Implications of the 2002 U.S. Farm Act for World Agriculture

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FAPRI

- Food and Agricultural Policy Research Institute (FAPRI) is a joint institute of
  - University of Missouri
  - Iowa State University
- Congress provides much of our funding to prepare projections of agricultural markets and analyze the effects of alternative policies

Context of the Farm Bill

- 2002 Farm Bill
  - Farmers concerned about safety nets for low prices
  - U.S. Budget surpluses
- 1996 Farm Bill
  - Record levels of commodity prices
  - Demand driven agriculture
  - New “price plateaus”

Major Features of the Bill

- Sets farm programs for next 6 years
  - Creates counter-cyclical payment program
  - Numerous other program changes
  - About $5 billion/year in new commodity program spending
  - Creates a price deficiency support system for U.S. dairy that expires in Sept 2005.

Allows Updating of Area and Yields Eligible for Payments

- Base Acreage
  - Farmers can retain current AMTA base acres and add oilseed acres, OR
  - For all covered commodities, update base acres using average 1998-2001 acres planted and prevented planted
- Payment Yields:
  - For fixed payments, keep AMTA yields
  - For CCPs, farmers updating base area can also update payment yields for part of the increase in actual yields between early 1980s and 1998-2001

Continues Loan Rates

	FAIR Act	2002 Farm Bill	
	Maximums	2002-03	2004-07
Corn	$1.89	$1.98	$1.95
Wheat	$2.58	$2.80	$2.75
Soybeans	$5.26	$5.00	$5.00
Sorghum	Rel. to corn	$1.98	$1.95
Cotton	51.92 cents	52.00 cents	52.00 cents
Rice	$6.50	$6.50	$6.50

Continues Fixed ("Direct") Payments

- Not tied to current production
- Paid on 85% of base acres (as under old farm bill), but base acres can be updated
- Paid on program yields used for FAIR Act payments—no updates
- Soybean payment yield: 78% of 1998-2001 yield

	FAIR Act	2002 Farm Bill
	2002	2002-07
Corn	$0.26	$0.28
Wheat	$0.46	$0.52
Soybeans	---	$0.44
Sorghum	$0.31	$0.35
Cotton	$0.0572	$0.0667
Rice	$2.05	$2.35

Re-establishes Target Prices

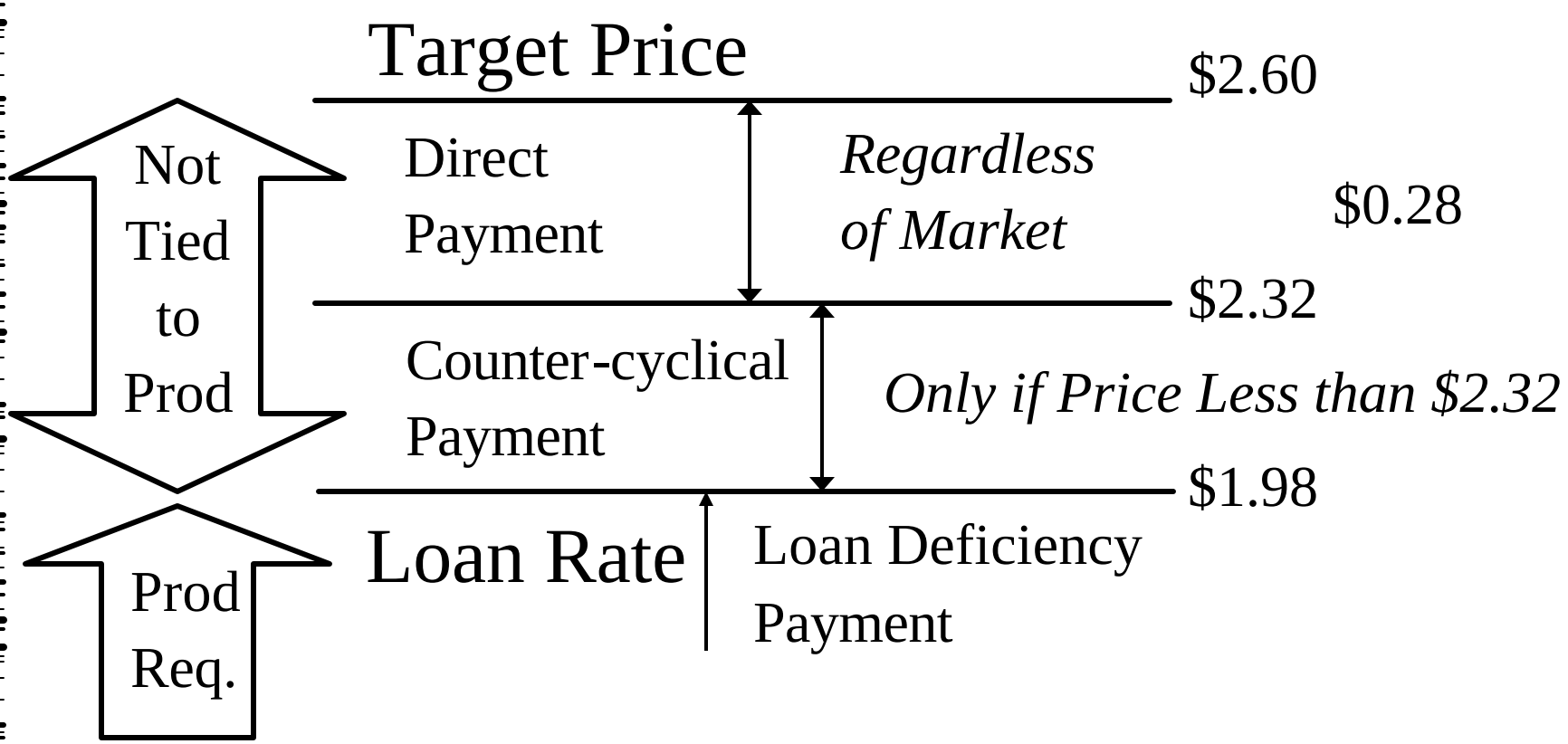
- Used to determine counter-cyclical payments (CCPs)
- CCP rate = Target Price – Fixed Payment – (higher of loan rate or season avg. farm price)
- Paid on 85% of base acres
- If producers do a full base update, then CCPs paid on updated program yield

