FEDERAL CROP INSURANCE AND DISASTER PROGRAMS

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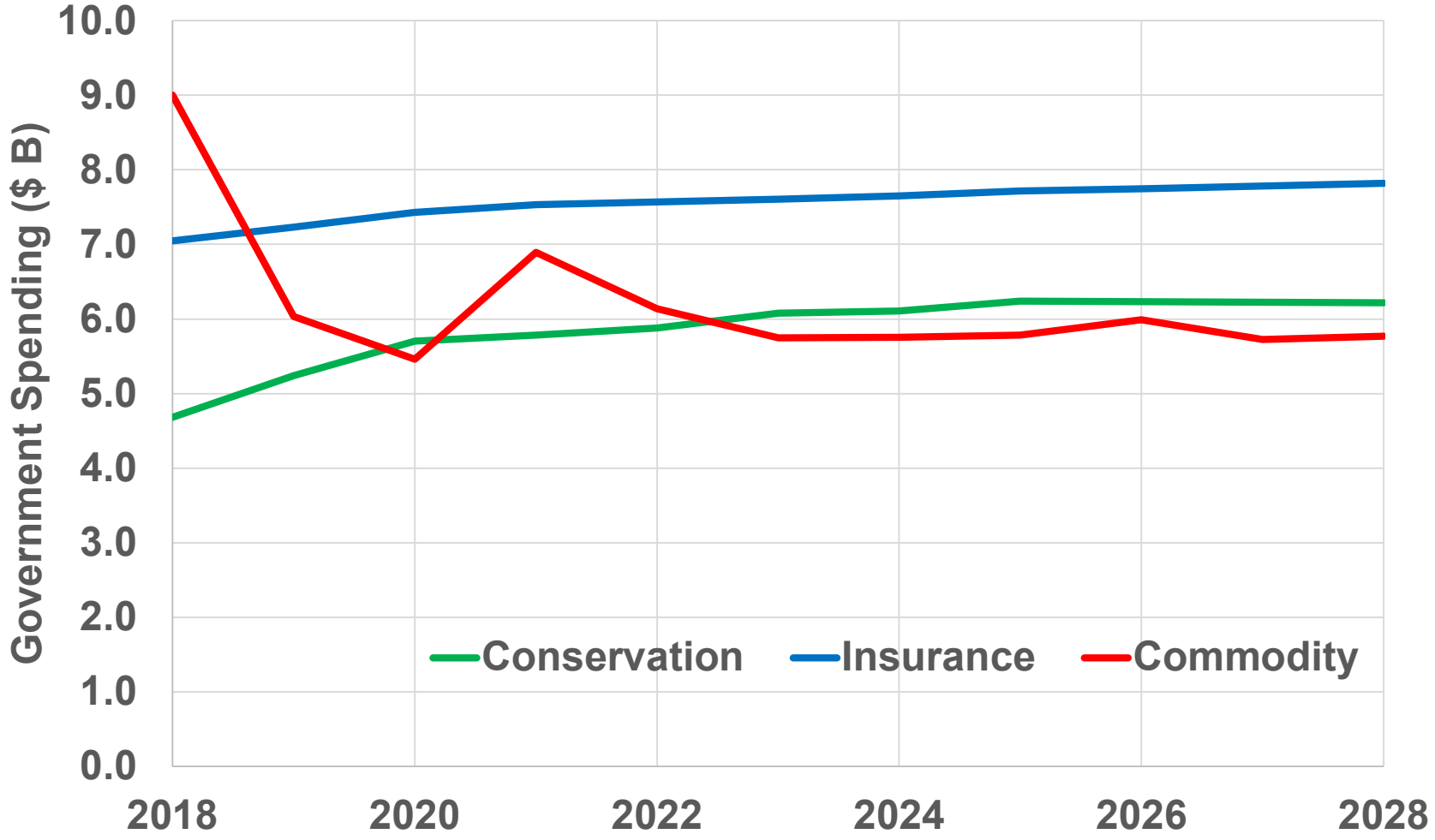
AAE 320: Farming Systems Management

