THE 1-2-3 SCENARIOS:
AN ANALYSIS OF SAFETY NET ALTERNATIVES

Prepared at the Request
of Rep. Charles Stenholm

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Executive Summary

At the request of Representative Charles Stenholm, FAPRI has analyzed the impacts of three safety net alternatives. Impacts of the scenarios are measured against the FAPRI January 2000 baseline projections. In order to provide a more complete picture of the potential impacts of the proposed changes, the analysis incorporates the major sources of variability that provide uncertainties around the baseline projections. Variability is introduced into the FAPRI modeling system through multiple draws on data such as yields, costs of production, and other variables that have an unpredictable component. The analysis not only evaluates impacts at the average, but also determines the range of possible impacts based on the resulting variability of supply, demand and price.

Key Assumptions
- Assume that authority exists for additional spending above baseline levels for the 2001-05 crop years.
- Under the scenarios, the additional funds are distributed under three separate policy options.
    - A Modified Supplemental Income Payment (MSIP) program where payments are made when the national per-acre value falls below some specified percentage of the per-acre average returns for the 1995-99 period.
    - Increase marketing loan rates (LR) above levels assumed in the FAPRI baseline. All rates are increased by the same percentage.
    - Direct payments in the form of Market Loss Assistance (MLA) payments.
- Each policy option is evaluated at 3 different spending levels
    - Average $1 billion/crop year above baseline levels for the 2001-05 crop years.
    - Average $2 billion/crop year above baseline for the same years.
    - Average $3 billion/crop year above baseline for the same years.

Key Results
- Overall acreage and price impacts under the options are relatively small. No acreage impacts are assumed with the decoupled direct payments.
- On average, MSIP provides the largest per-acre payments to cotton than either of the other two options. Corn, wheat and rice receive larger payments under the MLA alternative than under either the MSIP or LR options. Given the relationship between projected soybean prices and the loan rate, the LR option outdistances the other two in terms of additional revenue to soybeans.
- The MLA program provides the least variability in government outlays while MSIP reduces the variability in per-acre crop returns.
- At the national level, MSIP provides the greatest downside risk protection on per-acre crop returns.
- Important Note: These results are not "universal." They are conditioned on the construction of the particular alternatives as well as the projections in the FAPRI baseline. In addition, results at the national level may not hold at the farm level due to a variety of local factors.

Introduction
At the request of Representative Charles Stenholm of Texas, the Food and Agricultural Policy Research Institute (FAPRI) has analyzed the impacts of three safety net alternatives. In addition to input from Congressman Stenholm's office, several discussions were held with House Agriculture Committee majority staff as well as with majority and minority staff from the Senate Agriculture Committee. It should be made clear however, that those conversations were for purposes of insuring that the analysis be as complete as possible and do not reflect any position those offices may have related the options analyzed.

The impacts of the scenarios are measured against FAPRI's January 2000 baseline projections, details of which are found in FAPRI-UMC Report #02-00. This report presents the assumptions, methodology and results of the analysis. A detailed discussion of the methodologies occurs in the Appendix.

Assumptions
For this analysis, the assumption is made that authority exists for additional spending above baseline levels for the 2001-05 crop years. Spending under the FAPRI baseline reflects a continuation of current legislation. As a result, the bulk of net outlays by the Commodity Credit Corporation (CCC) are associated with contract payments under the Federal Agriculture Improvement and Reform (FAIR) Act as well the Conservation Reserve Program (CRP).

Under the scenarios, the additional funds are distributed under three separate policy options:
1) A modified Supplemental Income Payment program
2) Marketing loan rates increased above baseline levels
3) Direct payments in the form of Market Loss Assistance payments.

In addition, each policy option is evaluated at three different spending levels:
i) Average $1 billion/crop year above baseline levels for the 2001-05 crop years
ii) Average $2 billion/crop year above baseline levels for the 2001-05 crop years
iii) Average $3 billion/crop year above baseline levels for the 2001-05 crop years.

With each alternative evaluated at the different spending levels, the analysis contains nine alternative scenarios, each of which is compared to the baseline. The tables included in this document give detailed impacts of each of the nine scenarios. However, in the interest of time and space, the impacts of only the $2-billion spending level will be discussed in detail. Impacts of the alternative scenarios are similar in direction but vary in magnitude.

A Modified Supplemental Income Payment (MSIP) Program
After discussions with Congressional staff, the MSIP program analyzed by FAPRI is similar to earlier proposals by Representative Stenholm, with one key difference. The reference period used to determine payments is held fixed at the 1995-99 average. Payments are determined individually for each crop by using the following steps.

1) U.S. Value of Production = the maximum of the farm price or the loan rate for the commodity, multiplied by national production
2) U.S.Value per Acre = U.S. Value of Production/Harvested Acres

3) Fixed Reference Period = Average Value per Acre over the 1995-99 period
4) Per Acre SIP = if the Current Year Value per Acre falls below the **Trigger %** times the Fixed Reference Period Value per Acre, a payment is made that is equal to the difference of the two
5) Total SIP = Per-Acre SIP*U.S. Harvested Acres

It is important to note that the program is based on national numbers. If a payment is made in a given year, each producer of a particular crop will get the same per-acre payment. For example, a corn producer in Alabama will receive the same per-acre payment as a corn producer in Iowa. Thus a producer in Alabama could lose a crop, but should the U.S. Value of Production not fall low enough, the Alabama producer would not receive a payment under this program. The selected trigger percent is key for determining program costs and benefits.

Higher Marketing Loan Rates (LR)
The second alternative increases marketing loan rates above baseline levels for the 2001-05 crops. **A key assumption is that all rates are increased by the same percentage above baseline levels.** The baseline plays a key role in evaluating the impacts of this alternative. In the FAPRI baseline, loan rates for each crop are held fixed through 2001, but then allowed to adjust based on formulas in the FAIR Act. This results in lower rates for the 2002 crop compared to 2001 levels. This allows for larger percentage increases in scenario loan rates than would have been the case had baseline loan rates been held fixed at 2001 levels. In addition, the relationship between projected prices and loan rates has a significant impact on the importance of a loan rate increase. Given the baseline, soybeans and cotton will on average enjoy a much larger benefit from higher loan rates than corn and wheat.

Additional Market Loss Assistance (MLA) Payments
The third alternative makes direct payments in the fashion of the MLA payments from the previous and pending assistance packages. Under this option, funds are included for contract commodities as well as oilseeds. Based on the previous allocations, feed grains receive approximately 50 percent of additional funds while wheat collects 24 percent of the additional spending. Payments to oilseeds account for 8 percent of the total.

As mentioned earlier, each of three alternatives is evaluated at the three different levels of additional spending (relative to the FAPRI baseline). A summary of parameters required to meet the spending targets is given in Table 1.

To achieve an annual average of $1 billion in additional spending for the 2001-05 crop years, a trigger of 89.80 percent is necessary under MSIP. In other words, payments will be triggered when the national per-acre value of a crop falls below 89.80 percent of the 1995-99 reference value per acre. As the spending target increase to $2 billion, the trigger is increased to 93.86 percent. For $3 billion in additional spending, the trigger moves up to 96.75 percent. It should be noted that it takes less of an increase in the trigger to move from the $2-billion level up to the $3-billion mark. Again, these are the percentages to meet exact spending levels. It is unlikely that the triggers would be set to the second decimal place in legislation, but for exact comparison purposes, these precise percentages were applied.

In order to increase annual spending by $1 billion above baseline levels, the LR scenario requires an increase of 3.50 percent for all crops. For the higher levels of $2 billion and $3 billion, loan rates increase by 6.67 percent and 9.60 percent, respectively. As discussed earlier, no adjustment of the relative relationships between loan rates were made in this analysis. The same percentage increase is applied across the board.

Table 1. Summary of Key Assumptions

	Average Annual Additional Spending		
	$1 Billion	$2 Billion	$3 Billion
MSIP Trigger %	89.80%	93.86%	96.75%
LR Increase Above Baseline	3.50%	6.67%	9.60%
MLA Payments	$1 bil/crop year	$2 bil/crop year	$3 bil/crop year

Scenario Impacts
The impacts of the alternative safety net proposals that achieve additional spending of $2 billion per year are discussed in detail in the following sections. Quantitative measures of the impacts of all options analyzed are given in Tables 2 through 8. The tables summarize the impacts of each of the nine scenarios relative to the FAPRI baseline projection averages. In all cases, the impacts represent a comparison of the average results from the 500 stochastic simulations. Further discussion on the performance of the policies at the market extremes will occur in a later section. A detailed discussion of the stochastic methodology is given in the Appendix.

Impacts on Key Aggregate Measures Under the $2 Billion Scenario
By design, each policy alternative increases net CCC outlays by an annual average of $2 billion above baseline levels for the 2001-05 crops. Due to the timing of crop and fiscal years, the total additional costs of $10 billion are spread over fiscal years 2001-2006 (Table 2). Year-by-year cost impacts can be found in Table 3.

In examining the year-by-year patterns under each of the three options, timing becomes an important issue. This is particularly true for government cost and farm income comparisons as the former is given in fiscal years and the latter in calendar years. To further complicate the story, crop per-acre returns are given on a crop year basis. For example, Table 3 suggests that net farm income declines in 2001 under MSIP. This is due to the increased acreage and lower prices expected under MSIP relative to the baseline. However, due to the design of the MSIP option, it is assumed that payments would not be made until some months into the crop year when yields and prices are known – similar to the way deficiency payments were calculated under the 1985 and 1990 programs. The MLA and LR options would provide their gains to producers within calendar year 2001, thus suggesting the immediate increase in farm income. Conversely, the MSIP option makes its' final payments in calendar year 2006, while the MLA and LR payments would have already occurred. Thus, the net farm income numbers under MSIP are higher than under the LR or MLA options in 2006. Again, it is a question of timing. Each option provides an additional $5, $10 or $15 billion to the sector over the period 2001-2006. The difference is when the money is provided and what effect the monies have on production decisions.

4

The key word in this discussion for the MSIP and LR options is 'average'. The FAPRI baseline suggests that market prices will remain low through the 2002/03 crop year. In later years, general economic growth on a global basis is expected to provide some support to the export market and thus to prices. Given weaker commodity prices in the early years of the analysis, costs of the MSIP and LR programs increase relative to the baseline by more than $ 2 billion per year in fiscal 2002 and 2003. As prices and market revenues strengthen in the later years, additional spending under each of these programs ranges only $1 and $1.5 billion above baseline. Under the MLA program, with its' fixed payments, exactly $2 billion is allocated in each of fiscal 2002-2006.

Table 2. Summary of Impacts on Key Aggregate Measures

	Net CCC Outlays Total Increase Above Baseline, FY 01-06	Net Farm Income Total Increase Above Baseline, CalYr 01-06	8-Crop Planted Area Avg. Increase Above Baseline, Crop 01-05
	(Billion Dollars)	(Billion Dollars)	(Million Acres)
MSIP/$1 Bil	5.0	3.9	0.37
LR/$1 Bil	5.0	3.9	0.14
MLA/$1 Bil	5.0	4.5	0.00
MSIP/$2 Bil	10.0	7.4	0.66
LR/$2 Bil	10.0	7.8	0.25
MLA/$2 Bil	10.0	9.1	0.00
MSIP/$3 Bil	15.0	11.0	0.90
LR/$3 Bil	15.0	11.8	0.36
MLA/$3 Bil	15.0	13.6	0.00

As shown in Table 2, U.S. net farm income increases above baseline levels, but by less than the amount of additional spending. In all cases, a portion of the additional government payments is captured by higher land values and cash rents. The MLA program results in an increase of $909 million over calendar 2001-2006, the largest impact of the three alternatives. The MSIP and LR options increase farm income by $738 million and $782 million, respectively. The differences between these options and the MLA program can be attributed to the impacts on overall acreage and production.

Since payments under the MSIP and LR alternatives directly depend on either the number of acres harvested or the number of bushels produced, it is reasonable to expect that those programs will have an impact on overall acreage levels. With inelastic demand for the major crops, an increase in overall production levels causes a proportionately larger decline in price. As a result, overall market net income to the crops sector falls. Although a portion of this decline is captured in lower feed costs to the livestock sector, the total impact is negative on net farm income. The sum effect is that $1 spent under each these programs gives slightly less of a bump to net farm income than $1 spent in direct decoupled payments.

A few comments should be made regarding the impacts of the "decoupled" market loss assistance payments. There is significant debate regarding the impacts of the "decoupled" payments. It is commonly accepted that the payments definitely have an impact on land values and cash rents. As stated earlier, those impacts are captured in the farm income estimates. However, there are no acreage impacts assigned to the payments. We do not conclude that MLA payments would have no effect on acreage decisions, but we are not able to estimate any effects with confidence. It does seem clear however that payments tied directly to production levels, such as under MSIP and LR options, should have greater impacts on production than a similar amount of MLA payments that are not tied directly to production.

Impacts On the Crops Sector Under the $2 Billion Scenario (Tables 4-8)
While it is expected that there will be shifts in acreage under the MSIP and LR programs, the overall magnitudes are small. In most cases, the shifts are less than 1 million acres. As a result, price impacts are also rather modest.

Given the relative benefits under the MSIP option, soybean acreage declines from baseline levels by an average of 380 thousand acres over the 2001-05 period. A portion of those acres move into corn, while cotton and rice also pick up some acreage. Wheat acreage increases by an average of 360 thousand acres due to the expected payments under MSIP.

Under the LR alternative, many of the acreage shifts are in the opposite direction from the MSIP program due to the relative benefits of increased loan rates. For commodities that are "deep in the money" with baseline loan rates, such as soybeans and cotton, increased loan rates generate a substantial benefit relative to corn and wheat. Not surprisingly, soybean acreage increases by 550 thousand acres above the baseline, while cotton gains 320 thousand acres. Again, many of those acres come from corn and wheat.

The price adjustments indicated in the analysis reflect the production changes brought about by the acreage shifts. As mentioned earlier, the changes are relatively modest with corn, soybean and wheat prices moving by no more than 1 to 5 cents per bushel. Changes are a bit more substantial for cotton and rice with declines under MSIP of approximately 4 percent from baseline levels.

After incorporating the payments under the three alternatives, per-acre returns show some noticeable differences when compared across the different crops. Of the three options, corn, wheat and rice returns show the largest gains under the MLA program. For soybeans, higher loan rates under the LR option generate the most additional income. The MSIP program outdistances the other two options for cotton.