	2002-03	2004-07
Corn	$2.60	$2.63
Wheat	$3.86	$3.92
Soybeans	$5.80	$5.80
Sorghum	$2.54	$2.57
Cotton	$0.724	$0.724
Rice	$10.50	$10.50

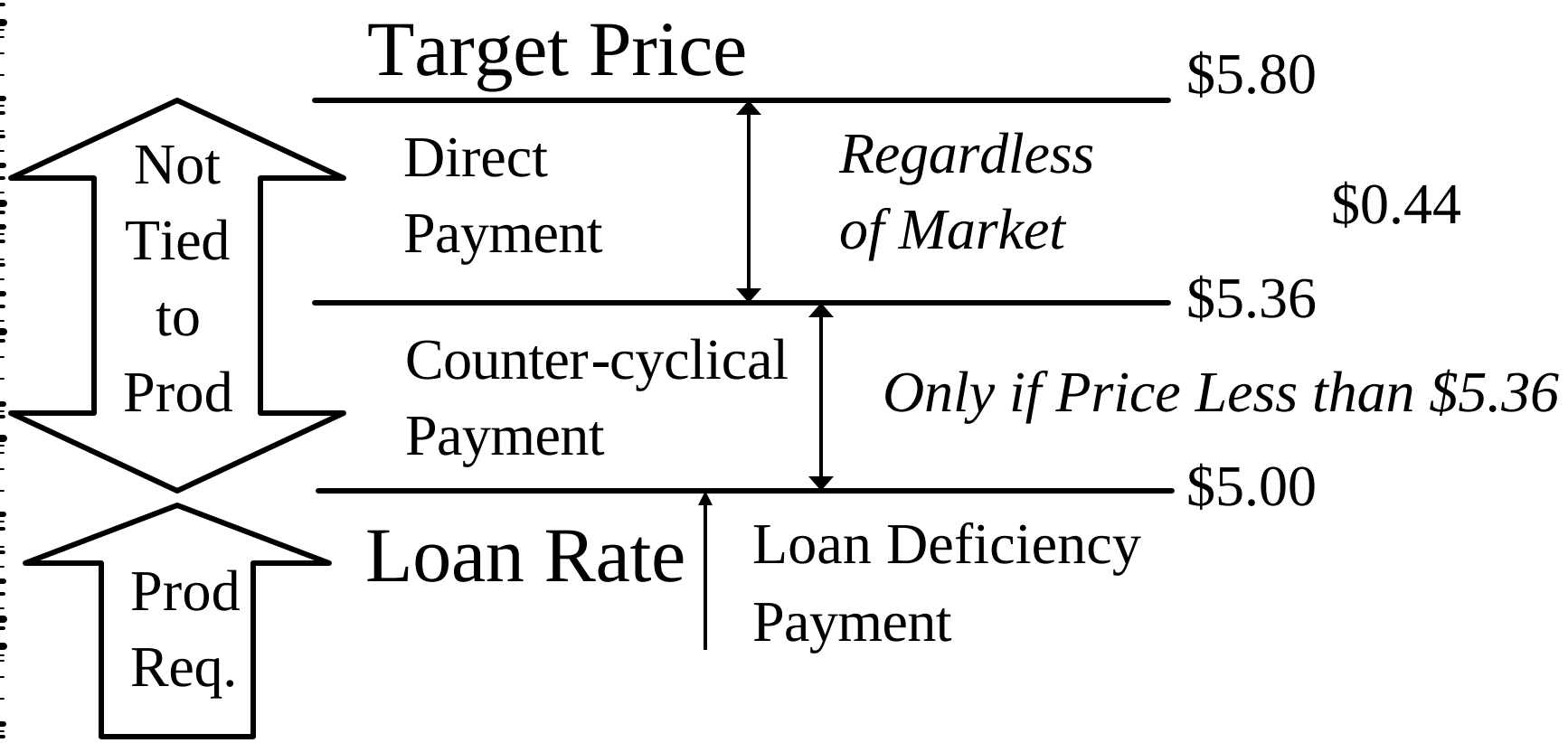
Payment Calculations

- Direct Payments
  - Direct Payment Rate * (Base Acres * 0.85) * Direct Payment Yield
- Counter-cyclical Payments
  - (Target Price – Direct Payment Rate – (Higher of Loan Rate or Season Average Price)) * (Base Acres * 0.85) * Counter-cyclical Payment Yield