Goal

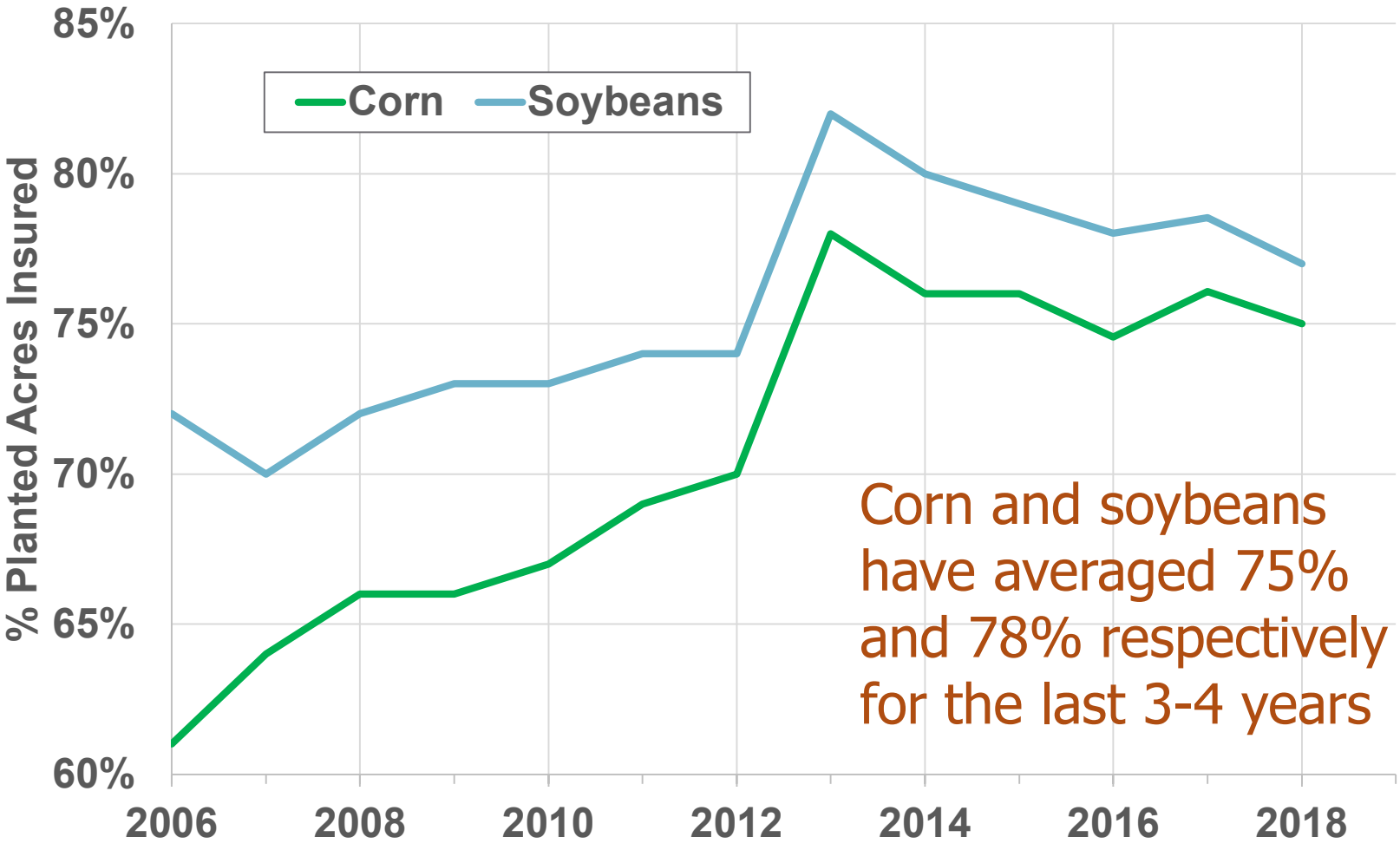
- Overview current crop insurance programs for major crops
  - How they work, choices farmer must make

- Disaster Programs were part of the Farm Bill, but crop insurance has become the emphasis