Table 3. Impacts on Key Aggregate Measures

	2001	2002	2003	2004	2005	2006	01-06 Sum or Avg
Net CCC Outlays, Fiscal Year				Billion Dollars			
Baseline, Stochastic Average	15.62	13.34	10.89	10.59	10.27	10.21	
				Average Change from Baseline			
MSIP/$1 Bil	0.08	1.27	1.50	0.98	0.74	0.43	5.00
LR/$1 Bil	0.16	1.34	1.00	0.89	0.86	0.76	5.00
MLA/$1 Bil	-0.00	1.00	1.00	1.00	1.00	1.00	5.00
MSIP/$2 Bil	0.12	2.49	2.86	2.02	1.55	0.96	10.00
LR/$2 Bil	0.32	2.64	2.00	1.79	1.73	1.53	10.00
MLA/$2 Bil	-0.00	2.00	2.00	2.00	2.00	2.00	10.00
MSIP/$3 Bil	0.14	3.72	4.10	3.05	2.40	1.60	15.00
LR/$3 Bil	0.48	3.90	2.98	2.69	2.62	2.32	14.99
MLA/$3 Bil	-0.00	3.00	3.00	3.00	3.00	3.00	15.00
Net Farm Income, Calendar Year				Billion Dollars			
Baseline, Stochastic Average	40.19	40.36	41.03	40.49	40.29	41.17	
				Average Change from Baseline			
MSIP/$1 Bil	-0.12	1.04	1.19	0.78	0.58	0.42	3.89
LR/$1 Bil	1.02	0.85	0.69	0.69	0.70	-0.04	3.90
MLA/$1 Bil	0.90	0.91	0.91	0.91	0.91	0.01	4.55
MSIP/$2 Bil	-0.14	1.99	2.16	1.49	1.09	0.80	7.38
LR/$2 Bil	1.99	1.71	1.39	1.38	1.41	-0.07	7.82
MLA/$2 Bil	1.80	1.81	1.82	1.82	1.82	0.02	9.09
MSIP/$3 Bil	-0.13	2.92	3.06	2.22	1.68	1.24	10.99
LR/$3 Bil	2.93	2.55	2.10	2.09	2.14	-0.06	11.75
MLA/$3 Bil	2.70	2.72	2.72	2.73	2.73	0.03	13.64
8-Crop Planted Area, Crop Year				Million Acres			
Baseline, Stochastic Average	256.82	257.53	257.75	258.42	258.67		257.84
				Average Change from Baseline			
MSIP/$1 Bil	0.84	0.40	0.33	0.14	0.16		0.37
LR/$1 Bil	0.26	0.10	0.11	0.09	0.09		0.13
MLA/$1 Bil	0.00	0.00	0.00	0.00	0.00		0.00
MSIP/$2 Bil	1.29	0.75	0.61	0.33	0.31		0.66
LR/$2 Bil	0.53	0.18	0.20	0.17	0.18		0.25
MLA/$2 Bil	0.00	0.00	0.00	0.00	0.00		0.00
MSIP/$3 Bil	1.64	1.05	0.85	0.50	0.47		0.90
LR/$3 Bil	0.81	0.23	0.27	0.25	0.25		0.36
MLA/$3 Bil	0.00	0.00	0.00	0.00	0.00		0.00

Table 4. Impacts on U.S. Corn

Crop Year	2001	2002	2003	2004	2005	Average
Planted Area, Million Acres						
Baseline, Stochastic Average	78.66	79.52	79.12	79.78	79.47	79.31
			Average Change from Baseline			
MSIP/$1 Bil	0.32	0.14	0.16	-0.02	0.02	0.12
LR/$1 Bil	-0.00	-0.15	-0.11	-0.09	-0.07	-0.08
MLA/$1 Bil	0.00	0.00	0.00	0.00	0.00	0.00
MSIP/$2 Bil	0.54	0.13	0.18	-0.09	-0.00	0.15
LR/$2 Bil	0.03	-0.29	-0.22	-0.17	-0.12	-0.15
MLA/$2 Bil	0.00	0.00	0.00	0.00	0.00	0.00
MSIP/$3 Bil	0.61	0.16	0.23	-0.12	-0.03	0.17
LR/$3 Bil	0.08	-0.42	-0.30	-0.24	-0.17	-0.21
MLA/$3 Bil	0.00	0.00	0.00	0.00	0.00	0.00
Farm Price, $/Bushel						
Baseline, Stochastic Average	2.15	2.17	2.25	2.26	2.33	2.23
			Average Change from Baseline			
MSIP/$1 Bil	-0.01	-0.01	-0.01	-0.00	0.00	-0.01
LR/$1 Bil	0.00	0.01	0.01	0.01	0.01	0.01
MLA/$1 Bil	0.00	0.00	0.00	0.00	0.00	0.00
MSIP/$2 Bil	-0.02	-0.01	-0.01	0.00	0.00	-0.01
LR/$2 Bil	0.00	0.01	0.01	0.01	0.01	0.01
MLA/$2 Bil	0.00	0.00	0.00	0.00	0.00	0.00
MSIP/$3 Bil	-0.02	-0.01	-0.01	0.00	0.00	-0.01
LR/$3 Bil	0.00	0.02	0.02	0.02	0.02	0.01
MLA/$3 Bil	0.00	0.00	0.00	0.00	0.00	0.00
Per-Acre Returns Above Variable Costs, $/Acre						
Baseline, Stochastic Average	151.63	143.73	154.04	156.74	167.93	154.82
			Average Change from Baseline			
MSIP/$1 Bil	2.79	5.79	2.77	2.48	1.30	3.03
LR/$1 Bil	5.05	3.68	2.94	3.16	3.20	3.61
MLA/$1 Bil	5.95	5.88	5.90	5.85	5.87	5.89
MSIP/$2 Bil	7.83	11.21	6.10	5.43	3.00	6.71
LR/$2 Bil	10.11	7.36	5.91	6.38	6.59	7.27
MLA/$2 Bil	11.89	11.75	11.80	11.70	11.73	11.78
MSIP/$3 Bil	13.27	15.97	9.40	8.37	4.95	10.39
LR/$3 Bil	15.11	10.97	8.77	9.64	10.03	10.90
MLA/$3 Bil	17.84	17.63	17.70	17.54	17.60	17.66

Table 5. Impacts on U.S. Soybeans

Crop Year	2001	2002	2003	2004	2005	Average
Planted Area, Million Acres						
Baseline, Stochastic Average	72.61	71.56	72.39	72.03	73.09	72.34
			Average Change from Baseline			
MSIP/$1 Bil	-0.93	-0.41	-0.50	-0.33	-0.33	-0.50
LR/$1 Bil	0.36	0.33	0.27	0.25	0.21	0.28
MLA/$1 Bil	0.00	0.00	0.00	0.00	0.00	0.00
MSIP/$2 Bil	-1.07	-0.14	-0.33	-0.12	-0.27	-0.38
LR/$2 Bil	0.68	0.64	0.53	0.49	0.41	0.55
MLA/$2 Bil	0.00	0.00	0.00	0.00	0.00	0.00
MSIP/$3 Bil	-0.89	0.03	-0.19	0.03	-0.15	-0.23
LR/$3 Bil	0.96	0.93	0.76	0.73	0.60	0.80
MLA/$3 Bil	0.00	0.00	0.00	0.00	0.00	0.00
Farm Price, $/Bushel						
Baseline, Stochastic Average	4.54	4.90	4.91	5.10	5.12	4.91
			Average Change from Baseline			
MSIP/$1 Bil	0.09	0.05	0.04	0.03	0.03	0.05
LR/$1 Bil	-0.04	-0.04	-0.03	-0.02	-0.02	-0.03
MLA/$1 Bil	0.00	0.00	0.00	0.00	0.00	0.00
MSIP/$2 Bil	0.10	0.02	0.02	0.00	0.02	0.03
LR/$2 Bil	-0.07	-0.07	-0.05	-0.04	-0.03	-0.05
MLA/$2 Bil	0.00	0.00	0.00	0.00	0.00	0.00
MSIP/$3 Bil	0.08	0.00	0.00	-0.01	0.01	0.02
LR/$3 Bil	-0.09	-0.10	-0.07	-0.06	-0.05	-0.07
MLA/$3 Bil	0.00	0.00	0.00	0.00	0.00	0.00
Per-Acre Returns Above Variable Costs, $/Acre						
Baseline, Stochastic Average	129.44	125.74	126.59	131.29	133.01	129.22
			Average Change from Baseline			
MSIP/$1 Bil	2.93	2.27	1.91	0.97	0.89	1.79
LR/$1 Bil	6.61	4.92	4.83	4.60	4.63	5.12
MLA/$1 Bil	1.08	1.09	1.08	1.09	1.07	1.08
MSIP/$2 Bil	5.59	6.03	4.81	2.52	2.00	4.19
LR/$2 Bil	12.79	9.75	9.63	9.21	9.28	10.13
MLA/$2 Bil	2.15	2.19	2.16	2.17	2.14	2.16
MSIP/$3 Bil	9.21	10.55	8.72	5.38	4.16	7.60
LR/$3 Bil	18.67	14.39	14.41	13.80	13.91	15.04
MLA/$3 Bil	3.23	3.28	3.24	3.26	3.21	3.24

Table 6. Impacts on U.S. Wheat

Crop Year	2001	2002	2003	2004	2005	Average
Planted Area, Million Acres						
Baseline, Stochastic Average	63.38	64.92	65.12	65.70	65.27	64.88
			Average Change from Baseline			
MSIP/$1 Bil	1.14	0.16	0.26	0.13	0.22	0.38
LR/$1 Bil	-0.25	-0.26	-0.20	-0.21	-0.18	-0.22
MLA/$1 Bil	0.00	0.00	0.00	0.00	0.00	0.00
MSIP/$2 Bil	1.34	0.09	0.15	0.01	0.19	0.36
LR/$2 Bil	-0.46	-0.52	-0.41	-0.41	-0.36	-0.43
MLA/$2 Bil	0.00	0.00	0.00	0.00	0.00	0.00
MSIP/$3 Bil	1.39	0.06	0.09	-0.08	0.16	0.32
LR/$3 Bil	-0.63	-0.78	-0.62	-0.62	-0.54	-0.64
MLA/$3 Bil	0.00	0.00	0.00	0.00	0.00	0.00
Farm Price, $/Bushel						
Baseline, Stochastic Average	3.04	3.12	3.27	3.26	3.36	3.21
			Average Change from Baseline			
MSIP/$1 Bil	-0.04	-0.01	-0.01	-0.00	-0.01	-0.01
LR/$1 Bil	0.01	0.01	0.01	0.01	0.01	0.01
MLA/$1 Bil	0.00	0.00	0.00	0.00	0.00	0.00
MSIP/$2 Bil	-0.05	-0.02	-0.01	-0.00	-0.00	-0.01
LR/$2 Bil	0.01	0.02	0.02	0.02	0.02	0.02
MLA/$2 Bil	0.00	0.00	0.00	0.00	0.00	0.00
MSIP/$3 Bil	-0.05	-0.02	-0.01	0.00	0.00	-0.01
LR/$3 Bil	0.02	0.03	0.03	0.03	0.03	0.03
MLA/$3 Bil	0.00	0.00	0.00	0.00	0.00	0.00
Per-Acre Returns Above Variable Costs, $/Acre						
Baseline, Stochastic Average	65.38	64.47	69.22	69.15	72.89	68.22
			Average Change from Baseline			
MSIP/$1 Bil	4.50	4.51	2.61	2.73	1.62	3.19
LR/$1 Bil	1.93	1.26	1.04	1.17	1.17	1.31
MLA/$1 Bil	4.34	4.24	4.23	4.19	4.22	4.24
MSIP/$2 Bil	7.83	7.11	4.66	4.68	3.10	5.48
LR/$2 Bil	3.93	2.57	2.12	2.42	2.39	2.69
MLA/$2 Bil	8.67	8.48	8.45	8.38	8.43	8.48
MSIP/$3 Bil	10.62	9.37	6.41	6.42	4.47	7.46
LR/$3 Bil	5.99	3.93	3.19	3.75	3.64	4.10
MLA/$3 Bil	13.01	12.71	12.68	12.57	12.65	12.72

Table 7. Impacts on U.S. Cotton

Crop Year	2001	2002	2003	2004	2005	Average
Planted Area, Million Acres						
Baseline, Stochastic Average	14.22	14.02	13.92	13.82	13.85	13.97
			Average Change from Baseline			
MSIP/$1 Bil	0.28	0.38	0.31	0.25	0.16	0.28
LR/$1 Bil	0.17	0.20	0.17	0.16	0.15	0.17
MLA/$1 Bil	0.00	0.00	0.00	0.00	0.00	0.00
MSIP/$2 Bil	0.51	0.62	0.54	0.46	0.33	0.49
LR/$2 Bil	0.31	0.37	0.34	0.31	0.29	0.32
MLA/$2 Bil	0.00	0.00	0.00	0.00	0.00	0.00
MSIP/$3 Bil	0.65	0.80	0.71	0.64	0.48	0.65
LR/$3 Bil	0.44	0.52	0.49	0.45	0.42	0.47
MLA/$3 Bil	0.00	0.00	0.00	0.00	0.00	0.00
Farm Price, $/Pound						
Baseline, Stochastic Average	0.486	0.504	0.524	0.544	0.561	0.524
			Average Change from Baseline			
MSIP/$1 Bil	-0.009	-0.014	-0.014	-0.013	-0.009	-0.012
LR/$1 Bil	-0.005	-0.008	-0.008	-0.007	-0.007	-0.007
MLA/$1 Bil	0.000	0.000	0.000	0.000	0.000	0.000
MSIP/$2 Bil	-0.015	-0.024	-0.024	-0.022	-0.017	-0.021
LR/$2 Bil	-0.010	-0.014	-0.015	-0.014	-0.013	-0.013
MLA/$2 Bil	0.000	0.000	0.000	0.000	0.000	0.000
MSIP/$3 Bil	-0.020	-0.031	-0.032	-0.030	-0.025	-0.028
LR/$3 Bil	-0.014	-0.020	-0.022	-0.021	-0.019	-0.019
MLA/$3 Bil	0.000	0.000	0.000	0.000	0.000	0.000
Per-Acre Returns Above Variable Costs, $/Acre						
Baseline, Stochastic Average	161.40	146.22	146.43	148.26	149.85	150.43
			Average Change from Baseline			
MSIP/$1 Bil	20.77	21.02	15.17	9.92	5.59	14.49
LR/$1 Bil	11.45	9.74	9.03	8.38	7.77	9.28
MLA/$1 Bil	7.81	7.92	7.99	8.04	8.03	7.96
MSIP/$2 Bil	34.27	35.70	28.23	20.56	13.06	26.37
LR/$2 Bil	21.92	19.14	18.05	16.79	15.75	18.33
MLA/$2 Bil	15.62	15.85	15.97	16.08	16.06	15.91
MSIP/$3 Bil	45.56	47.26	39.34	30.26	21.09	36.70
LR/$3 Bil	31.67	28.07	26.78	25.06	23.68	27.05
MLA/$3 Bil	23.43	23.77	23.96	24.12	24.08	23.87