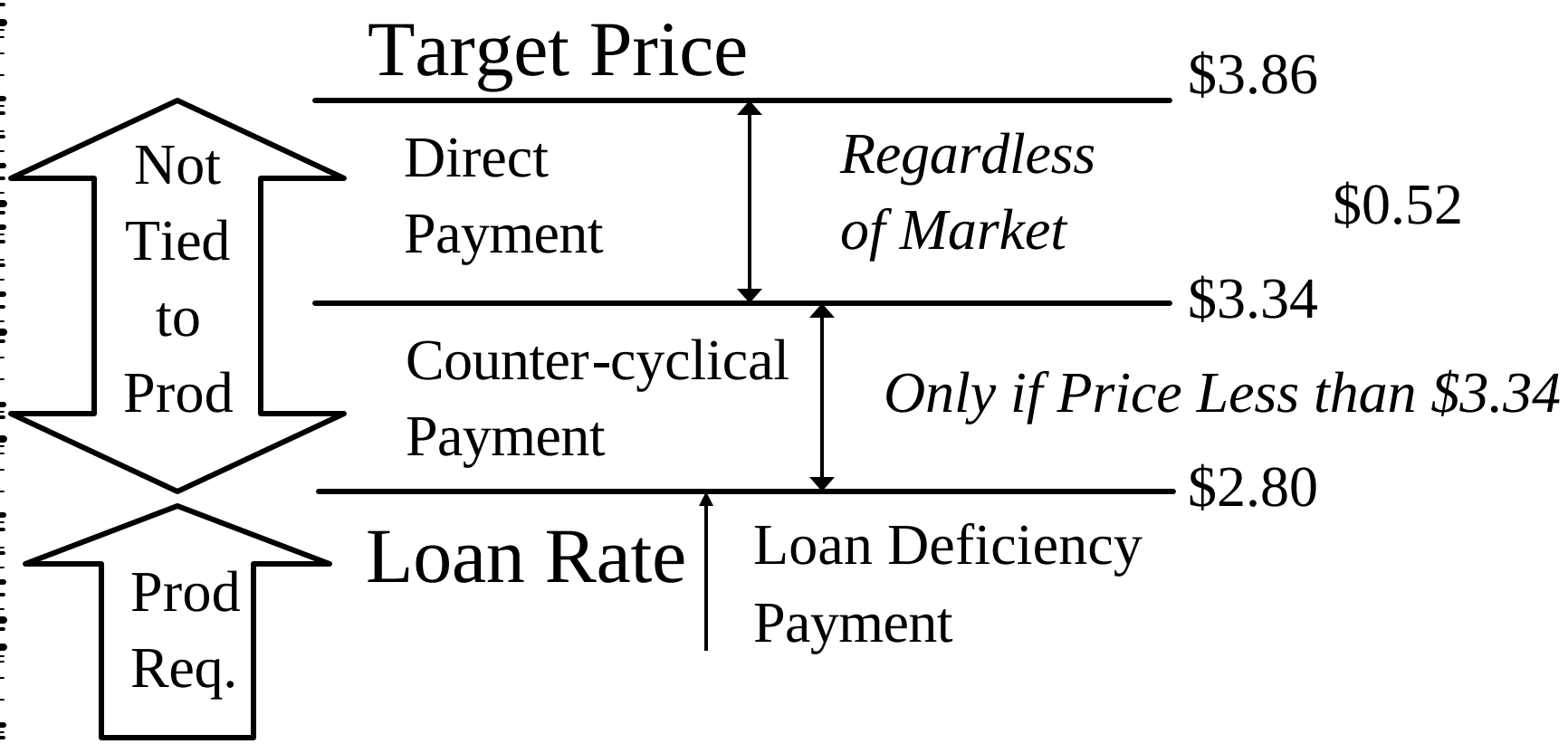
Structure of Payments
Corn Example



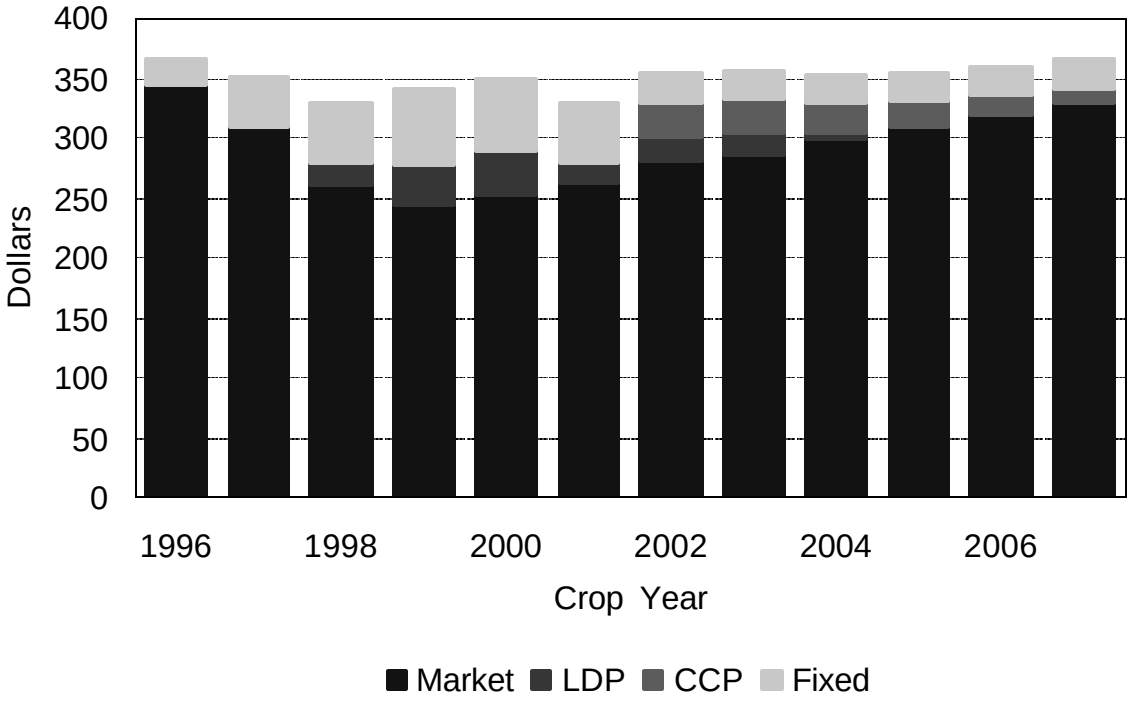
Structure of Payments
Soybean Example



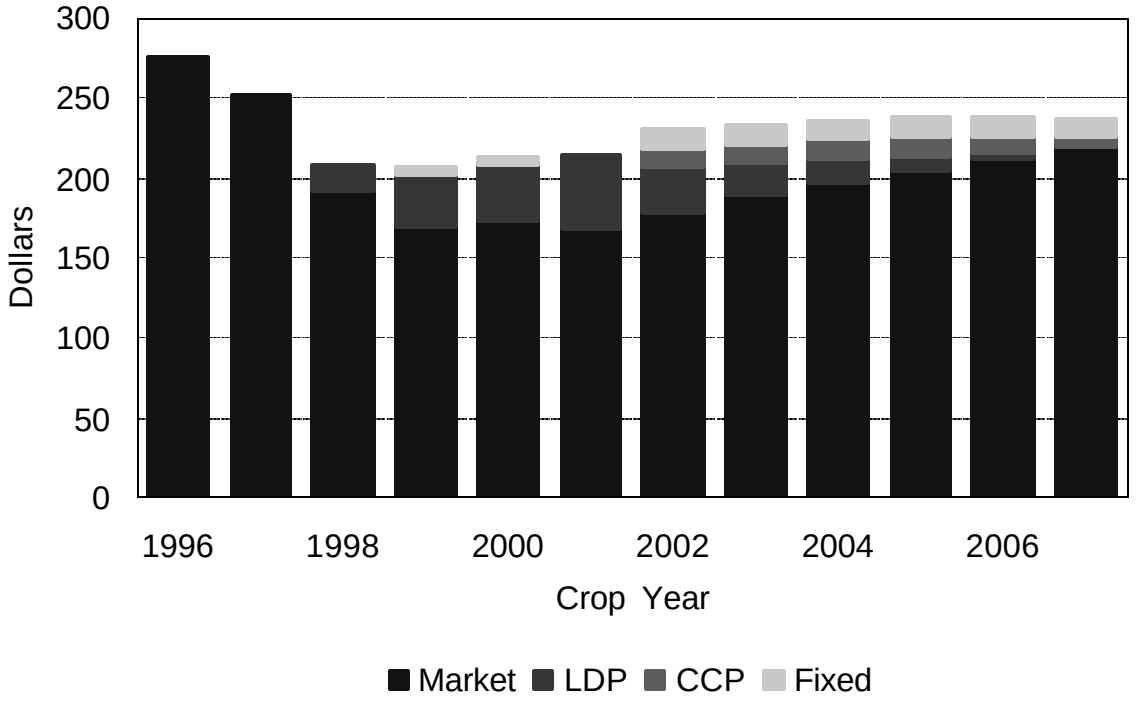
Structure of Payments
Wheat Example



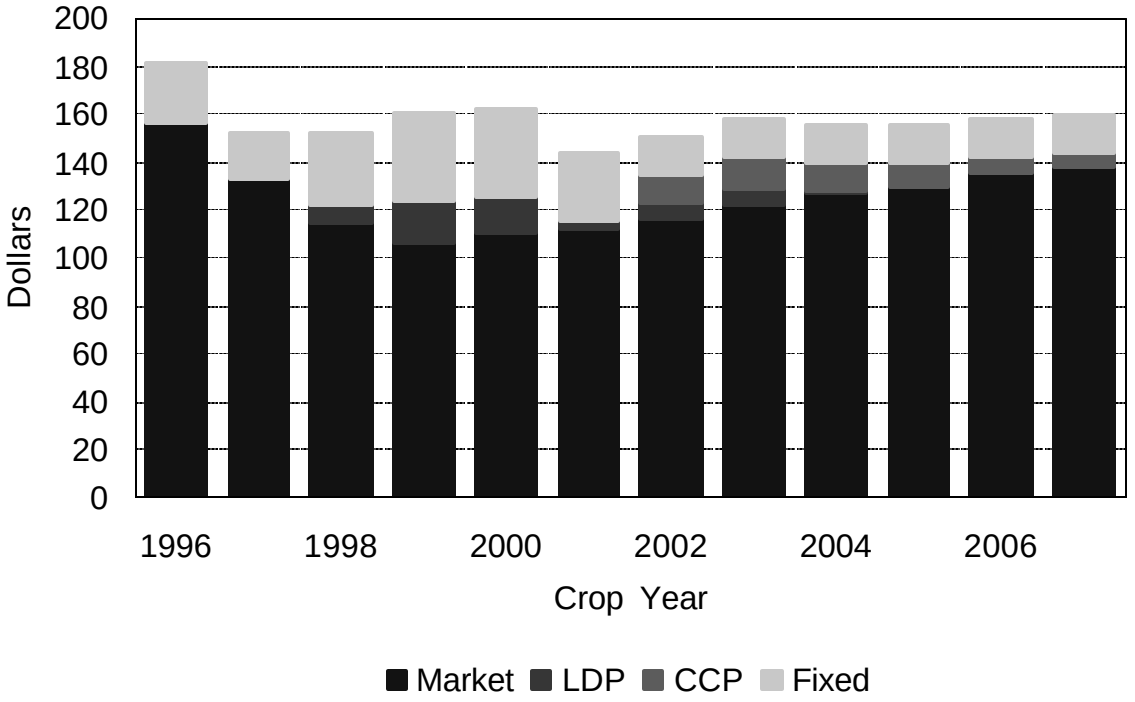