CBO Projected Spending: Crop Insurance Largest Spending Category



Trends in WI Crop Insurance Participation



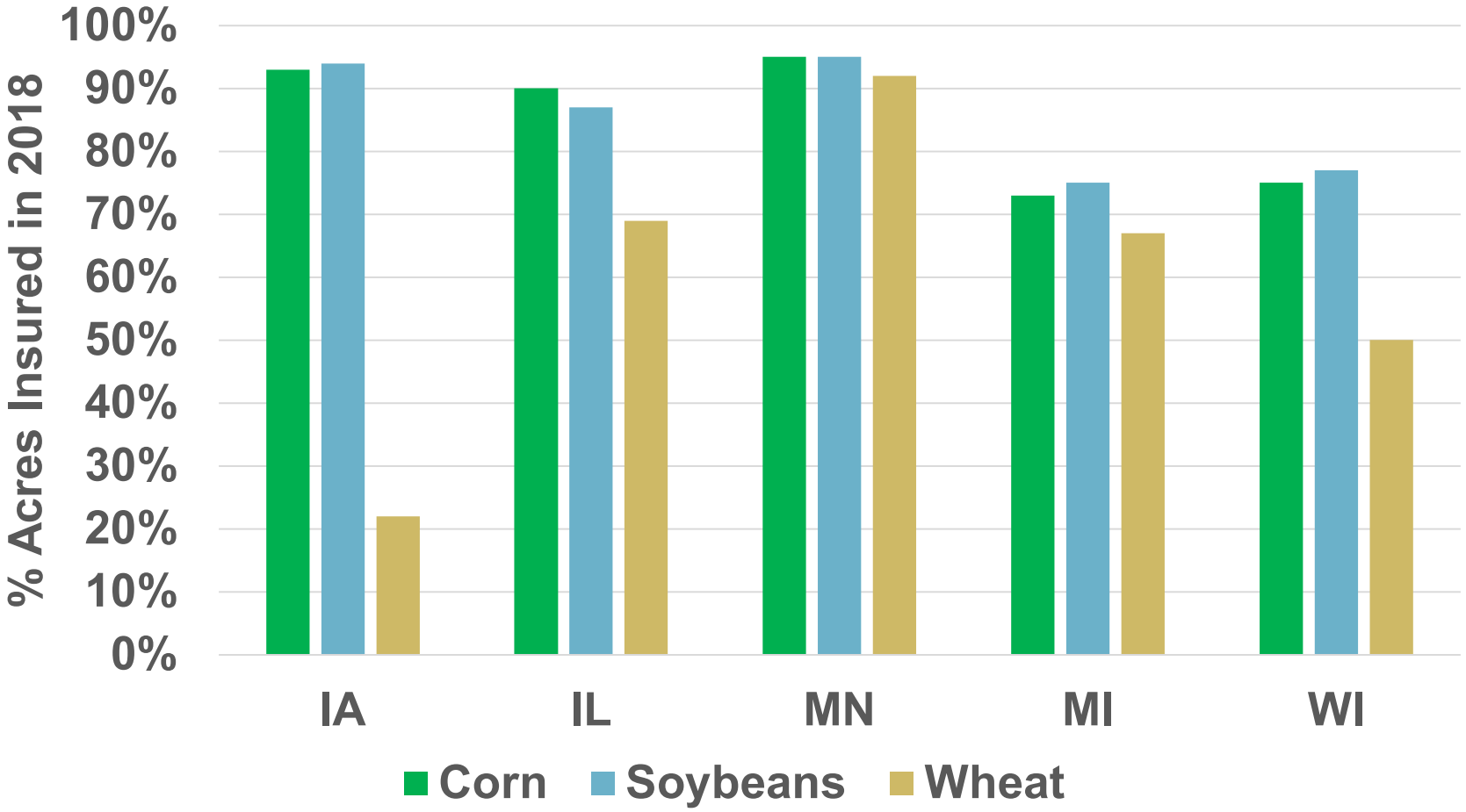
WI vs. neighboring states

% planted acres insured in **2018**

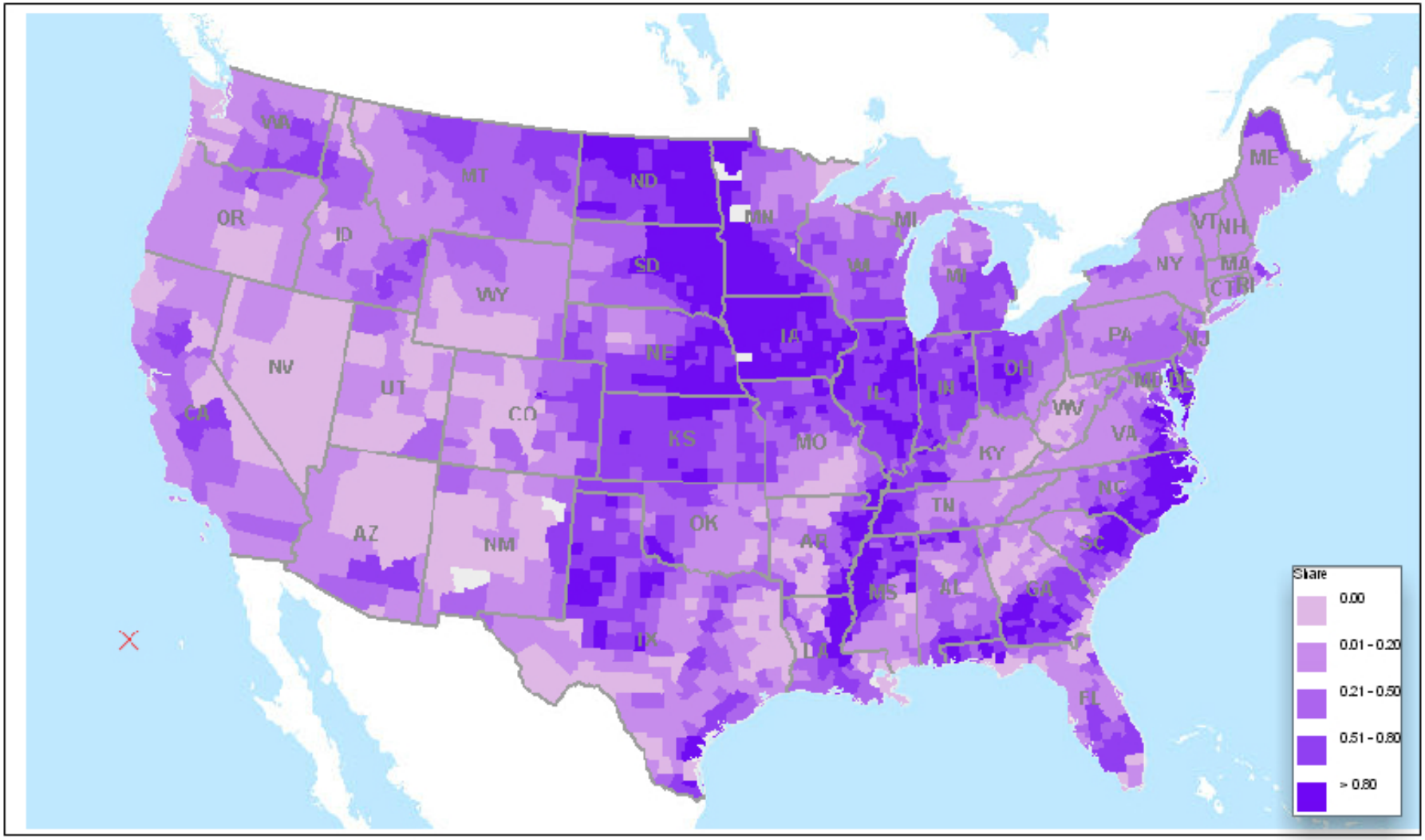
State	Corn	Soybeans	Wheat
IA	93%	94%	22%
IL	90%	87%	69%
MN	95%	95%	92%
MI	73%	75%	67%
WI	75%	77%	50%

WI vs. neighboring states

% planted acres insured in **2018**



2009 Insured Acres as Share of Cropland Acres



Crop Insurance

- Suppose I'm interested: Where do I start?
  Contact a crop insurance agent!
  - They all sell exactly the same polices for exactly the same prices, you are buying service – Find someone you like to work with
- For corn and soybeans: Choices you make
  1. What policy to buy?
  2. What coverage level to chose?
  3. What unit structure to use?

Types of Crop Insurance Policies

- Farmers have four choices for most crops
  - Are exceptions for regionally minor crops
- Yield Insurance vs Revenue Insurance
  - What triggers a payment?
  - Yield or Revenue below the guarantee?
- Individual vs. Area-Wide Coverage
  - Whose yield/revenue triggers payment?
  - Your own or your county's?