Table 8. Impacts on U.S. Rice

Crop Year	2001	2002	2003	2004	2005	Average
Planted Area, Million Acres						
Baseline, Stochastic Average	3.46	3.51	3.42	3.40	3.38	3.43
			Average Change from Baseline			
MSIP/$1 Bil	0.18	0.07	0.05	0.04	0.03	0.07
LR/$1 Bil	0.02	0.02	0.01	0.01	0.01	0.01
MLA/$1 Bil	0.00	0.00	0.00	0.00	0.00	0.00
MSIP/$2 Bil	0.23	0.10	0.07	0.05	0.05	0.10
LR/$2 Bil	0.04	0.03	0.02	0.02	0.02	0.03
MLA/$2 Bil	0.00	0.00	0.00	0.00	0.00	0.00
MSIP/$3 Bil	0.25	0.12	0.09	0.06	0.06	0.12
LR/$3 Bil	0.05	0.05	0.03	0.03	0.03	0.04
MLA/$3 Bil	0.00	0.00	0.00	0.00	0.00	0.00
Farm Price, $/Cwt						
Baseline, Stochastic Average	6.87	7.02	7.25	7.41	7.60	7.23
			Average Change from Baseline			
MSIP/$1 Bil	-0.51	-0.35	-0.22	-0.16	-0.14	-0.28
LR/$1 Bil	-0.05	-0.06	-0.05	-0.04	-0.04	-0.05
MLA/$1 Bil	0.00	0.00	0.00	0.00	0.00	0.00
MSIP/$2 Bil	-0.64	-0.48	-0.32	-0.23	-0.19	-0.37
LR/$2 Bil	-0.10	-0.11	-0.10	-0.08	-0.07	-0.09
MLA/$2 Bil	0.00	0.00	0.00	0.00	0.00	0.00
MSIP/$3 Bil	-0.71	-0.57	-0.39	-0.28	-0.24	-0.44
LR/$3 Bil	-0.14	-0.17	-0.14	-0.11	-0.10	-0.13
MLA/$3 Bil	0.00	0.00	0.00	0.00	0.00	0.00
Per-Acre Returns Above Variable Costs, $/Acre						
Baseline, Stochastic Average	210.95	205.08	211.60	215.34	217.66	212.13
			Average Change from Baseline			
MSIP/$1 Bil	31.26	25.08	18.22	14.71	10.36	19.93
LR/$1 Bil	10.08	8.86	8.33	8.30	8.23	8.76
MLA/$1 Bil	22.82	22.52	23.11	23.23	23.36	23.01
MSIP/$2 Bil	48.95	40.03	30.33	25.14	19.46	32.78
LR/$2 Bil	19.75	17.34	16.46	16.29	16.23	17.21
MLA/$2 Bil	45.63	45.04	46.22	46.46	46.73	46.02
MSIP/$3 Bil	62.76	52.00	40.56	34.26	27.43	43.40
LR/$3 Bil	29.18	25.44	24.37	24.05	24.10	25.43
MLA/$3 Bil	68.45	67.56	69.33	69.69	70.09	69.02

Assessing Variability
Up to this point, discussions of scenario impacts have focused on averages from the 500 simulations. However, the MSIP option in particular was designed to try to support producers in situations where incomes come under pressure. In short, one of the goals of the program is to reduce the variability of farm income, particularly on the low end. Consequently, in order to fully assess the impacts, the distributions or potential range of outcomes under each policy option must be examined. Figures 1 and 2 compare the resulting distributions for net government outlays and corn per-acre net returns

In Figure 1, the distributions of net outlays for fiscal 2004 are given. In each case, the distributions are highly skewed with much more upside than downside spending potential. Given the increased fixed payments under MLA, there is a higher minimum level of outlays that occurs. However, there is also less upside spending potential than either the MSIP or LR alternative. For each of the distributions, the average spending level is approximately $12.6 billion.

The ranges of outcomes for 2002 corn net returns are given by the distributions in Figure 2. While each of the three options provide approximately the same average level of return, the MSIP program offers much more downside protection on per-acre returns. Notice in particular that the minimum level of net returns under the MSIP option is roughly $30 per acre more than the MLA option, and $40 over the LR option. There are few differences between the distributions for the LR and MLA alternatives. However, it should be strongly pointed out that these distributions reflect national average returns. Farm-level results could look much different, depending on a number of local factors.

Additional insight into the range of outcomes can be found by investigating the likelihood that the options will produce certain outcomes, such as the probability that income or costs will achieve or exceed a certain level. As an example, Table 9 compares the probabilities that net CCC outlays exceed selected levels under each of the three options. The probabilities are based on the frequency of occurrence in the 500 stochastic simulations.

Under the $2 billion scenarios, the fixed payments under MLA lead to the highest probabilities of net outlays exceeding $10 billion. However, the potential for increased upside spending under MSIP and LR becomes apparent when looking at the probabilities of $15 billion in spending. Both programs have a greater chance of generating outlays above $15 billion than the MLA option. A similar story holds for $20 billion, but at that level, the chances are low that any option will surpass that mark.

Additional probability tables for farm income and crop returns are given in the Appendix. Measures such as the standard deviation and coefficient of variation for several parameters are also included in the Appendix.

Figure 1. Distribution of Net CCC Outlays, FY 2004
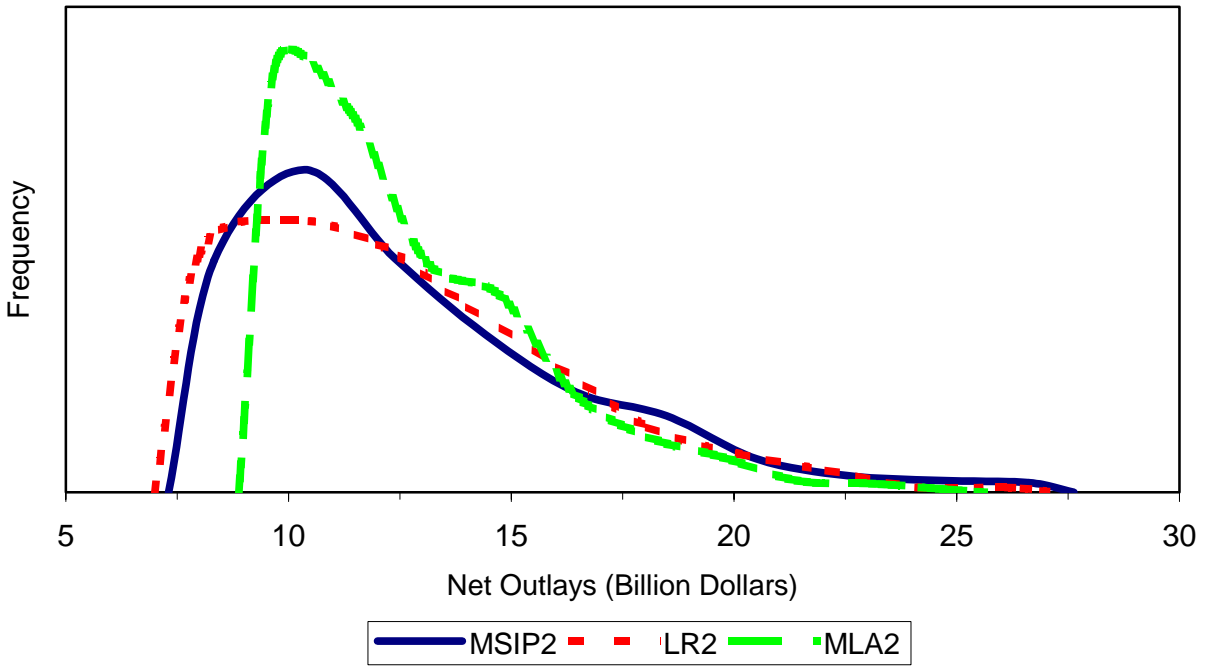**$2 Billion Scenario**

Frequency

Net Outlays (Billion Dollars)

MSIP2   LR2   MLA2

Figure 2. Distribution of Corn Per-Acre Net Returns, 2002
$2 Billion Scenario

Frequency

Net Returns (Dollars per Acre)

MSIP2   LR2   MLA2
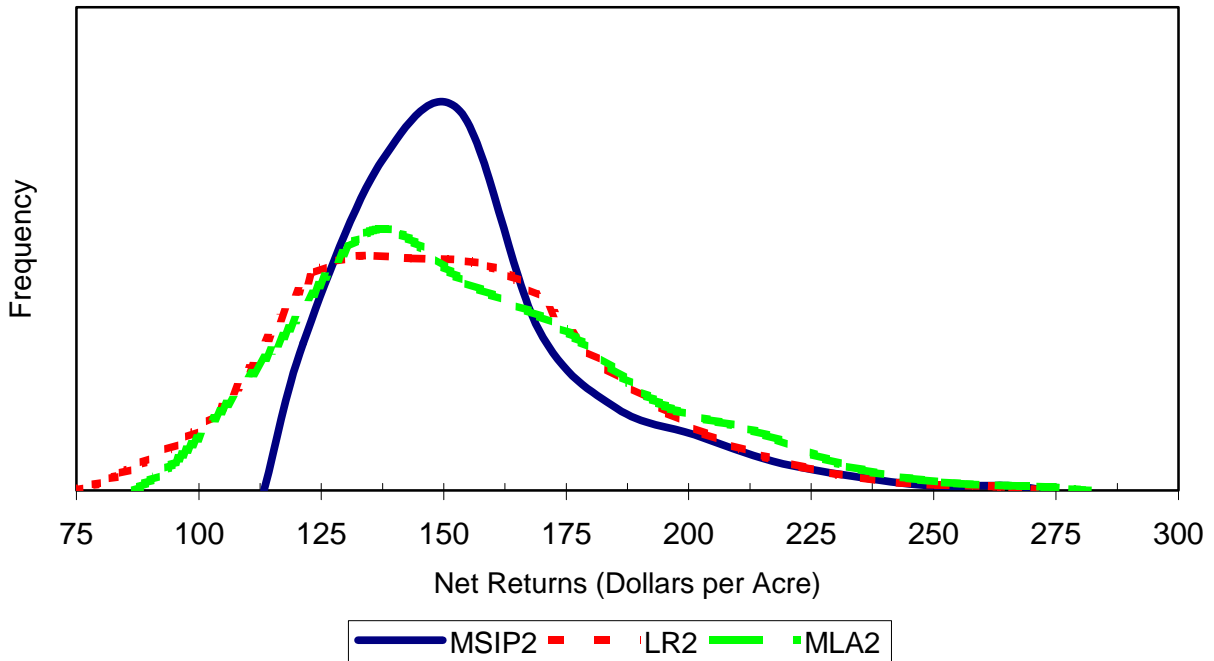
Table 9. Net CCC Outlays, Probability of Exceeding Selected Levels

Fiscal Year	2001	2002	2003	2004	2005	2006	02-06 Avg
Probability Net Outlays > $10 Billion							
Baseline	91%	74%	50%	47%	39%	40%	50%
MSIP/$1 Bil	91%	85%	66%	59%	48%	44%	60%
LR/$1 Bil	91%	83%	62%	59%	50%	50%	61%
MLA/$1 Bil	91%	84%	62%	61%	53%	55%	63%
MSIP/$2 Bil	91%	91%	77%	71%	59%	52%	70%
LR/$2 Bil	92%	89%	70%	67%	61%	59%	69%
MLA/$2 Bil	91%	95%	82%	83%	79%	76%	83%
MSIP/$3 Bil	91%	94%	84%	79%	69%	60%	77%
LR/$3 Bil	92%	93%	77%	74%	70%	67%	76%
MLA/$3 Bil	91%	100%	99%	100%	99%	99%	100%
Probability Net Outlays > $15 Billion							
Baseline	53%	32%	12%	8%	8%	7%	13%
MSIP/$1 Bil	53%	40%	21%	15%	12%	9%	20%
LR/$1 Bil	54%	42%	18%	14%	13%	12%	20%
MLA/$1 Bil	53%	38%	16%	12%	11%	10%	18%
MSIP/$2 Bil	53%	49%	32%	23%	18%	13%	27%
LR/$2 Bil	55%	50%	26%	22%	20%	18%	27%
MLA/$2 Bil	53%	46%	21%	19%	17%	15%	24%
MSIP/$3 Bil	53%	60%	43%	31%	22%	17%	35%
LR/$3 Bil	56%	60%	35%	30%	27%	24%	35%
MLA/$3 Bil	53%	55%	30%	27%	23%	22%	31%
Probability Net Outlays > $20 Billion							
Baseline	18%	8%	1%	1%	1%	1%	3%
MSIP/$1 Bil	20%	14%	6%	3%	3%	2%	6%
LR/$1 Bil	20%	16%	3%	2%	2%	2%	5%
MLA/$1 Bil	18%	11%	2%	1%	2%	2%	4%
MSIP/$2 Bil	20%	20%	11%	5%	5%	3%	9%
LR/$2 Bil	21%	23%	7%	4%	5%	3%	9%
MLA/$2 Bil	18%	16%	4%	2%	2%	2%	5%
MSIP/$3 Bil	20%	28%	16%	9%	8%	5%	13%
LR/$3 Bil	23%	31%	10%	7%	7%	6%	12%
MLA/$3 Bil	18%	22%	6%	4%	4%	3%	8%

Concluding Remarks

General conclusions regarding these policy options are difficult to draw. In short, the answer depends on the commodity as to which performs 'best'. For the sector as a whole, the upside potential government cost is significant for all of the options. It is important to realize that each of the options observed have the current farm program of AMTA payments and marketing loans operating in the background. Thus, even the MLA option has upside cost possibilities similar to those observed under the other two options. Conversely, the MLA option makes payments even if market prices are high, and thus the downside outlay levels under MLA are roughly $2 billion (for the $2 billion option) above those observed for the MSIP and LR option.

While the cost implications are focused on how large potential outlays may be, the income side is focused more on the likelihood of a low number. On average, over the three policy options, the likelihood of net farm income dropping below $40 billion is lowered by roughly 10% when compared to the current FAIR Act. There are some year-to-year differences of note. For 2003, with MSIP outlays the highest of the analysis period, the probability of net farm income falling below $40 billion is only 30%, with the likelihood at 33% under MLA and 35% under the LR option.

For individual commodities, the question as to which policy ranks 'best' is related to their expected price levels compared to the loan rate, the proportion of historical MLA payments the commodity has received, or the base period used to calculate the MSIP support level.

Cotton returns, on a per-acre basis, rise most under the MSIP option, due mainly to the size of the MSIP payments in the first two years of the program. Conversely, MSIP ranks last for corn producers, with revenue under the MSIP option averaging nearly $5 per acre below that observed under the MLA option.

Of the three, the LR option gives soybean producers the greatest increase in returns. Given the market price projections for soybeans throughout the analysis period, the increase in loan rates positions the soybean sector so that it would receive loan deficiency payments in nearly all years of the analysis. Conversely, under the MLA option, payments go to soybean producers based on the historical proportion of payments received under the earlier *ad hoc* programs. Thus while the feed grains sector receives 50% of the MLA payments, oilseed producers receive only 8%.

Corn, wheat and rice see the largest gains in average per-acre returns under the MLA option. For corn, the cause again, is mainly the current proportion of MLA payments received relative to the overall acreage. For wheat, the story is somewhat similar, but also keys on the ratio of the MLA payments to market receipts and the level of market prices compared to the loan rate. Unlike soybeans, wheat LDP's are expected to be relatively small, even with the loan rate adjustment. Rice currently receives 8% of the MLA funds, but accounts for only 1 percent of the area planted to the 15 major crops. Again, on a per-acre basis, this suggests the improvements in rice income would be noticeable.