Corn Gross Returns per Acre



Soybean Gross Returns per Acre



Wheat Gross Returns per Acre



Milk Income Loss Contract Program - MILC

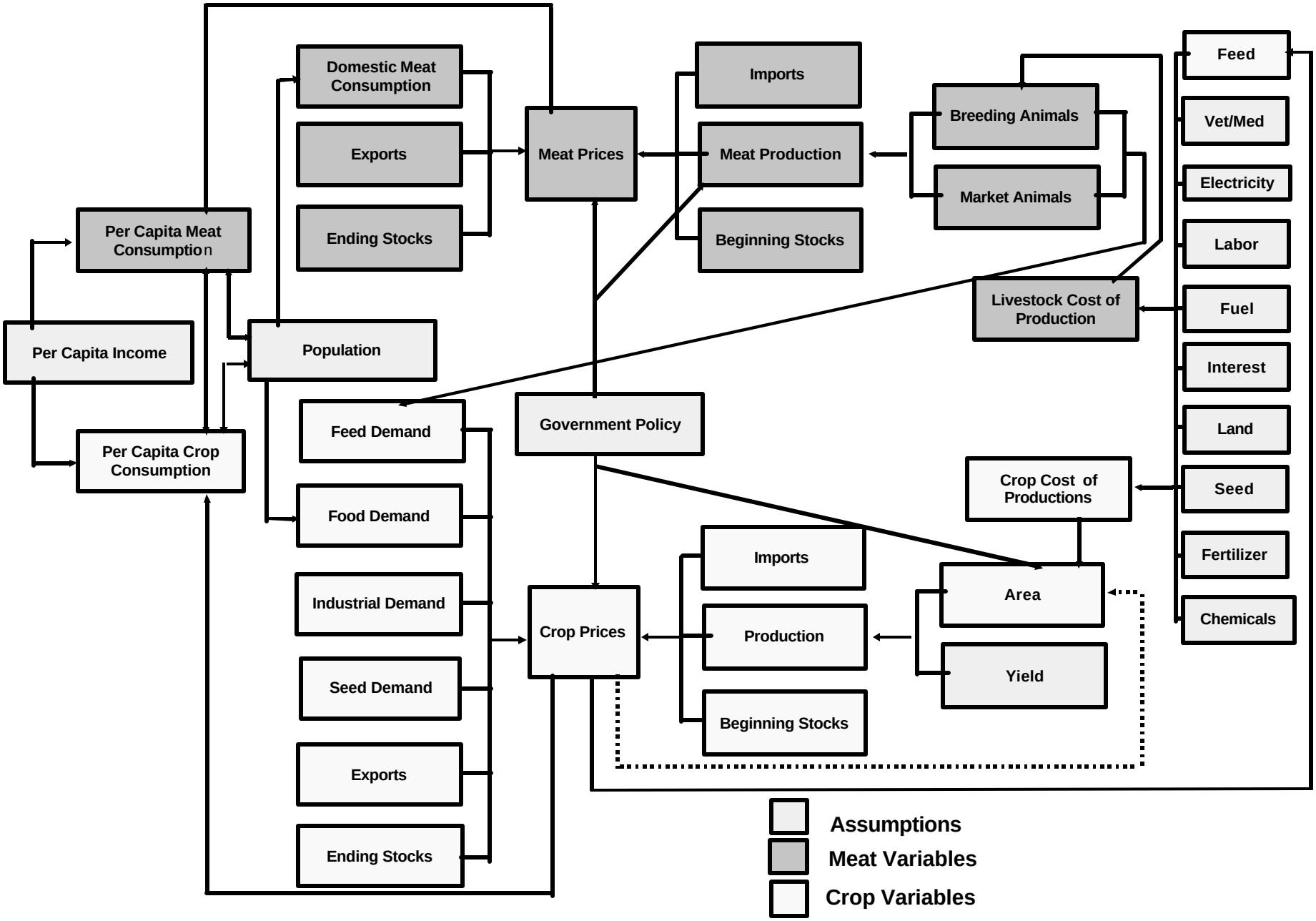
- Signup started Aug. 13, 2002, and ends Sept. 30, 2005
- Retroactive or transition period payments begin with Dec. 1, 2001 milk marketed
- Eligible milk capped at 2.4 million pounds per fiscal year (Oct. 1 – Sept. 30)
- Direct payment program that makes payments when the Boston Class I milk price falls below $16.94 per cwt
- Official FSA Website - http://www.fsa.usda.gov/dafp/psd/MILC.htm