WI Crop Insurance Policies: Corn & Soybeans

So Many Options!!	Individual (Farm)	Area-Wide (County)
Yield	YP Yield Protection	AYP Area Yield Protection
Revenue	RP Revenue Protection	ARP Area Revenue Protection
	RP-HPE: Harvest Price Exclusion	ARP-HPE w/ Harvest Price Exclusion

- **Catastrophic coverage (CAT):** For YP, AYP
- **AGR-Lite**: Insure Schedule F income

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Types of Policies

- Yield Protection (YP)
  - Individual Yield Insurance
- Revenue Protection (RP) and RP-HPE (harvest price exclusion)
  - Individual Revenue Insurance
- Area Yield Protection (AYP)
  - Area-wide (County) Yield Insurance
- Area Revenue Protection (ARP) and ARP-HPE (harvest price exclusion)
  - Area-wide (County) Revenue Insurance

Farmer Choices

- After choose a policy (YP, RP, AYP, ARP), then have three choices to make
  - Coverage Level (like the deductible)
  - Price Election (payment rate for losses)
  - Unit Structure (some policies have no options)
- I will explain Yield Protection details to understand the other policies

YP: Yield Protection

- If actual harvested yield is less than your Yield Guarantee, receive an indemnity
- Actual Production History (APH): Average harvested yields over last 4-10 years
- Yield Guarantee: chose Coverage Level as % of your APH (Actual Production History)
- Coverage Level: % average yield (APH) chosen as guarantee, from 50% to 85% by 5% intervals
- Price Election: Choose price paid for each bushel below your yield guarantee, from 100% to 55% of established Base Price

Coverage Level sets Yield Guarantee: Example to Illustrate

Year	Yield
2013	165
2014	175
2015	150
2016	110
2017	185
2018	145
AVG	**155**

APH = 155

Coverage Level	Yield Guarantee
50% x 155 =	78 bu/ac
55% x 155 =	85 bu/ac
60% x 155 =	93 bu/ac
65% x 155 =	101 bu/ac
70% x 155 =	109 bu/ac
75% x 155 =	116 bu/ac
80% x 155 =	124 bu/ac
85% x 155 =	132 bu/ac

Price Election

- How much you are paid for each bushel that actual harvest is below yield guarantee
- Base Price set by USDA-RMA: Average of Dec corn (Nov soybean) futures contracts on Chicago Mercantile in Feb
- Choose 100% to 60% of this price in 1% intervals, appears as $/bu options
  - **Most farmers choose 100%**
  - Price set for large regions
  - 2014: Corn $4.62, Soybeans $11.36, Wheat $6.51
  - 2015: Corn $4.15, Soybeans $9.73, Wheat $5.85
  - 2016: Corn $3.86, Soybeans $8.85, Wheat $5.13
  - 2017: Corn $3.96, Soybeans $10.19, Wheat $4.74
  - 2018: Corn $3.96, Soybeans $10.16, Wheat $5.02
  - 2019: Corn $4.00, Soybeans $9.54, Wheat $4.35

YP Indemnity

- If Actual Harvested Yield < Yield Guarantee
- Indemnity = Price x ($Y_{guarantee} - Y_{harvested}$)
- Price: Chosen Price Election
  - **Most farmers choose 100%**
- Coverage Level determines your trigger, pay more for higher coverage levels
- Price Election determines how much you are paid when you have a loss, pay more for higher price election