The average change in income levels, however, is not the entire story. As discussed earlier for corn, the advantages of "safety nets" are their ability to limit the downside potential of the per acre returns. As shown in Figure 2, the MSIP option provides a minimum national average

return that is $30-40 per acre above what the other two options provide. Another way of looking at the downside protection is to evaluate the probabilities that net returns fall below a certain level. Under MSIP, 2002 corn returns exhibited a 2% chance of falling below $125, based on the 500 simulations. For the MLA option, the probability increased to 12% and went up to 15% under the LR alternative.

Again, these are national results associated with the various program options. The farm level results may suggest a very different ranking of the options than suggested at a national level. Overall, however, commodities currently receiving the bulk of the MLA payments will likely prefer the increase in MLA support over the other two options. On the other hand, those commodities whose loan rates are expected to be higher than market prices in most years would likely prefer the LR option, particularly for soybeans where the level of support under the MLA option is relatively low. Further, the fundamental question that was asked of the three options was the ability of each to limit the downside income risk. The LR and MLA options may provide a slightly higher average for many commodities than that given by MSIP, but the minimum income levels on a crop-by-crop basis are noticeably higher under the MSIP option than either the MLA or LR option.

Appendix – Methodology of the Analysis

The Food and Agriculture Policy Research Institute (FAPRI) has undergone a major change in its approach to domestic policy analysis over the last few months. With the request to examine a variety of 'safety-net' programs, the unit has adopted a stochastic analysis methodology for examining policy options.

This stochastic methodology starts with the same set of core economic models of the agricultural sector used in the FAPRI analysis system for several years. These core models describe the economic behavior of producers, processors, consumers and importers of 14 crops and derivatives, as well as the entire livestock and dairy sectors. The models are updated and revised on a frequent basis in order to improve performance and to more accurately describe changing policy and market conditions. As an example, the models underwent a major revision following the 1990 farm bill in order to accommodate the planting flexibility provisions, only to undergo a much more extensive revision following the 1996 Federal Agricultural Improvement and Reform Act. The dairy model has also recently undergone changes to improve its behavior with respect to the cheese market by disaggregating cheese into various types, rather than just a generic 'cheese'.

In the commodity policy analysis conducted to date, essentially a deterministic, or single value, approach has been taken. The FAPRI baseline is developed each year to give the 'most likely' view for world markets over the coming ten years. It assumes constant policy, but more importantly, it also assumes trend yields or 'normal weather' both domestically and abroad.

Further, the baseline assumes that world macroeconomic conditions are also fairly well behaved, with stable exchange rates and modest general economic growth. The baseline then serves as a yardstick against which all policy requests are evaluated. While this 'most likely' view of world agriculture is carefully reviewed, it does not give an indication of future variability.

Much attention in the last few years has focused on the 'safety net' or 'counter-cyclical' features of various programs. These programs are designed to provide additional support when market prices decline, without the need to resort to the type of *ad hoc* programs that have been operated over the last several years. But these programs, by design, are intended to provide support under varying market conditions.

The most obvious source of uncertainty and variability in agriculture is weather, both domestic and foreign. To incorporate yield variability in the United States, the distributions of the percentage deviations from trend yields over the 1969-1998 period were examined. Draws from the empirical distribution were used to provide a basis for generating yield paths that were used as an input into the model. In generating these yield distributions; correlations across crops were included. For example, the correlation between corn and soybean yields is 0.92. Also, as these yields were examined on a departure from trend basis, the absolute levels of departure from trend increases over time as the baseline yields increase.

Developments in international weather are among several other factors that impact exports of United States agricultural commodities. Changes in policies and macroeconomic conditions also affect production and consumption in other countries, thus shifting their net trade positions. FAPRI maintains models for the major importing and exporting countries and regions around the world. These models are structured to capture these different influences. Ideally, shocks to the yields, policy, macro-economic and other variables in all of these respective countries would be conducted. However, this would be an extremely involved undertaking. As an alternative, equations have been developed that mimic the behavior of the FAPRI global model to changing commodity prices. As with yields, the error terms, or deviations, from the equations are used to develop distributions that determine the potential range of shocks to United States exports. As in yields, the correlations across commodities are also imposed. Further, correlations across time are also derived from the historical data and imposed on the set of draws for the export equations.

As the past few months have shown, prices of inputs, such as fuel and fertilizer, can also be highly variable. In the FAPRI modeling system, these input prices help to drive production costs, which influence production and acreage decisions, but also help to determine the total production costs in the farm income accounts. The baseline projects these cost of production components for the major crops. Given the underlying macroeconomic assumptions, these projections of input costs generally increase in a smooth fashion based on general price inflation. History suggests that here as well, year-to-year fluctuations have also been significant. As with yields and exports, historical deviations have been used to introduce variability around production costs.

In any economic model, the equations contain unexplained errors. The models are themselves simplifications of reality and as such, several factors not incorporated into the model can cause even the best of models to display some error. This represents an additional area of uncertainty around the deterministic projections. To incorporate these errors, distributions around the error terms of selected equations have been developed and used to generate stochastic draws. These equations include ending stocks for the major crops and slaughter weights, breeding inventories and per-capita domestic consumption for the livestock side.

With the distributions and appropriate correlations in place for the identified sources of variability, 500 multi-year draws are made from the various distributions in order to generate the stochastic input data. Each draw of data serves as input into the FAPRI modeling system, with the solution to the system giving output for variables such as production, consumption, prices and trade of the major crop and livestock commodities. In addition, estimates for farm income and government outlays under the various program designs are calculated for each of the 500 draws.

The results generated by passing the weather, macroeconomic and export shocks through the system suggest that the price bands for several of the commodities are significant. From a government cost standpoint however, the results suggest that the deterministic estimate of government costs is well below the average suggested by the 500 draws. In less than one-third of the draws, government outlays fell below the baseline expenditure estimate. Stated in the opposite fashion, over two-thirds of the time, government outlays exceeded those suggested by

the deterministic baseline results. Farm income distribution looks much less skewed. Figures A-1 and A-2 show the distribution of government cost and farm income estimates for fiscal year 2004 and calendar year 2004, respectively.

It is important to note that the stochastic analysis is based on the distributions described for a set of selected input variables. The distributions are derived from observed deviations during the historical period. It is the goal of this analysis approach to capture the major sources of variability in the sector and to reflect the impact of that variability on key variables in the system. By no means however, have we captured all possible sources of variability. It would be a mistake to conclude that the extreme values achieved in this analysis represent the absolute extremes that are possible in the future.

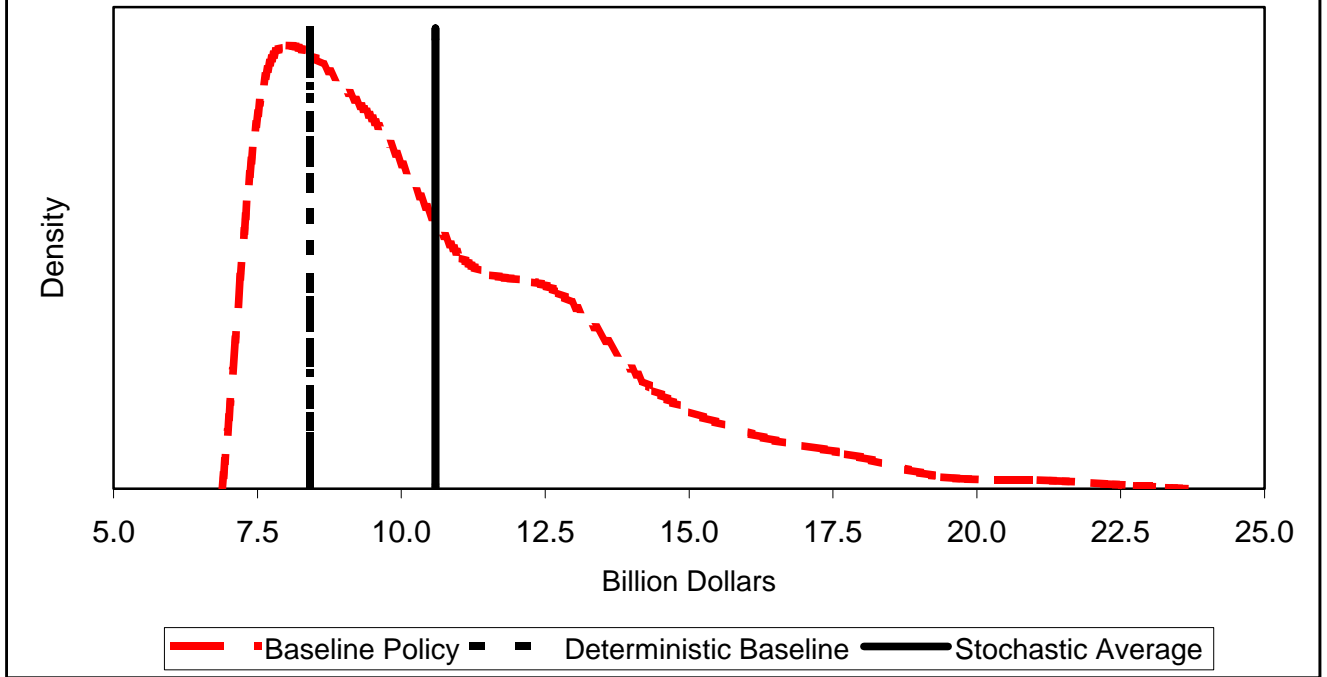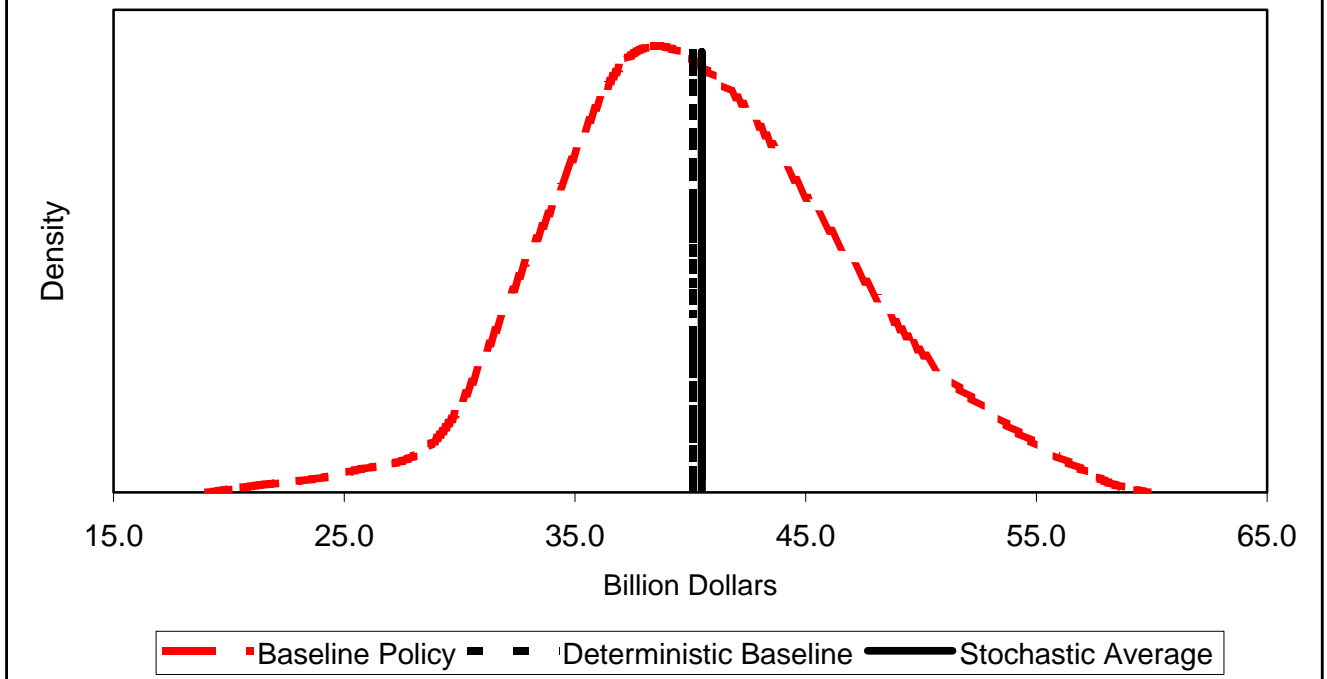Figure A-1. Distribution of Net CCC Outlays, FY-2004

Figure A-2. Distribution of Net Farm Income, Calendar 2004

Appendix Table 1. Net Farm Income, Probability of Falling Below Selected Levels

Calendar Year	2001	2002	2003	2004	2005	2006	01-06 Avg
Probability Net Farm Income < $35 Billion							
Baseline	13%	17%	18%	18%	22%	21%	18%
MSIP/$1 Bil	14%	12%	11%	13%	17%	19%	14%
LR/$1 Bil	10%	12%	15%	16%	18%	21%	15%
MLA/$1 Bil	10%	11%	14%	14%	18%	21%	15%
MSIP/$2 Bil	14%	8%	6%	10%	14%	15%	11%
LR/$2 Bil	8%	10%	13%	12%	16%	21%	13%
MLA/$2 Bil	7%	8%	11%	10%	14%	21%	12%
MSIP/$3 Bil	15%	6%	4%	8%	11%	13%	9%
LR/$3 Bil	6%	7%	11%	9%	14%	20%	11%
MLA/$3 Bil	4%	7%	8%	8%	11%	21%	10%
Probability Net Farm Income < $40 Billion							
Baseline	47%	49%	44%	49%	51%	46%	48%
MSIP/$1 Bil	49%	41%	36%	44%	48%	44%	44%
LR/$1 Bil	37%	41%	38%	44%	47%	46%	42%
MLA/$1 Bil	38%	42%	37%	45%	46%	46%	42%
MSIP/$2 Bil	49%	34%	30%	39%	46%	43%	40%
LR/$2 Bil	32%	36%	35%	39%	44%	46%	39%
MLA/$2 Bil	33%	35%	33%	37%	42%	46%	38%
MSIP/$3 Bil	49%	27%	24%	32%	43%	41%	36%
LR/$3 Bil	26%	32%	31%	35%	40%	45%	35%
MLA/$3 Bil	26%	30%	27%	32%	36%	46%	33%
Probability Net Farm Income < $45 Billion							
Baseline	86%	80%	75%	76%	75%	70%	77%
MSIP/$1 Bil	86%	74%	71%	74%	73%	69%	74%
LR/$1 Bil	78%	75%	72%	73%	72%	70%	73%
MLA/$1 Bil	80%	75%	71%	72%	72%	69%	73%
MSIP/$2 Bil	86%	68%	65%	72%	71%	67%	71%
LR/$2 Bil	71%	70%	68%	71%	68%	70%	70%
MLA/$2 Bil	74%	68%	66%	68%	67%	69%	69%
MSIP/$3 Bil	86%	63%	58%	67%	69%	66%	68%
LR/$3 Bil	64%	66%	64%	67%	64%	71%	66%
MLA/$3 Bil	67%	65%	60%	63%	61%	69%	64%

