	75.7	71.2	69.9	66.3	65.5	62.7	68.6	69.6
50% Prob less/Eq to	133.4	129.9	100.6	79.8	77.0	74.8	72.0	72.5	70.1	74.5	76.2
66% Prob less/Eq to	136.3	132.4	104.2	86.0	81.3	80.5	77.2	78.7	78.7	78.8	83.7
75% Prob less/Eq to	136.5	133.5	107.6	89.1	85.7	84.2	82.3	81.0	80.3	82.5	86.4
90% Prob less/Eq to	137.5	136.6	114.5	95.8	92.7	92.5	92.2	88.5	93.1	93.9	97.6
Maximum	138.4	139.3	131.9	115.7	105.7	101.8	110.1	106.8	119.9	111.8	109.7
SCENARIO 50-50											
Mean (Bill $)	133.3	117.1	107.4	103.3	98.0	93.3	91.1	91.1	92.5	97.5	99.6
Standard Deviation	2.2	3.8	5.3	5.5	4.1	3.3	3.6	3.1	3.7	3.1	2.9
SD as % of Mean (CV)	1.67	3.28	4.89	5.32	4.2	3.54	3.95	3.45	4.04	3.14	2.9
Minimum	128.1	109.5	97.7	94.2	90.5	87.4	82.7	83.0	80.8	90.7	94.1
10% Prob less/Eq to	130.4	112.9	100.4	97.4	93.8	90.2	87.7	87.7	88.8	93.7	95.9
25% Prob less/Eq to	131.7	114.3	103.9	99.8	95.7	91.1	89.2	89.2	90.5	95.8	97.5
33% Prob less/Eq to	132.7	114.9	105.4	100.9	96.5	91.2	89.9	90.0	91.0	96.2	98.1
50% Prob less/Eq to	133.6	116.4	106.6	103.2	97.5	92.6	90.9	90.8	92.2	97.3	99.9
66% Prob less/Eq to	134.4	118.5	109.0	104.1	98.5	94.3	91.9	91.8	93.8	98.3	100.6
75% Prob less/Eq to	134.6	119.1	110.2	104.6	99.0	95.2	92.7	92.7	94.1	99.2	101.2
90% Prob less/Eq to	135.3	122.4	113.8	109.0	102.0	96.4	94.0	93.9	96.5	100.5	102.2
Maximum	138.5	127.5	122.3	128.0	115.8	108.8	109.6	111.1	112.3	112.0	112.4
SCENARIO 70-30											
Mean (Bill $)	133.3	117.1	107.4	103.3	98.0	93.3	91.1	90.9	92.1	97.2	99.2
Standard Deviation	2.2	3.8	5.3	5.5	4.1	3.3	3.6	3.2	3.7	3.2	2.8
SD as % of Mean (CV)	1.67	3.28	4.89	5.32	4.2	3.52	3.92	3.48	3.96	3.26	2.81
Minimum	128.1	109.5	97.7	94.2	90.5	87.4	82.7	83.0	80.8	90.6	94.0
10% Prob less/Eq to	130.4	112.9	100.4	97.4	93.8	90.2	87.7	87.7	88.1	93.7	95.9
25% Prob less/Eq to	131.7	114.3	103.9	99.8	95.7	91.1	89.2	89.1	90.1	95.3	97.2
33% Prob less/Eq to	132.7	114.9	105.4	100.9	96.5	91.2	89.9	89.6	90.8	95.8	97.6
50% Prob less/Eq to	133.6	116.4	106.6	103.2	97.5	92.6	90.8	90.8	92.0	97.1	99.1
66% Prob less/Eq to	134.4	118.5	109.0	104.1	98.5	94.3	91.7	91.3	93.3	97.9	100.3
75% Prob less/Eq to	134.6	119.1	110.2	104.6	99.0	95.1	92.4	92.3	94.0	98.6	100.7
90% Prob less/Eq to	135.3	122.4	113.8	109.0	102.0	96.4	94.0	93.9	95.8	100.5	101.8
Maximum	138.5	127.5	122.3	128.0	115.8	108.8	109.6	111.1	112.3	111.5	*109.9*