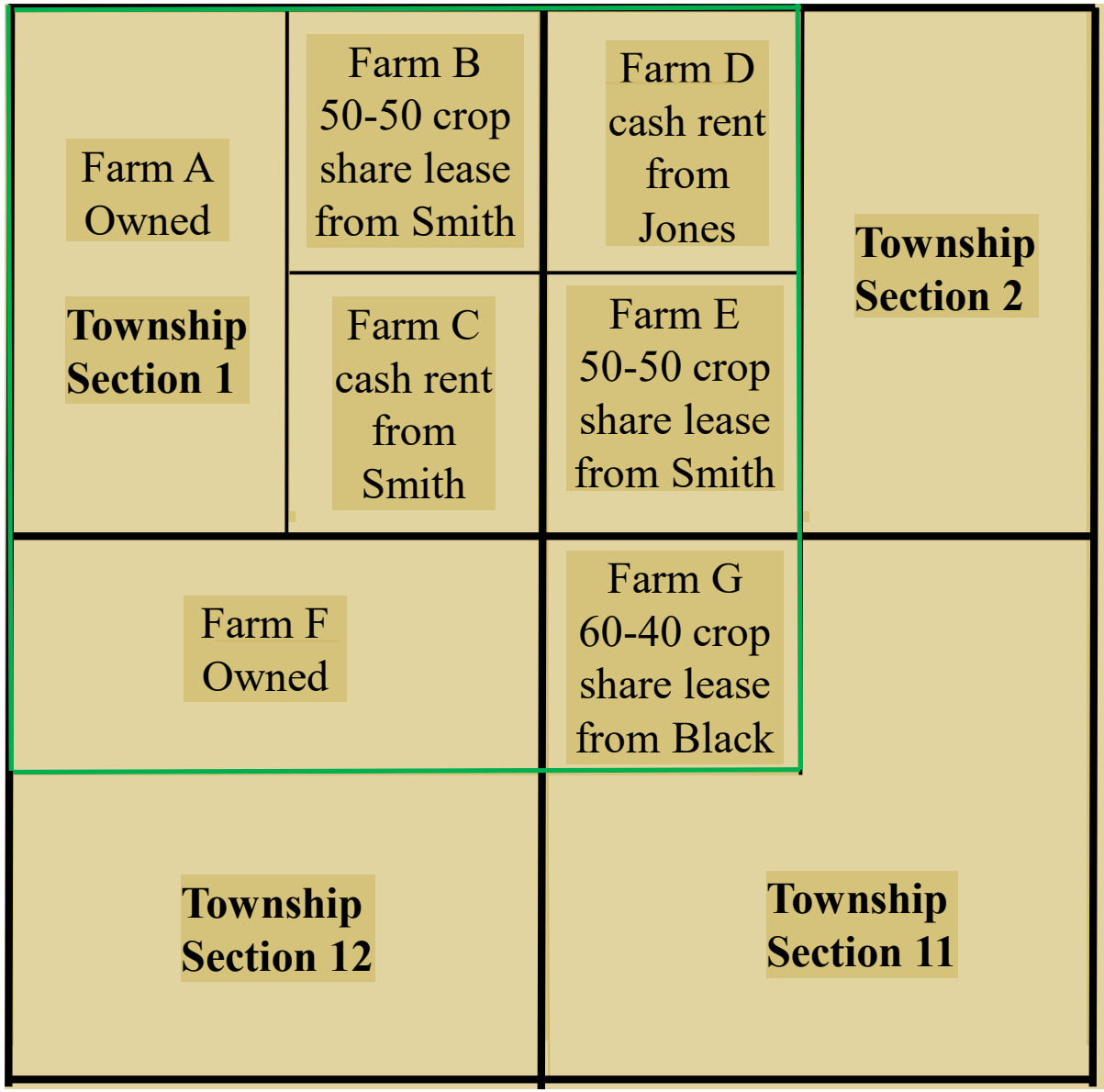
Unit Structure

- Legally define the area (fields) insured
  - Planted to same crop during insurance period
  - Cannot cut across a county line
  - **Separate production records for each unit**
- Three unit types (smallest to largest)
  - Optional Unit, Basic Unit, Enterprise Unit
- Previous Recommendation: Get as many Optional Units as you can
- Current Recommendation: Premium discounts have made Enterprise Units often the best deal
- Lots of rules: Crop insurance agent can help you figure out rules

Unit Structure Choices

- All guarantees at the unit level, not on a per acre basis
- 100 acre unit, average yield 160 bu/ac, 75% coverage level = 100 x 160 x 0.75 = 12,000 bushels
  - Guaranteed 12,000 bu from those 100 acres
- Have to choose how to combine fields together into units
- Can't just combine fields any way you want: Rules to follow
- Unit Sizes (smallest to largest):
  - Optional < Basic < Enterprise
- Smaller units means more indemnities (averaging over smaller area) and so larger premiums
- Government encourages larger units by giving larger premium subsidies for larger units (enterprise unit discount)