Appendix Table 2. Per-Acre Crop Net Returns, Probability of Falling Below Selected Levels

Crop Year	2001	2002	2003	2004	2005	Average
Probability Corn Returns < $150						
Baseline	53%	61%	50%	46%	36%	49%
MSIP/$1 Bil	51%	60%	49%	44%	36%	48%
LR/$1 Bil	41%	57%	47%	42%	29%	43%
MLA/$1 Bil	41%	56%	43%	39%	28%	41%
MSIP/$2 Bil	34%	48%	44%	41%	33%	40%
LR/$2 Bil	31%	52%	40%	37%	25%	37%
MLA/$2 Bil	30%	49%	35%	32%	21%	33%
MSIP/$3 Bil	23%	38%	38%	35%	28%	32%
LR/$3 Bil	23%	44%	36%	31%	21%	31%
MLA/$3 Bil	22%	43%	28%	25%	17%	27%
Probability Soybean Returns < $125						
Baseline	32%	47%	43%	34%	30%	37%
MSIP/$1 Bil	27%	44%	40%	33%	30%	35%
LR/$1 Bil	23%	32%	29%	21%	16%	24%
MLA/$1 Bil	29%	44%	40%	31%	27%	34%
MSIP/$2 Bil	13%	25%	27%	25%	23%	23%
LR/$2 Bil	18%	23%	21%	15%	11%	18%
MLA/$2 Bil	28%	41%	37%	28%	24%	32%
MSIP/$3 Bil	5%	9%	12%	13%	14%	11%
LR/$3 Bil	14%	18%	18%	13%	10%	14%
MLA/$3 Bil	25%	38%	33%	25%	22%	29%
Probability Wheat Returns < $75						
Baseline	79%	76%	64%	65%	60%	69%
MSIP/$1 Bil	71%	75%	63%	63%	59%	66%
LR/$1 Bil	75%	74%	63%	62%	58%	66%
MLA/$1 Bil	67%	67%	55%	58%	53%	60%
MSIP/$2 Bil	60%	67%	57%	59%	55%	60%
LR/$2 Bil	70%	72%	60%	60%	55%	63%
MLA/$2 Bil	57%	57%	46%	48%	42%	50%
MSIP/$3 Bil	48%	59%	52%	54%	52%	53%
LR/$3 Bil	63%	69%	59%	58%	52%	60%
MLA/$3 Bil	44%	47%	37%	40%	32%	40%

Appendix Table 2. Per-Acre Net Return Probabilities (cont)

Crop Year	2001	2002	2003	2004	2005	Average
Probability Cotton Returns < $150						
Baseline	37%	51%	52%	52%	50%	48%
MSIP/$1 Bil	14%	27%	34%	40%	43%	32%
LR/$1 Bil	28%	41%	44%	44%	43%	40%
MLA/$1 Bil	31%	43%	44%	42%	43%	41%
MSIP/$2 Bil	5%	17%	25%	31%	36%	23%
LR/$2 Bil	22%	35%	37%	36%	35%	33%
MLA/$2 Bil	25%	35%	37%	36%	34%	33%
MSIP/$3 Bil	3%	12%	18%	25%	31%	18%
LR/$3 Bil	16%	28%	29%	30%	30%	26%
MLA/$3 Bil	20%	29%	29%	28%	28%	27%
Probability Rice Returns < $200						
Baseline	41%	47%	43%	40%	40%	42%
MSIP/$1 Bil	20%	27%	30%	31%	31%	28%
LR/$1 Bil	31%	40%	35%	32%	33%	34%
MLA/$1 Bil	25%	28%	24%	23%	23%	25%
MSIP/$2 Bil	13%	19%	23%	22%	27%	21%
LR/$2 Bil	27%	32%	30%	27%	26%	28%
MLA/$2 Bil	11%	15%	13%	12%	10%	12%
MSIP/$3 Bil	6%	14%	16%	17%	22%	15%
LR/$3 Bil	19%	27%	25%	23%	21%	23%
MLA/$3 Bil	3%	7%	6%	4%	5%	5%

Appendix Table 3. Standard Deviation of Key Aggregate Measures

	2001	2002	2003	2004	2005	2006	Average
Net CCC Outlays, Fiscal Year				Billion Dollars			
Baseline	4.523	4.237	3.183	2.867	2.925	2.971	3.451
MSIP/$1 Bil	4.572	4.421	3.994	3.430	3.436	3.222	3.846
LR/$1 Bil	4.567	4.686	3.625	3.291	3.383	3.419	3.829
MLA/$1 Bil	4.523	4.237	3.183	2.867	2.925	2.971	3.451
MSIP/$2 Bil	4.585	4.715	4.506	3.896	3.847	3.532	4.180
LR/$2 Bil	4.609	5.074	4.015	3.672	3.799	3.830	4.166
MLA/$2 Bil	4.523	4.237	3.183	2.867	2.925	2.971	3.451
MSIP/$3 Bil	4.590	4.994	4.917	4.303	4.240	3.865	4.485
LR/$3 Bil	4.649	5.414	4.376	4.024	4.182	4.208	4.475
MLA/$3 Bil	4.523	4.237	3.183	2.867	2.925	2.971	3.451
Net Farm Income, Calendar Year							
Baseline	4.477	5.544	6.278	6.242	6.763	7.278	6.097
MSIP/$1 Bil	4.521	5.536	5.858	5.921	6.489	7.080	5.901
LR/$1 Bil	4.603	5.599	6.319	6.232	6.735	7.233	6.120
MLA/$1 Bil	4.477	5.544	6.278	6.242	6.763	7.278	6.097
MSIP/$2 Bil	4.545	5.508	5.692	5.780	6.345	6.991	5.810
LR/$2 Bil	4.727	5.675	6.382	6.247	6.726	7.177	6.156
MLA/$2 Bil	4.477	5.544	6.278	6.242	6.763	7.278	6.097
MSIP/$3 Bil	4.559	5.468	5.565	5.663	6.199	6.896	5.725
LR/$3 Bil	4.847	5.768	6.454	6.289	6.736	7.131	6.204
MLA/$3 Bil	4.477	5.544	6.278	6.242	6.763	7.278	6.097
US Planted Area, Crop Year				Million Acres			
Baseline	1.371	1.460	1.508	1.560	1.567	1.595	1.510
MSIP/$1 Bil	1.062	1.147	1.297	1.368	1.580	1.600	1.343
LR/$1 Bil	1.360	1.450	1.492	1.530	1.561	1.589	1.497
MLA/$1 Bil	1.371	1.460	1.508	1.560	1.567	1.595	1.510
MSIP/$2 Bil	0.968	1.050	1.202	1.288	1.580	1.603	1.282
LR/$2 Bil	1.363	1.453	1.478	1.506	1.559	1.596	1.492
MLA/$2 Bil	1.371	1.460	1.508	1.560	1.567	1.595	1.510
MSIP/$3 Bil	0.926	0.995	1.141	1.220	1.578	1.606	1.244
LR/$3 Bil	1.372	1.460	1.471	1.498	1.558	1.597	1.493
MLA/$3 Bil	1.371	1.460	1.508	1.560	1.567	1.595	1.510

Appendix Table 4. Coefficient of Variation of Key Aggregate Measures

	2001	2002	2003	2004	2005	2006	Average
Net CCC Outlays, Fiscal Year							
Baseline	0.290	0.318	0.292	0.271	0.285	0.291	0.291
MSIP/$1 Bil	0.291	0.303	0.322	0.296	0.312	0.303	0.305
LR/$1 Bil	0.289	0.319	0.305	0.287	0.304	0.312	0.303
MLA/$1 Bil	0.290	0.295	0.268	0.247	0.260	0.265	0.271
MSIP/$2 Bil	0.291	0.298	0.328	0.309	0.326	0.316	0.311
LR/$2 Bil	0.289	0.318	0.312	0.297	0.317	0.326	0.310
MLA/$2 Bil	0.290	0.276	0.247	0.228	0.238	0.243	0.254
MSIP/$3 Bil	0.291	0.293	0.328	0.316	0.335	0.327	0.315
LR/$3 Bil	0.289	0.314	0.316	0.303	0.324	0.336	0.314
MLA/$3 Bil	0.290	0.259	0.229	0.211	0.220	0.225	0.239
Net Farm Income, Calendar Year							
Baseline	0.111	0.137	0.153	0.154	0.168	0.177	0.150
MSIP/$1 Bil	0.113	0.134	0.139	0.143	0.159	0.170	0.143
LR/$1 Bil	0.112	0.136	0.151	0.151	0.164	0.176	0.148
MLA/$1 Bil	0.109	0.134	0.150	0.151	0.164	0.177	0.147
MSIP/$2 Bil	0.113	0.130	0.132	0.138	0.153	0.167	0.139
LR/$2 Bil	0.112	0.135	0.150	0.149	0.161	0.175	0.147
MLA/$2 Bil	0.107	0.131	0.147	0.148	0.161	0.177	0.145
MSIP/$3 Bil	0.114	0.126	0.126	0.133	0.148	0.163	0.135
LR/$3 Bil	0.112	0.134	0.150	0.148	0.159	0.173	0.146
MLA/$3 Bil	0.104	0.129	0.143	0.144	0.157	0.177	0.142
US Planted Area, Crop Year							
Baseline	0.005	0.006	0.006	0.006	0.006	0.006	0.006
MSIP/$1 Bil	0.004	0.004	0.005	0.005	0.006	0.006	0.005
LR/$1 Bil	0.005	0.006	0.006	0.006	0.006	0.006	0.006
MLA/$1 Bil	0.005	0.006	0.006	0.006	0.006	0.006	0.006
MSIP/$2 Bil	0.004	0.004	0.005	0.005	0.006	0.006	0.005
LR/$2 Bil	0.005	0.006	0.006	0.006	0.006	0.006	0.006
MLA/$2 Bil	0.005	0.006	0.006	0.006	0.006	0.006	0.006
MSIP/$3 Bil	0.004	0.004	0.004	0.005	0.006	0.006	0.005
LR/$3 Bil	0.005	0.006	0.006	0.006	0.006	0.006	0.006
MLA/$3 Bil	0.005	0.006	0.006	0.006	0.006	0.006	0.006

Appendix Table 5. Standard Deviation of Per-Acre Net Returns

Crop Year	2001	2002	2003	2004	2005	Average
Corn Returns			Dollars per Acre			
Baseline	26.49	33.21	36.03	35.98	41.03	34.55
MSIP/$1 Bil	23.81	28.21	33.05	33.19	39.74	31.60
LR/$1 Bil	25.61	32.09	34.72	34.66	39.72	33.36
MLA/$1 Bil	26.44	33.14	35.97	35.92	40.98	34.49
MSIP/$2 Bil	21.61	25.19	30.73	31.07	38.58	29.43
LR/$2 Bil	25.26	31.28	33.66	33.63	38.58	32.48
MLA/$2 Bil	26.40	33.07	35.92	35.86	40.93	34.43
MSIP/$3 Bil	20.00	23.10	28.68	29.19	37.36	27.67
LR/$3 Bil	25.27	30.74	32.92	32.94	37.71	31.92
MLA/$3 Bil	26.35	33.00	35.87	35.80	40.88	34.38
Soybean Returns						
Baseline	15.70	15.42	15.29	17.15	17.47	16.21
MSIP/$1 Bil	11.74	12.94	13.04	15.68	16.41	13.96
LR/$1 Bil	16.57	15.19	15.19	16.56	16.71	16.04
MLA/$1 Bil	15.70	15.43	15.30	17.16	17.48	16.21
MSIP/$2 Bil	9.51	10.86	10.92	14.16	15.13	12.12
LR/$2 Bil	17.38	15.34	15.49	16.48	16.32	16.20
MLA/$2 Bil	15.70	15.44	15.31	17.16	17.49	16.22
MSIP/$3 Bil	8.01	9.60	9.41	12.63	13.59	10.65
LR/$3 Bil	18.09	15.88	16.03	16.75	16.26	16.60
MLA/$3 Bil	15.70	15.44	15.32	17.17	17.50	16.22
Wheat Returns						
Baseline	13.70	16.13	18.58	18.21	19.84	17.29
MSIP/$1 Bil	11.35	12.63	15.84	15.86	18.30	14.80
LR/$1 Bil	13.07	15.55	18.05	17.61	19.24	16.70
MLA/$1 Bil	13.71	16.14	18.62	18.24	19.87	17.32
MSIP/$2 Bil	10.50	11.47	14.49	14.72	17.39	13.71
LR/$2 Bil	12.49	15.06	17.52	17.03	18.69	16.16
MLA/$2 Bil	13.72	16.16	18.67	18.27	19.90	17.34
MSIP/$3 Bil	10.02	10.65	13.46	13.75	16.58	12.89
LR/$3 Bil	12.04	14.60	17.03	16.46	18.21	15.67
MLA/$3 Bil	13.73	16.17	18.71	18.31	19.94	17.37

Appendix Table 5. Standard Deviation of Per-Acre Net Returns (continued)

Crop Year	2001	2002	2003	2004	2005	Average
Cotton Returns			Dollars per Acre			
Baseline	42.26	41.32	39.81	41.88	41.27	41.31
MSIP/$1 Bil	28.95	32.02	32.96	35.85	37.10	33.38
LR/$1 Bil	43.59	43.35	42.09	43.71	42.91	43.13
MLA/$1 Bil	42.28	41.33	39.85	41.88	41.34	41.34
MSIP/$2 Bil	26.63	31.52	32.61	35.18	36.70	32.53
LR/$2 Bil	44.81	44.93	44.12	45.27	45.00	44.83
MLA/$2 Bil	42.31	41.35	39.91	41.90	41.41	41.38
MSIP/$3 Bil	25.87	31.18	32.58	35.60	37.06	32.46
LR/$3 Bil	45.86	46.36	45.91	46.65	46.68	46.29
MLA/$3 Bil	42.35	41.38	39.97	41.92	41.49	41.42
Rice Returns						
Baseline	44.96	49.43	51.48	50.84	54.12	50.16
MSIP/$1 Bil	49.45	50.78	50.66	50.18	53.66	50.95
LR/$1 Bil	45.57	50.17	52.10	50.89	54.05	50.56
MLA/$1 Bil	45.43	50.01	52.19	51.61	54.92	50.83
MSIP/$2 Bil	49.89	51.19	51.00	51.05	53.77	51.38
LR/$2 Bil	46.00	50.66	52.64	51.15	54.31	50.95
MLA/$2 Bil	45.93	50.63	52.94	52.41	55.75	51.53
MSIP/$3 Bil	49.65	51.42	51.38	51.80	53.87	51.63
LR/$3 Bil	46.20	51.03	53.03	51.27	54.68	51.24
MLA/$3 Bil	46.48	51.28	53.74	53.26	56.61	52.27