MILC Program Operation

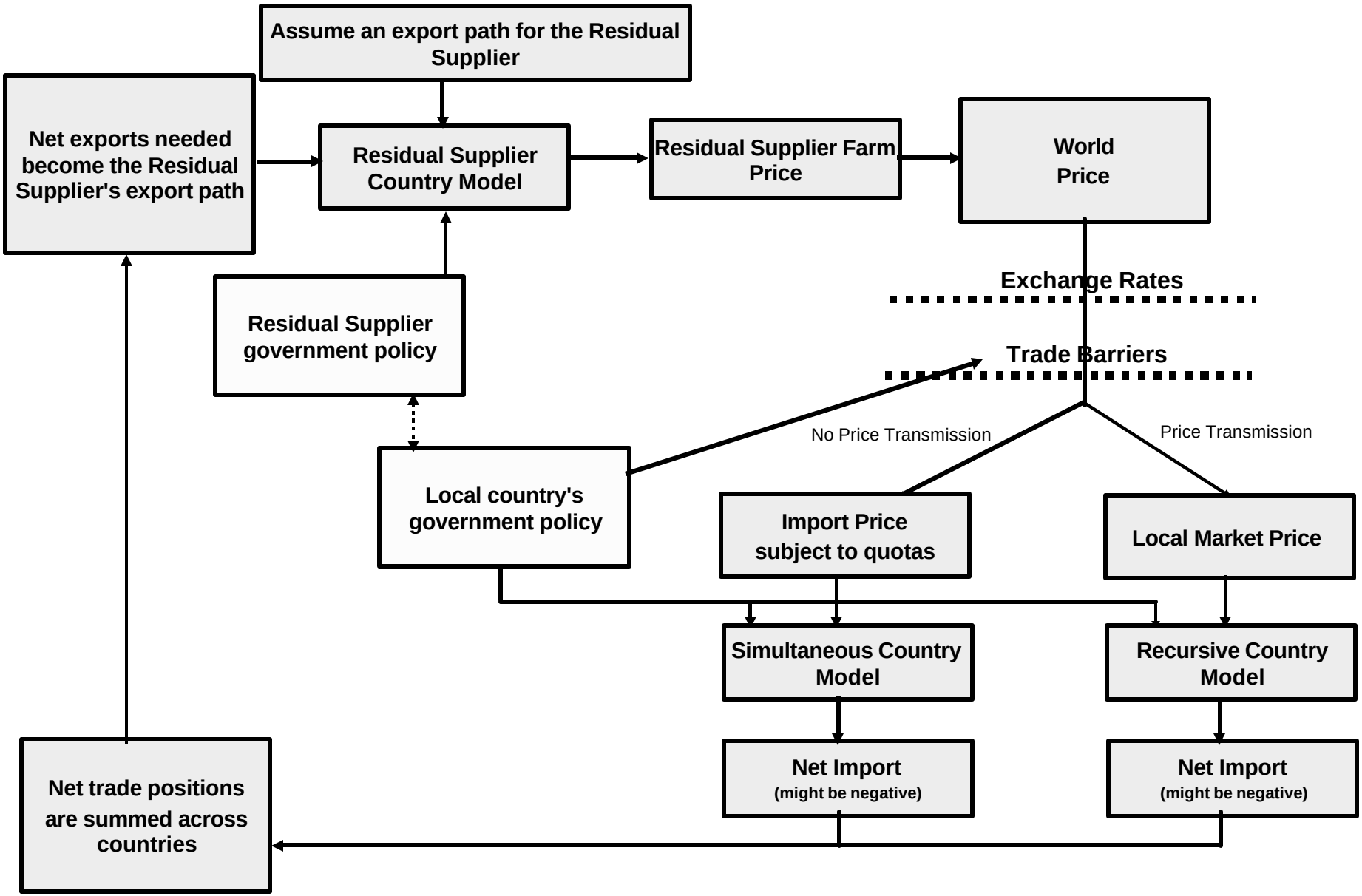
- Direct Payment Rate = 0.45 * ($16.94 – Boston Class I Price)
- Payments made no later than 60 days after production evidence is received by FSA
- Transition payments should reach those already signed up by late October
- Producer can pick the month payments start
  - Once started payments continue until fiscal year ends or the 2.4 million pound cap is reached

The FAPRI Modelling System

U.S. Country Model Flow Diagram



Iterative Process to Determine Global Equilibrium



U.S. Acreage Specifications

$$\text{Area Planted}_i = f\left(\frac{\text{E(Net Returns}_i)}{\text{Deflator}}, \frac{\text{E(Net Returns}_c)}{\text{Deflator}}, \frac{\text{E(Net Returns}_{c+1})}{\text{Deflator}}, \ldots, \frac{\text{E(Net Returns}_{c+j})}{\text{Deflator}}, \frac{\text{De-Coupled Payments}}{\text{Deflator}}\right)$$

$$\text{E(Net Returns}_k) = \frac{(\text{Max(Farm Price}_{k,(t-1)}, \text{Loan Rate}_{k,t}) * \text{Trend Yield}_k - \text{Variable Cost of Production}_k))}{\text{Deflator}}$$

Acreage Equation Coefficients

Table 4. Matrix of Coefficients on Deflated Expected Net Returns

	Barley	Corn	Cotton	Oats	Rice	Soybeans (Sgl)	Soybeans (Dbl)	Sorghum	Sunflowers	Wheat (Sgl)	Total
Barley	2.800	-0.287	-0.028	-0.084	-0.018	-0.250	-0.009	-0.014	-0.073	-1.000	1.037
Corn	-0.573	11.577	-0.303	-0.693	-0.063	-5.877	-0.422	-0.609	-0.263	-2.700	0.075
Cotton	-0.037	-0.577	2.505	-0.028	-0.070	-0.776	-0.235	-0.355	0.000	-0.397	0.030
Oats	-0.056	-0.257	-0.008	2.100	-0.002	-0.152	-0.011	-0.014	-0.019	-0.700	0.879
Rice	-0.014	-0.058	-0.054	-0.002	0.400	-0.051	-0.059	-0.037	0.000	-0.120	0.004
Soybeans(Sgl)	-0.503	-5.804	-0.331	-0.544	-0.118	11.596	-0.412	-0.420	-0.224	-3.020	0.218
Soybeans(Dbl)	-0.011	-0.425	-0.103	-0.018	-0.045	-0.468	1.405	-0.025	0.000	-0.144	0.166
Sorghum	-0.014	-0.502	-0.107	-0.043	-0.022	-0.231	-0.016	3.742	-0.035	-1.294	1.478
Sunflowers	-0.148	-0.166	0.000	-0.059	0.000	-0.100	0.000	-0.022	1.455	-0.512	0.448
Wheat (Sgl)	-1.289	-3.147	-0.420	-0.600	-0.053	-1.629	-0.057	-1.051	-0.522	19.212	10.443
										Total	14.778

Example of the Acreage Effect of Fixed & Counter Cyclical Payments

- Total Acreage Effect =
  Acreage expansion coefficient
  * decoupled scaling factor
  * average “fixed + counter cyclical payment”
    payment per acre/deflator
- = 14.778 x .40 x $20.68/117.95
  = 1.037 million acres

FAPRI Stochastic Analysis

- In the past, FAPRI had made only one deterministic baseline, but it has become clear that this method consistently understated government costs.
- Over the past 3 years FAPRI has been developing procedures to run stochastic analysis.