Appendix Table 6. Coefficient of Variation of Per-Acre Net Returns

Crop Year	2001	2002	2003	2004	2005	Average
Corn Returns						
Baseline	0.175	0.231	0.234	0.230	0.244	0.223
MSIP/$1 Bil	0.154	0.189	0.211	0.208	0.235	0.199
LR/$1 Bil	0.163	0.218	0.221	0.217	0.232	0.210
MLA/$1 Bil	0.168	0.221	0.225	0.221	0.236	0.214
MSIP/$2 Bil	0.135	0.163	0.192	0.192	0.226	0.181
LR/$2 Bil	0.156	0.207	0.210	0.206	0.221	0.200
MLA/$2 Bil	0.161	0.213	0.217	0.213	0.228	0.206
MSIP/$3 Bil	0.121	0.145	0.176	0.177	0.216	0.167
LR/$3 Bil	0.152	0.199	0.202	0.198	0.212	0.192
MLA/$3 Bil	0.155	0.205	0.209	0.205	0.220	0.199
Soybean Returns						
Baseline	0.121	0.123	0.121	0.131	0.131	0.13
MSIP/$1 Bil	0.089	0.101	0.101	0.119	0.123	0.11
LR/$1 Bil	0.122	0.116	0.116	0.122	0.121	0.12
MLA/$1 Bil	0.120	0.122	0.120	0.130	0.130	0.12
MSIP/$2 Bil	0.070	0.082	0.083	0.106	0.112	0.09
LR/$2 Bil	0.122	0.113	0.114	0.117	0.115	0.12
MLA/$2 Bil	0.119	0.121	0.119	0.129	0.129	0.12
MSIP/$3 Bil	0.058	0.070	0.070	0.092	0.099	0.08
LR/$3 Bil	0.122	0.113	0.114	0.115	0.111	0.12
MLA/$3 Bil	0.118	0.120	0.118	0.128	0.128	0.12
Wheat Returns						
Baseline	0.210	0.250	0.268	0.263	0.272	0.25
MSIP/$1 Bil	0.162	0.183	0.221	0.221	0.246	0.21
LR/$1 Bil	0.194	0.237	0.257	0.250	0.260	0.24
MLA/$1 Bil	0.197	0.235	0.254	0.249	0.258	0.24
MSIP/$2 Bil	0.143	0.160	0.196	0.199	0.229	0.19
LR/$2 Bil	0.180	0.225	0.246	0.238	0.248	0.23
MLA/$2 Bil	0.185	0.221	0.240	0.236	0.245	0.23
MSIP/$3 Bil	0.132	0.144	0.178	0.182	0.214	0.17
LR/$3 Bil	0.169	0.213	0.235	0.226	0.238	0.22
MLA/$3 Bil	0.175	0.210	0.228	0.224	0.233	0.21

Appendix Table 6. Coefficient of Variation of Crop Net Returns (continued)

Crop Year	2001	2002	2003	2004	2005	Average
Cotton Returns						
Baseline	0.262	0.283	0.272	0.282	0.275	0.275
MSIP/$1 Bil	0.159	0.191	0.204	0.227	0.239	0.204
LR/$1 Bil	0.252	0.278	0.271	0.279	0.272	0.270
MLA/$1 Bil	0.250	0.268	0.258	0.268	0.262	0.261
MSIP/$2 Bil	0.136	0.173	0.187	0.208	0.225	0.186
LR/$2 Bil	0.244	0.272	0.268	0.274	0.272	0.266
MLA/$2 Bil	0.239	0.255	0.246	0.255	0.250	0.249
MSIP/$3 Bil	0.125	0.161	0.175	0.199	0.217	0.176
LR/$3 Bil	0.238	0.266	0.265	0.269	0.269	0.261
MLA/$3 Bil	0.229	0.243	0.235	0.243	0.239	0.238
Rice Returns						
Baseline	0.213	0.241	0.243	0.236	0.249	0.236
MSIP/$1 Bil	0.204	0.221	0.220	0.218	0.235	0.220
LR/$1 Bil	0.206	0.235	0.237	0.228	0.239	0.229
MLA/$1 Bil	0.194	0.220	0.222	0.216	0.228	0.216
MSIP/$2 Bil	0.192	0.209	0.211	0.212	0.227	0.210
LR/$2 Bil	0.199	0.228	0.231	0.221	0.232	0.222
MLA/$2 Bil	0.179	0.202	0.205	0.200	0.211	0.200
MSIP/$3 Bil	0.181	0.200	0.204	0.208	0.220	0.203
LR/$3 Bil	0.192	0.221	0.225	0.214	0.226	0.216
MLA/$3 Bil	0.166	0.188	0.191	0.187	0.197	0.186

The 1-2-3 Scenarios:

An Analysis of Safety Net Alternatives

July 27, 2000

Briefing to the Staff of the

U.S. House and Senate Agriculture Committees

FAPRI

First, a word about the baseline...

FAPRI

- Analysis, prepared at the request of Rep. Charles Stenholm, is compared to the FAPRI January, 2000 baseline.
  - The baseline assumes provisions of the FAIR Act with 2002 levels extended for the life of the baseline.

- We need to remember a few things about the baseline because it **does** have a bearing on the outcome of the scenarios.

US Crop Prices

- In general, baseline crop prices are weak in the near term before showing recovery in later years.

- For soybeans and cotton, loan rates continue to play a large role through 2005.
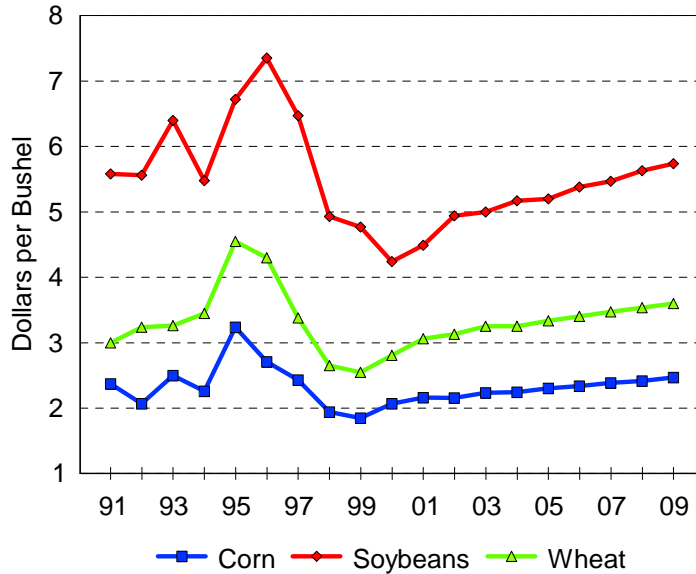
Net CCC Outlays

- Increased LDPs due to the low prices, together the 1998 and '99 assistance packages push net outlays to near-record levels.

- Longer term, outlays decline as prices increase and AMTA payments fall.
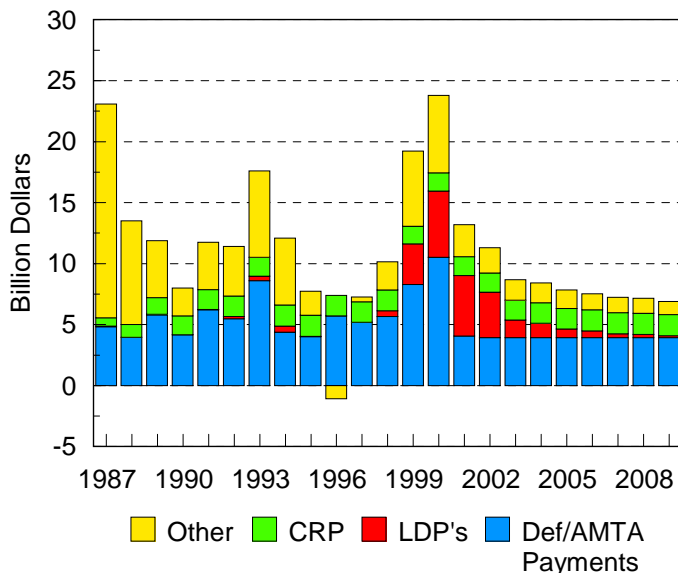
US Farm Income

- In the absence of additional assistance packages, farm income remains around $40 billion through 2006.

- Modest recovery in the later years as the cattle cycle turns.

Net Farm Income
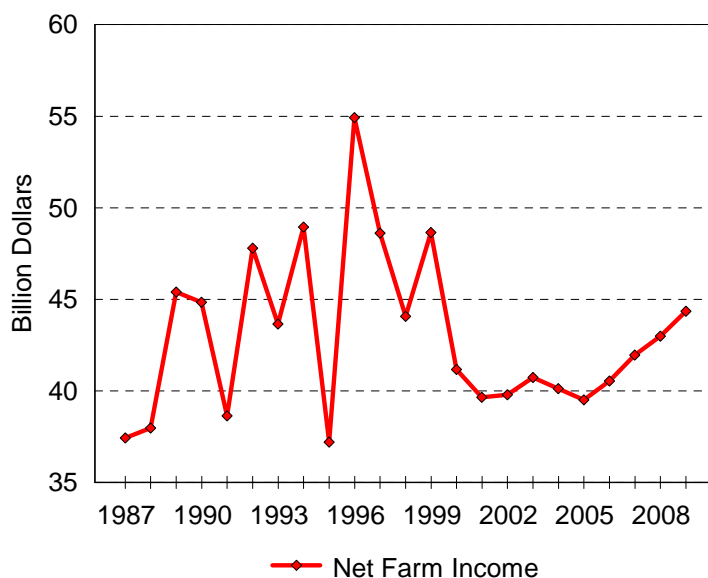
Scenario Assumptions

- ***For the scenarios, all baseline policies remain in place, i.e. AMTA payments remain.***

- In addition, assume authority exists for additional spending above baseline levels for the 2001-05 crops.

  - Average $1 Billion/Crop Year ($5 Billion Total)

  - Average $2 Billion/Crop Year ($10 Billion Total)

  - Average $3 Billion/Crop Year ($15 Billion Total)

More Assumptions

- Spend the additional money in three ways

  - Modified Supplemental Income Payments (MSIP) - Payments based on 1995-99 reference period.

  - Higher Marketing Loan Rates (LR) - Increase **all loan rates by the same percentage** in order to achieve the additional spending.

  - Market Loss Assistance (MLA) Payments - Distributed in the same fashion as the previous MLA payments. Some money included for oilseeds.

- Precise levels for loan rates and SIP triggers set so as to spend <u>on average</u> the same amount as the increase in MLA payments.

Modified SIP Formulas

- For each crop, the following calculations are made:

  - US Value of Production = max(US Farm Price, US Loan Rate)*US Production

  - US Value/Acre = US Value of Production/Harvested Acres

  - **Fixed Reference Period = 1995-99 Average of Value/Acre**

  - Current Per-Acre Payment = max(0, **Trigger %***Reference Period Value/Acre - Current Year Value/Acre)
    Everybody gets same per-acre payment

  - Total Payments = Per-Acre Payment * Harvested Acres

Modified SIP:
Where the Baseline Is Important

FAPRI

- Relative to the FAPRI baseline, MSIP will play a larger role in the early years as the value per acre falls well below the 1995-99 average.

- Over time, stronger prices and increasing yields reduce the gap between the value and the reference period.

Rice Value vs. MSIP Reference Value
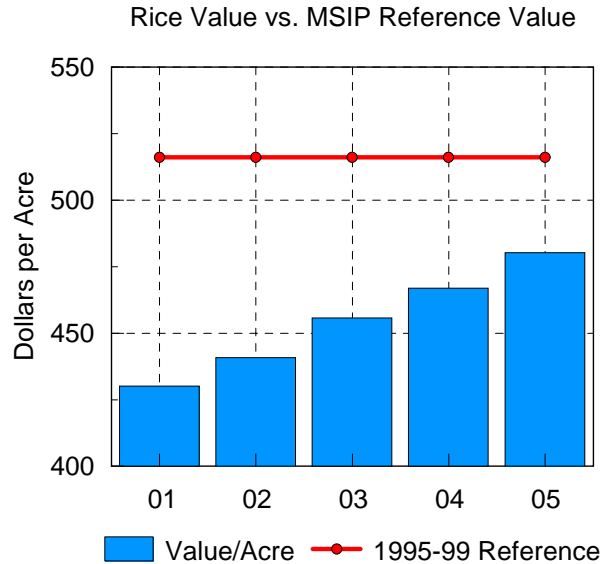
Loan Rate Formulas:
Where the Baseline Is Important

FAPRI

- **In the FAPRI baseline, loan rates are held fixed through the 2001 crop and then allowed to adjust to minimum levels based on the formulas.**

- The scenarios maintain this convention with loan rates for all crops increased by the same percentage above baseline levels.

- Soybean example given in the chart.

Soybean Loan Rate vs. Farm Price
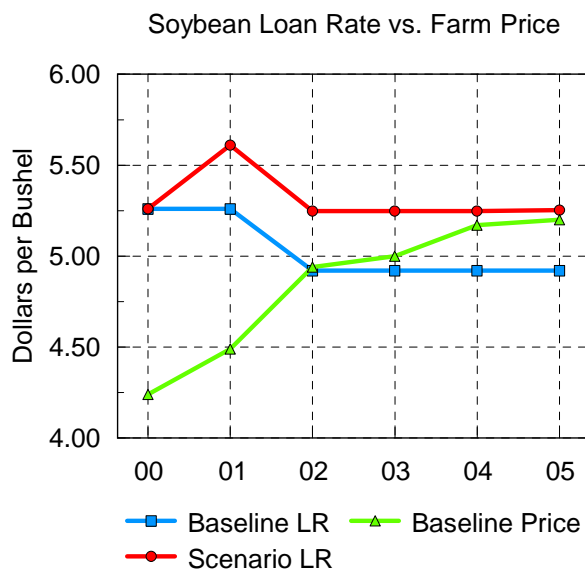
Market Loss Assistance

- Market Loss Assistance payments are allocated based on percentages from the previous assistance packages.

- Feed grains receive 50% of the money under these rules.

Allocation of MLA Payments

Oilseeds 8%

Rice 8%

Cotton 10%

Wheat 24%

Feed Grains 50%
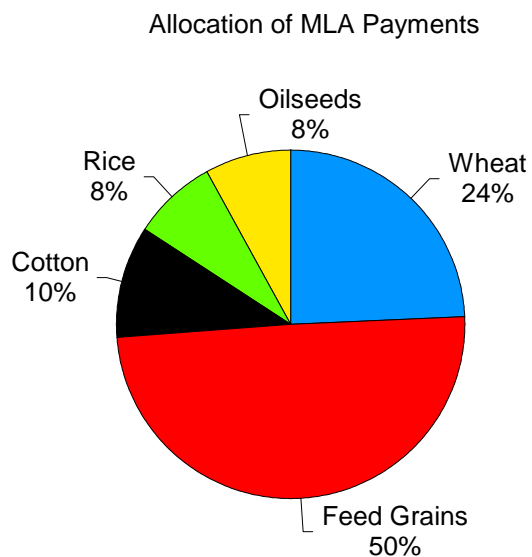
Methodology

- The FAPRI baseline represents a deterministic view of the future conditioned on specific assumptions such as
  - trend yields
  - stable growth in macroeconomic indicators.