Why Stochastic Analysis?

- Consider the effects of yield variation
- Consider the effects of export variation

What is Stochastic Analysis?

- Instead of making one forecast based on trend yields, FAPRI created a distributions around crops yield deviations from trend and U.S. exports.

- By pulling 500 different combinations of yield deviations and export paths, (adjusting to account for the covarience), FAPRI made 500 deterministic forecasts. The average of these 500 deterministic forecasts is then used as the stochastic solution.

Why is Stochastic Analysis important?

- Stochastic analysis does a better job estimating government costs because it accounts for counter cyclical and loan deficiency payments given the historical probabilities for good and bad yields.

- Since good yields tend to generate low prices and more government payments, but low yields generate no additional direct payments, the stochastic mean of for government payments is always above the deterministic mean.

Why is Stochastic Analysis important?

- Provides a mechanism to assign probabilities to issues such as how probable it is that the U.S. will exceed its WTO commitments.

Analysis Results of the Impact of FSRI

Key Assumptions in the Analysis of FSRI

- CRP acreage expanded to 38.5 million acres under the 2002 FSRI Act instead of 36.2 million acres under the 1996 FAIR Act

- No further ad hoc disaster or “double AMTA payments” under the extension of the 1996 FAIR Act.

Impacts of FSRI on U.S. Planted Area

	2002	2003	2004	2005	2006	2007	2008	2009	2100	02-10 average
Planted area (million acres)										
9 major crops	2.09	1.96	1.46	1.14	0.90	0.66	0.47	0.35	0.23	2.09
Wheat	1.19	1.10	0.69	0.55	0.36	0.27	0.15	0.10	0.06	1.19
Corn	1.31	1.15	0.80	0.63	0.53	0.43	0.31	0.26	0.20	1.31
Soybeans	-1.33	-1.17	-0.82	-0.76	-0.67	-0.60	-0.48	-0.42	-0.38	-1.33
Upland cotton	0.11	0.10	0.12	0.10	0.08	0.07	0.06	0.05	0.04	0.11
Rice	0.02	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.02
Sorghum	0.47	0.46	0.39	0.34	0.30	0.23	0.19	0.16	0.12	0.47
Barley	0.12	0.08	0.07	0.08	0.09	0.08	0.08	0.06	0.05	0.12
Oats	0.17	0.19	0.18	0.18	0.17	0.14	0.14	0.12	0.11	0.17
Sunflowers	0.03	0.04	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03

Impacts of FSRI on U.S. Exports

Table 9. Impacts of the Farm Security and Rural Investment Act of 2002 on the U.S. Crop Sector

	Units	2002	2003	2004	2005	2006	2007	2008	2009	2010	02-10 avg.
US Exports		(Changes on a crop-year basis relative to a March 2001 baseline)									
Wheat	Million MT	0.48	0.85	0.86	0.73	0.56	0.42	0.29	0.20	0.14	0.50
	% Chg	1.7%	2.9%	2.9%	2.4%	1.8%	1.4%	0.9%	0.6%	0.4%	
Corn	Million MT	0.53	1.11	1.45	1.50	1.40	1.22	0.99	0.77	0.60	1.06
	% Chg	1.0%	2.0%	2.4%	2.4%	2.2%	1.9%	1.5%	1.1%	0.8%	
Soybeans	Million MT	-0.44	-0.92	-0.88	-0.76	-0.63	-0.54	-0.47	-0.41	-0.36	-0.60
	% Chg	-1.5%	-3.1%	-2.9%	-2.5%	-2.0%	-1.7%	-1.5%	-1.3%	-1.1%	
Soybean Meal	1000 MT	-126.1	-74.6	-19.1	-12.1	-27.5	-38.4	-33.7	-31.4	-29.8	-43.62
	% Chg	-1.8%	-1.1%	-0.3%	-0.2%	-0.4%	-0.6%	-0.5%	-0.5%	-0.4%	
Soybean Oil	1000 MT	-35.52	-33.26	-20.05	-15.07	-14.97	-14.94	-12.13	-10.32	-9.33	-18.40
	% Chg	-5.0%	-4.4%	-2.5%	-1.8%	-1.7%	-1.7%	-1.3%	-1.1%	-1.0%	
Upland cotton	1000 MT	12.08	17.07	20.84	20.69	18.89	16.47	13.86	11.67	10.11	15.742
	% Chg	0.7%	0.9%	1.1%	1.1%	0.9%	0.8%	0.7%	0.6%	0.5%	
Rice	Million MT	0.03	0.03	0.04	0.04	0.03	0.03	0.03	0.02	0.02	0.03
	% Chg	0.8%	0.8%	1.0%	0.9%	0.9%	0.8%	0.7%	0.6%	0.6%	
Sorghum	Million MT	0.11	0.16	0.15	0.14	0.13	0.11	0.09	0.08	0.06	0.11
	% Chg	2.2%	2.9%	2.8%	2.5%	2.2%	1.8%	1.5%	1.2%	0.9%	

Impacts of FSRI on U.S. Prices

Impacts of the Farm Security and Rural Investment Act of 2002 on the U.S. Crop Sector

	Units	2002	2003	2004	2005	2006	2007	2008	2009	2010	02-10 avg.
Crop prices											
Wheat	$/bu.	-0.04	-0.05	-0.04	-0.03	-0.03	-0.02	-0.01	-0.01	-0.01	-0.03
Corn	$/bu.	-0.04	-0.06	-0.06	-0.05	-0.04	-0.03	-0.02	-0.02	-0.01	-0.04
Soybeans	$/bu.	0.09	0.08	0.06	0.05	0.04	0.04	0.03	0.03	0.03	0.05
Upland cotton	$/lb.	-0.002	-0.003	-0.003	-0.003	-0.002	-0.002	-0.002	-0.002	-0.001	-0.002
Rice	$/cwt	-0.05	-0.05	-0.06	-0.05	-0.05	-0.05	-0.04	-0.03	-0.03	-0.05
Sorghum	$/bu.	-0.06	-0.08	-0.07	-0.06	-0.05	-0.04	-0.03	-0.02	-0.02	-0.05
Barley	$/bu.	-0.05	-0.06	-0.05	-0.05	-0.04	-0.04	-0.03	-0.02	-0.02	-0.04

Impacts of FSRI on U.S. Crop Gross Returns

Impacts of the Farm Security and Rural Investment Act of 2002 on the U.S. Crop Sector

	Units	2002	2003	2004	2005	2006	2007	2008	2009	2010	02-10 avg.
Crop gross returns**											
Wheat	$/bu.	0.48	0.38	0.35	0.29	0.23	0.18	0.15	0.13	0.11	0.26
Corn	$/bu.	0.22	0.20	0.19	0.16	0.13	0.11	0.09	0.07	0.06	0.14
Soybeans	$/bu.	0.30	0.30	0.28	0.28	0.27	0.27	0.26	0.26	0.26	0.28
Upland cotton	$/lb.	0.089	0.086	0.083	0.079	0.074	0.067	0.063	0.058	0.053	0.07
Rice	$/cwt	1.13	0.93	0.90	0.78	0.71	0.59	0.56	0.51	0.45	0.73
Sorghum	$/bu.	0.35	0.33	0.30	0.27	0.22	0.20	0.17	0.14	0.12	0.23
Barley	$/bu.	0.18	0.15	0.12	0.14	0.12	0.11	0.10	0.09	0.08	0.12

** Gross returns include program payments

Impacts of FSRI on the U.S. Dairy Sector

Impacts of the Farm Security and Rural Investment Act of 2002 on the U.S. Dairy Sector

	Units	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	02-11 avg.
		(Changes on a calendar-year basis relative to a December 2001 baseline)										
Milk production	bil. lbs.	0.8	1.1	1.2	1.2	0.8	0.5	0.3	0.2	0.1	0.1	0.6
All-milk price	$/cwt	-0.12	-0.22	-0.33	-0.41	-0.16	-0.16	-0.17	-0.13	-0.09	-0.06	-0.18
Gross returns*	$/cwt	0.38	0.31	0.21	0.11	-0.16	-0.16	-0.17	-0.13	-0.09	-0.06	0.02

* Gross returns include total program payments divided by total milk production

Impacts of FSRI on Government Cost and Farm Income

Impacts of the Farm Security and Rural Investment Act of 2002 on CCC Net Outlays

	Units	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	02-11 total
						(Changes on a fiscal-year basis relative to a March 2001 baseline)						
Title I (Commodities)	$ bil.	3.62	4.61	7.67	7.43	6.05	5.15	4.01	4.19	3.71	3.23	49.66
Title II (Conservation)	$ bil.	0.34	0.45	0.83	1.20	1.52	1.64	1.64	1.74	1.86	1.98	13.21
Titles I and II	$ bil.	3.97	5.06	8.50	8.63	7.56	6.80	5.65	5.93	5.57	5.21	62.87

Impacts of the Farm Security and Rural Investment Act of 2002 on Net Farm Income

	Units	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	02-11 avg.
						(Changes on a calendar-year basis relative to a March 2001 baseline)						
Title I (Commodities)	$ bil.	4.57	6.11	5.47	5.08	3.99	2.61	2.95	2.72	2.41	2.12	3.80
Title II (Conservation)	$ bil.	0.09	0.28	0.50	0.71	0.89	0.92	0.86	0.87	0.90	0.93	0.70
Titles I and II	$ bil.	4.66	6.39	5.97	5.79	4.88	3.53	3.81	3.59	3.31	3.05	4.50

WTO Issues

- WTO Agreement limits certain types of “amber box” support to U.S. producers to $19.1 billion.
- Counter cyclical payments are put in the “amber box” in FAPRI calculation although other interpretations are possible.
- But given uncertainty about prices, production, etc., we estimate a 19.2% chance the U.S. would exceed its WTO amber box limit.

FSRI Conclusion

- Very minimal impact on prices and U.S. exports, but significant increase in farm income
- Does increase the probability that the U.S. will exceed the WTO spending limits for the “amber box”
- The counter cyclical payments and loan rates will limit the downside exposure of U.S. farmers to low prices (i.e. the U.S. farmer will not respond to low world prices)

Trends in Global Policy

- Decoupled subsidies
- Move away from supply control
- Counter cyclical payments

Text Corrections

- Table 3, FAIR Act Maximums should be 1990 Farm Act
- Tables 5 – 9 should be titled “Impacts of the FSRI Act…”
- Page 13 or 14, “de-coupled payments ***for corn*** were projected to average $20.68….”, omit “for corn”
- CRP acres are allowed to rise to 38.5 million acres under the FSRI scenario, not 36.2 million acres as the text suggests

FAPRI Web Site

- www.fapri.missouri.edu

Questions?