- However, this view does not provide an indication of the range of outcomes and the potential variability.

- To capture this range, shocks were introduced into the FAPRI US modeling system for the major sources of variability.

Determining Sources of Variability

- Shocks include the following:
  - US crop yields
  - Harvested/planted ratios
  - US crop exports
  - Costs of production
  - Animal slaughter weights
  - Adjustment factors on selected crop demand equations, livestock per-capita demand equations, and selected animal inventory equations.

- Shocks are applied with correlations determined from historical observations
  - a good corn yield most often is accompanied with a good soybean yield

Multiple Draws Must Be Done

- Looking at one possible path doesn't provide enough information.

- Program must be evaluated over a number of runs. We have done 500 simulations.

- Graph shows 10 of the 500 corn yield paths used in this analysis.

- Remember - all other shocks are being introduced at the same time.
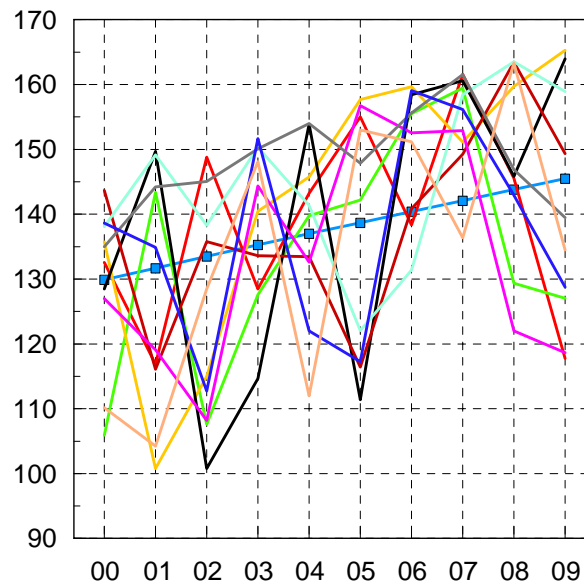
Generating Results,
Developing Probability Ranges

- The results of the 500 draws will give variability around production, consumption and prices.

- We can develop probabilities ranges or the likelihood that price will be in a certain range.

U.S. Corn Farm Price ($/Bu)

Legend:
- Baseline Price
- 5th & 95th Percent
- 25th & 75th Percent
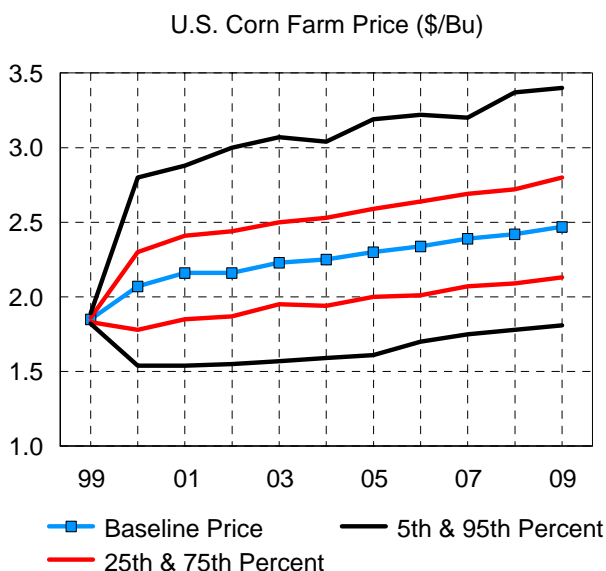
Analyzing Alternative Policies

- The 500 sets of exogenous shocks are evaluated under baseline policies. This generates a range of outcomes for prices, production, exports, gov't costs and farm income.

- Each of the scenarios has been analyzed using the same 500 sets of exogenous shocks.

- The only changes are the policy adjustments defined in each scenario.

- Impacts of the scenarios are evaluated at the mean (i.e. the average outcome) ,as well as over the range of possible outcomes.

Policies Analyzed in this Study

- 3 ways to spend an additional money above baseline spending over the 2001-05 crops.

	Avg Annual Additional Spending		
	$1 Billion	*$2 Billion*	*$3 Billion*
MSIP (Trigger %)	89.80%	93.86%	96.75%
LR Increase Above Base	3.50%	6.67%	9.60%
MLA Payments	$1 bil/crop yr	$2 bil/crop yr	$3 bil/crop yr

Change in Net CCC Outlays,
$2 Billion Scenario

FAPRI

- Scenarios designed to achieve the same average increase in CCC outlays for the 2001-05 crops.

- ***Given FAPRI price projections, spending under SIP and LR scenarios increase more in early years and less in later years.***

- Similar patterns under the other spending levels.

$2 Billion Average Annual Additional Spending
($10 Billion Total)

Billion Dollars / Fiscal Year

Crop/Fiscal Year Timing

■ MSIP2 ■ LR2 ■ MLA2
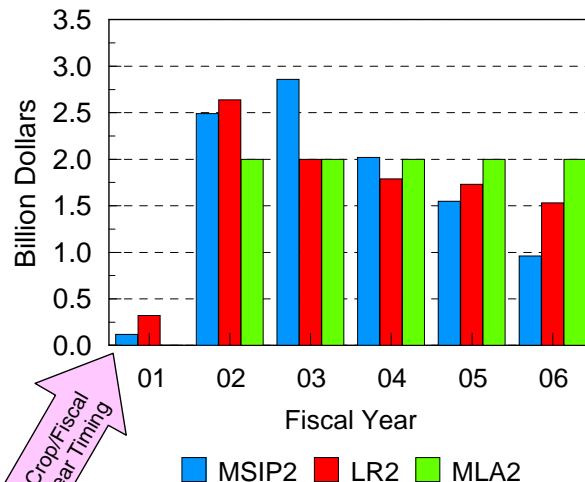
Change in Planted Area,
$2 Billion Scenario

FAPRI

- MSIP - acreage shifts from soybeans into other crops.

- Under LR, soybeans, cotton and rice gain acres at expense of grains.

- *No crop shifting under MLA payments due to decoupled nature.*

Change in Planted Area
2001-05 Average

Million Acres

Less than 1% of total

Corn Soybeans Wheat Cotton Rice 8-Crops

■ MSIP2 ■ LR2 ■ MLA2
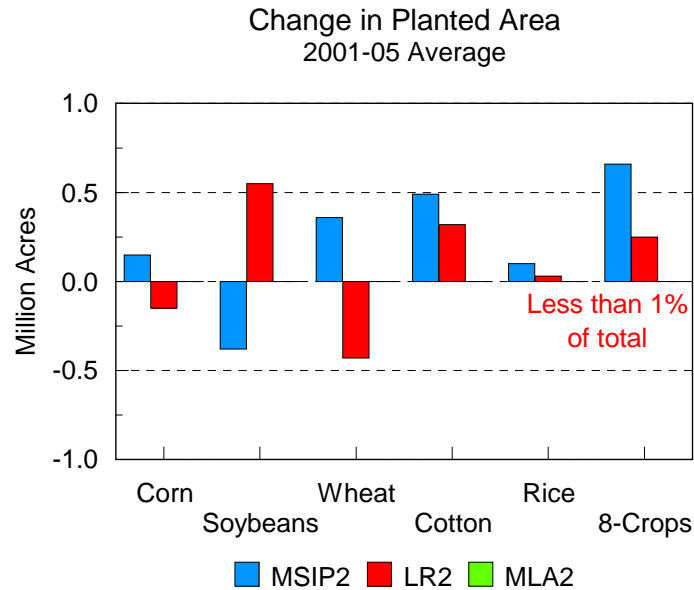
Change in Crop Prices,
$2 Billion Scenario

FAPRI

- Price changes reflect planted are shifts.

- In general, price changes are relatively modest.

Percent Change in Crop Prices
2001-05 Average

Corn Soybeans Wheat Cotton Rice

■ MSIP2 ■ LR2 ■ MLA2
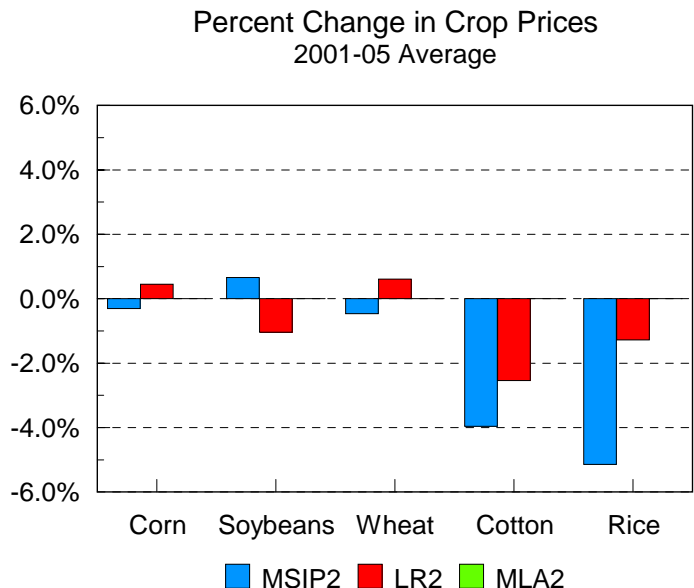
Change in Per-Acre Returns,
$2 Billion Scenario

- Of the 3 options

  Corn receives largest payment under MLA

  Soybeans receive the most under LR

  Wheat payments are highest under MLA

  Cotton receives the most under SIP

  Rice payments are highest under MLA

- Rankings the same under alternative spending levels.

Change in Per-Acre Returns
2001-05 Average

Dollars per Acre — Corn, Soybeans, Wheat, Cotton, Rice

Legend: MSIP2, LR2, MLA2
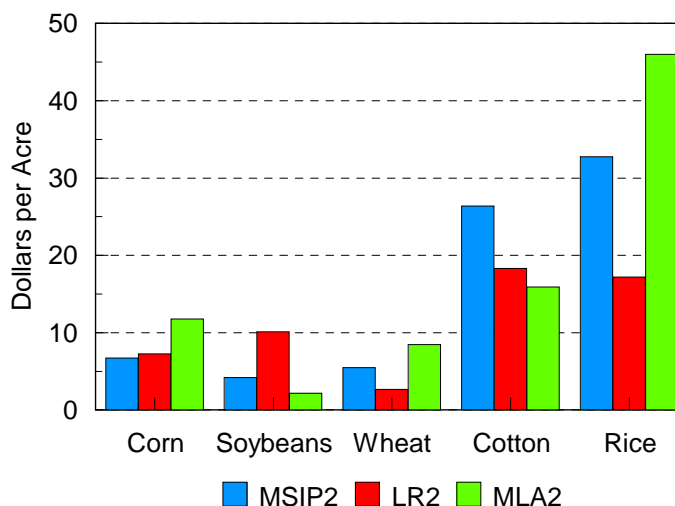
Assessing Variability

- Thus far, we have focused on the average outcome based on the 500 simulations.

- However, to get some idea of the variability, we can look at:

  - The range of outcomes and probabilities associated with those outcomes.
    - Does the policy reduce the chance of an undesirable outcome? or increase the chance of a desirable one?

  - The "countercyclical" nature of the policies?

Probability Density Function,
Think About Rolling a Pair of Dice

- The range and likelihood of outcomes can be shown with a probability density function (PDF).

- As you would suspect, if you roll the dice enough times, outcomes are going to be symmetrical and some more likely to occur than others.

Rolling a Pair of Dice
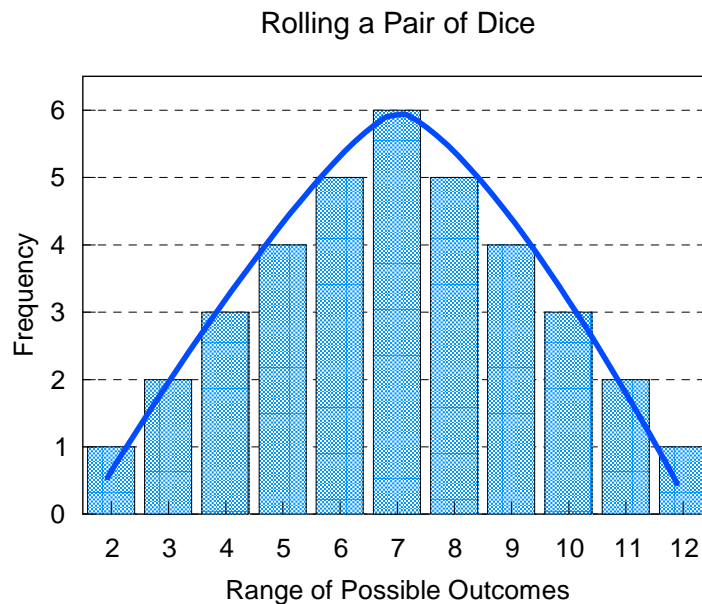
Distribution of Gov't Outlays,
$2 Billion Scenario

- Average spending levels are similar under all 3 programs ($12.6 Bil)

- With fixed payments, there is a higher minimum under MLA.

- In all cases, much more upside spending potential than downside.

Distribution of Net CCC Outlays, FY 2004
$2 Billion Scenario
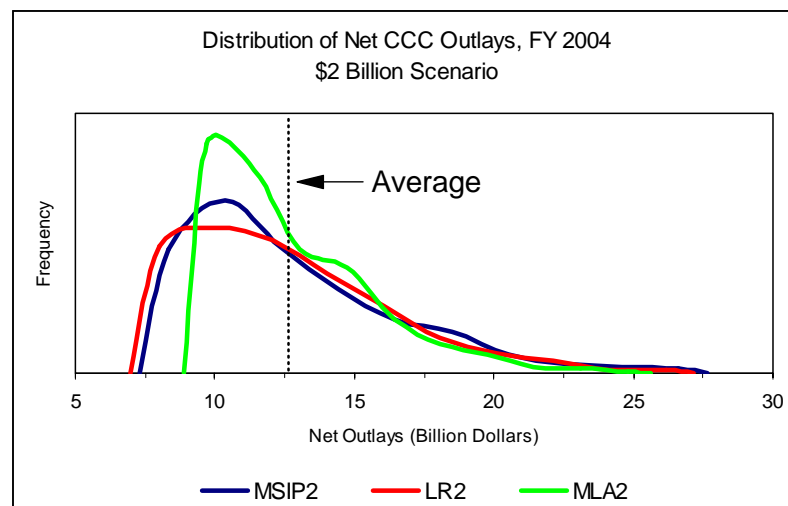
Likelihood That Net CCC Outlays Exceed $10 Bil, $2 Billion Scenario

FAPRI

- Rising prices and declining AMTA payments reduce chance that net outlays exceed $10B.

- Fixed payments under MLA2 give greatest chance of net outlays exceeding $10 billion.

- **From 1986-99, net outlays surpassed $10 billion in 10 of 14 years.**

Probability Net CCC Outlays Exceed $10 Billion

Fiscal Year

Base ■ MSIP2 ■ LR2 ■ MLA2
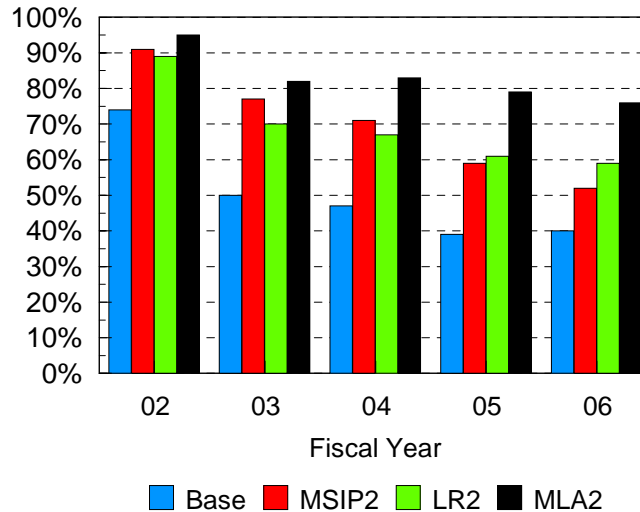
Likelihood That Net CCC Outlays Exceed $15 Bil, $2 Billion Scenario

FAPRI

- The infusion of additional money under all 3 scenarios greatly increase the likelihood that outlays exceed $15Bil.

- In general, MSIP2 and LR2 have greater chances of exceeding $15 Bil, when compared to MLA2.
  - Upside spending potential when linked to prices and production.

Probability Net CCC Outlays Exceed $15 Billion

Fiscal Year

Base ■ MSIP2 ■ LR2 ■ MLA2
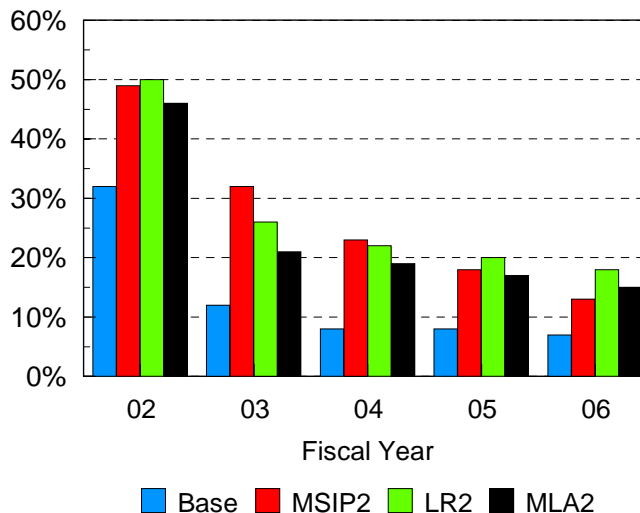
Distribution of Corn Returns,
$2 Billion Scenario

FAPRI

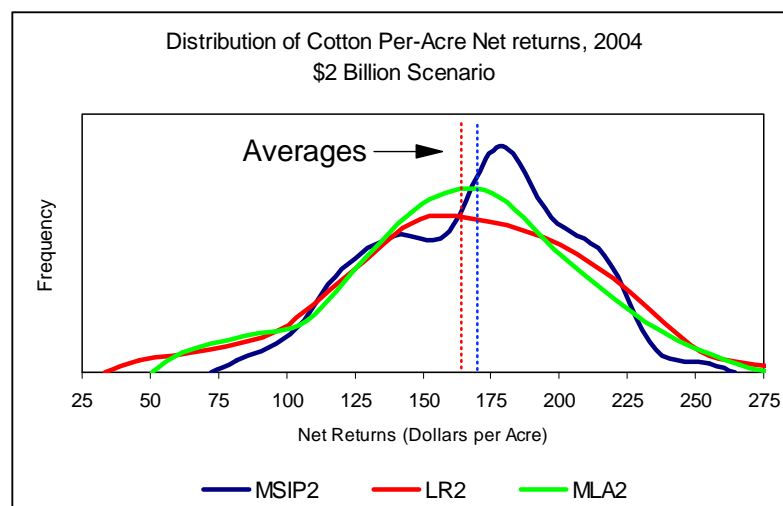- Returns average $155 under MSIP2 and MLA2. Average is $151 under LR2.

- SIP reduces more of the downside risk in returns.

Distribution of Corn Per-Acre Net Returns, 2002
$2 Billion Scenario

Averages

Frequency

Net Returns (Dollars per Acre)

—— MSIP2 —— LR2 —— MLA2
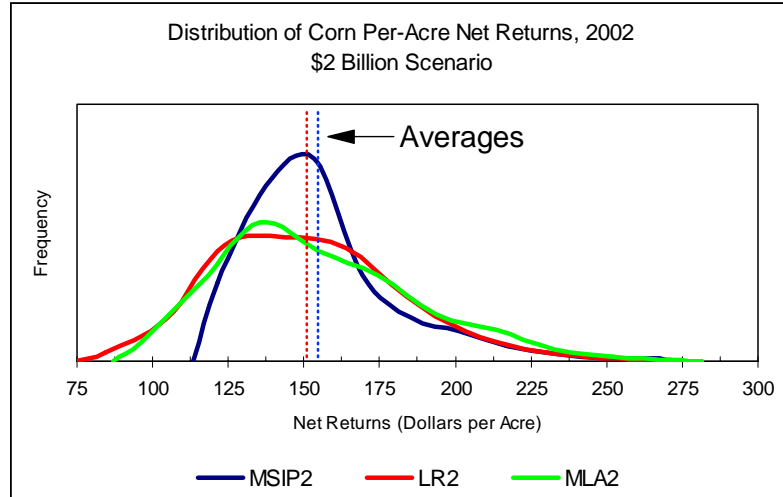
Distribution of Cotton Returns,
$2 Billion Scenario

FAPRI

- Average returns under LR2 and MLA2 are $165/ac. Average under MSIP2 is $169.

- Note the different shape relative to corn returns
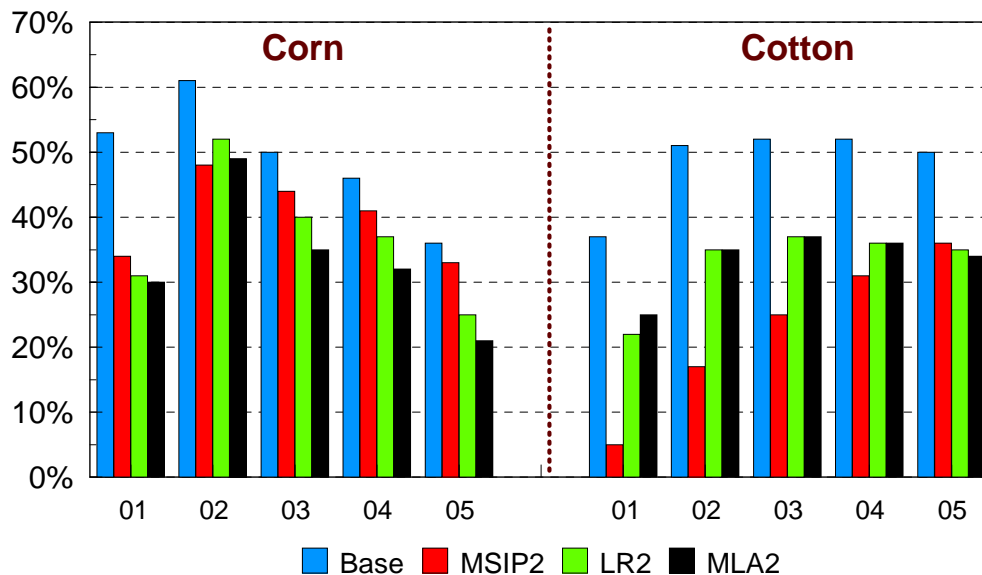 - Skewed in the opposite direction.

Distribution of Cotton Per-Acre Net returns, 2004
$2 Billion Scenario

Averages

Frequency

Net Returns (Dollars per Acre)

—— MSIP2 —— LR2 —— MLA2

Likelihood of Net Returns Less than $150, $2 Billion Scenario

FAPRI

Corn — Cotton

Base — MSIP2 — LR2 — MLA2

Likelihood of Net Returns Less than $150, $2 Billion Scenario

FAPRI
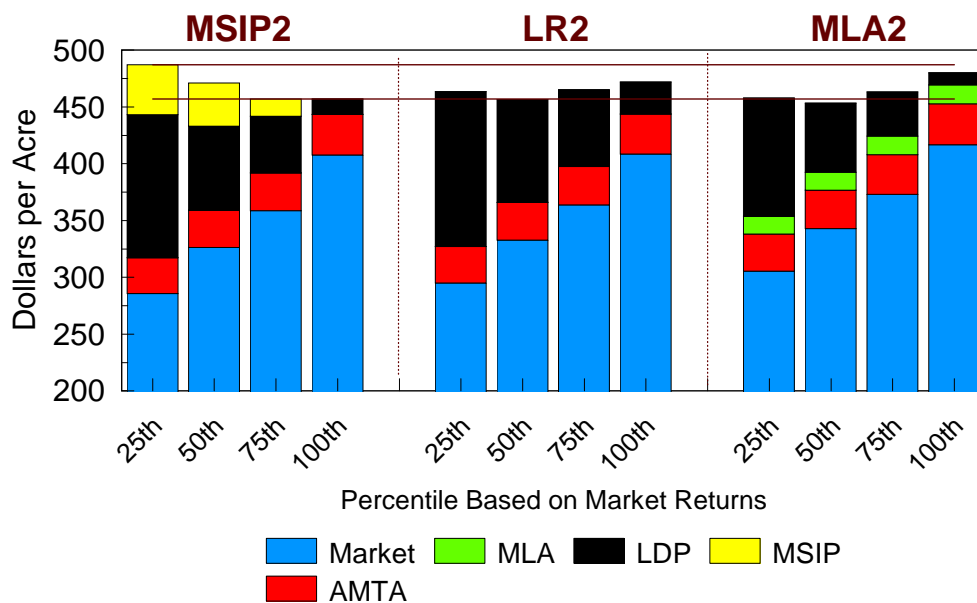
Corn — Cotton

Base — MSIP2 — LR2 — MLA2
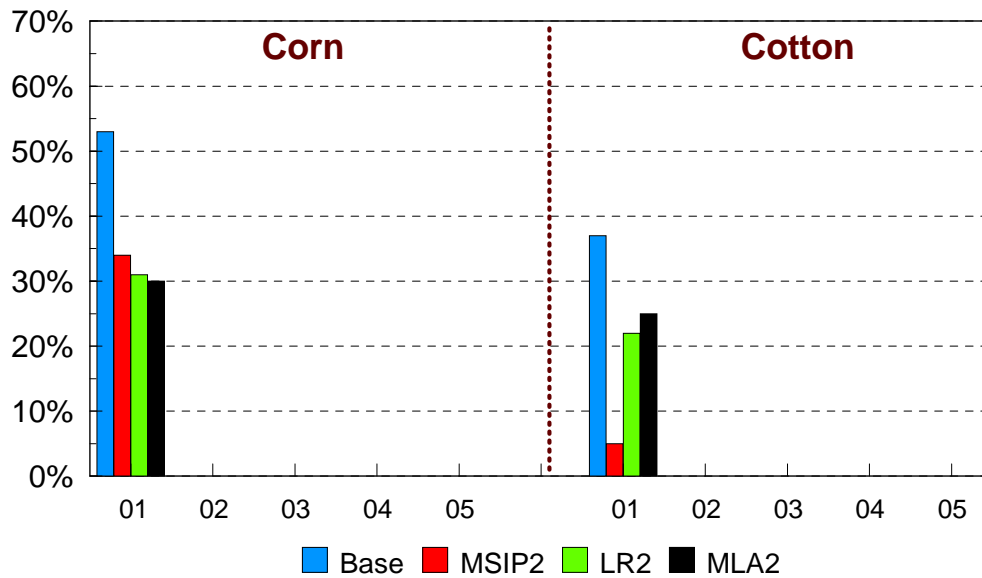
Corn Gross Returns in 2002,
$2 Billion Scenario
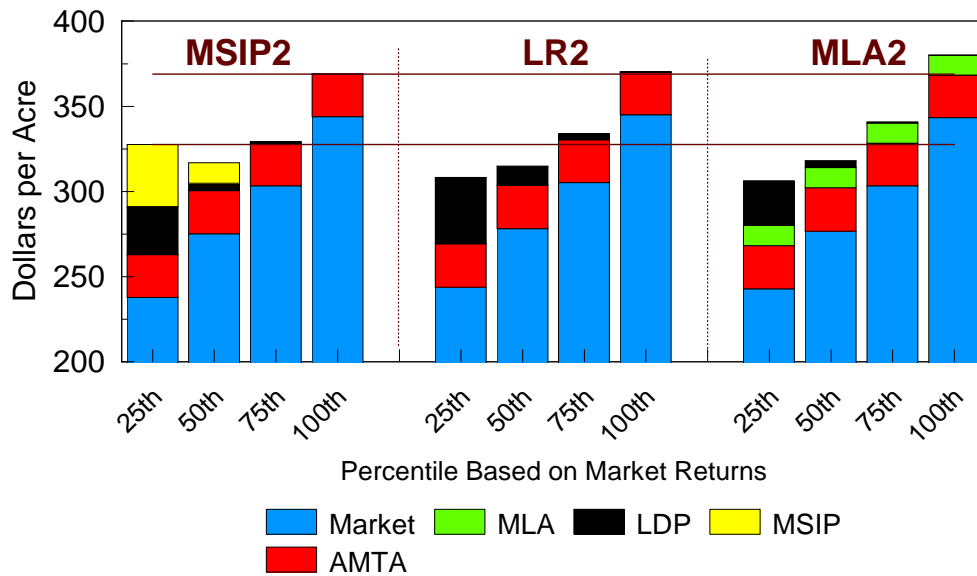
FAPRI

Cotton Gross Returns in 2004,
$2 Billion Scenario

FAPRI

Summary Points

- The results of the analysis are not "universal"
  - They are influenced by baseline characteristics such as
    - Loan rates adjusting after 2001
    - Relative price/loan rate relationships for different crops

- With that in mind, the results of the $2 billion scenario generally hold for the other two as well, just at different magnitudes.

- Acreage Impacts
  - Small in the aggregate.
  - MSIP shifts acreage from soybeans into other crops.
  - Soybeans, cotton, rice gain acreage under LR.

Summary Points

- Relative to MLA and LR, MSIP reduces the variability per-acre crop returns.
  - LR and MSIP increase the variability and upside spending potential of government outlays
  - Under LR and MSIP, there are higher probabilities that outlays exceed $15 bil. However, MLA gives a better chance of producing outlays above $10 billion.

- At the national level, "counter-cylcical" nature of MSIP provides greater downside protection on net returns.
  - **This may not hold for farm level results. A number of local factors come into play.**