Farms A-G: Same operator planting the same crop



Basic Units

1) A, C, D, and F
2) B and E
3) G

Optional Units

1) A and C
2) B
3) D
4) E
5) F
6) G

Enterprise Unit

1) A thru G

Simple YP Example for a Unit

- Suppose have one unit, 100 acres of corn
- APH (average yield) is 160 bu/ac
- Choose 70% coverage level, and 100% price election $5.65/bu
- Yield guarantee = 70% x 160 bu/ac = 112 bu/ac
- Unit Guarantee = 112 x 100 ac = 11,200 bushels
- Actual harvest from Unit is 10,500 bu (or 105 bu/ac)
- Indemnity: $5.65 x (11,200 – 10,500) = $3,955 (or $39.55/ac)
- Notice how guarantee and indemnity work at the unit level, but often talk about it at the per acre level

Revenue Protection

- Combines Yield Protection with price protection based on CBOT futures prices
- Your yield history and CBOT prices set your preliminary Revenue Guarantee
- Same coverage levels, same unit structures
- Your revenue at harvest is your yield x CBOT prices (e.g., Nov average of Dec corn)
- If your harvest revenue is below your guarantee, triggers an indemnity payment

Initial and Final Revenue Guarantee RP vs. RP-HPE

- Base Price: Feb avg of Dec corn futures
- Harvest Price: Nov avg of Dec corn futures
- Initial Revenue Guarantee: calculated using the Base Price
- Final Revenue Guarantee: calculated using the **maximum** of Base Price and Harvest Price
- Main Point: With RP, if price increases over season, your revenue guarantee increases
- RP-Harvest Price Exclusion: revenue guarantee is not updated with max(Base, Harvest) price
- Lower indemnities with RP-HPE if price increases and have low yield, so Lower Premiums
- Very few farmers buy RP-HPE

RP Protects Against Both Price Increases and Decreases

- If price falls or have low yield, you know you will have the grain, or the money to buy grain at existing prices, to fulfill contracts/feed livestock
- If price increases, revenue guarantee increases too, so again you know you will have the grain, or the money to buy the grain at existing prices, to fulfill contracts/feed livestock
- Still have to market your grain
  - Can now market more aggressively since you will have grain or indemnities to buy grain at existing market prices if you have a yield loss

Simple Example Comparing the three

- Assume 150 bu/ac APH and 70% coverage level, so
- YP: per acre guarantee is 105 bu/ac
- Base price at plant $5.00, so RP and RP-HPE Initial Guarantee $5.00 x 105 = $525/ac
- Actual yield is 75 bu/ac, so loss is 105 – 75 = 30 bu/ac
- YP pays $5.00 x 30 bu/ac = $150/ac
- What happens if harvest price increased to $6.00?
  - RP Guarantee $6.00 x 105 bu/ac = $630/ac
  - RP pays: $630 – ($6.00 x 75) = $630 – $450 = $180/ac
  - RP-HRE: Guarantee not change: $525 – $450 = $75/ac
- What happens if harvest price decreased to $4.00?
  - RP and RP-HRE Guarantees do not change
  - Both pay $525 – ($4.00 x 75) = $525 – $300 = $225/ac
- Note: all of these would be at unit level, not per acre

RP vs. RP-HPE vs. YP
(150 bu/ac APH and 70% coverage level)

Policy	Base Price $/bu	Gtee $/ac bu/ac	Harvest Price $/bu	Gtee $/ac bu/ac	Actual Yield bu/ac	Actual Rev $/ac	Indemnity $/ac
RP	$5.00	$525	$6.00	**$630**	75	$450	630 – 450 = **$180**
RP-HPE	$5.00	$525	$6.00	**$525**	75	$450	525 – 450 = **$75**
YP	$5.00	105 bu/ac	$6.00	105 bu/ac	75	$450	$5x(105 - 75) = **$150**
RP	$5.00	$525	$4.00	**$525**	75	$300	525 – 300 = **$225**
RP-HPE	$5.00	$525	$4.00	**$525**	75	$300	525 – 300 = **$225**
YP	$5.00	105 bu/ac	$4.00	105 bu/ac	75	$300	$5x(105 - 75) = **$150**

RP vs. RP-HPE vs. YP

- If harvest price > base price and low yield, larger indemnity for RP than for RP-HPE
- If harvest price < base price, no difference for RP vs RP-HPE
- Notice: RP-HPE: can do worse than YP if high prices and low yields
  - RP-HPE uses actual higher harvest price to calculate actual revenue, while YP uses actual yield loss at lower base price
- RP-HPE: worst if low yields and high prices, best if low yields and low prices

Simple RP Example for a Unit

- Suppose have one unit, 100 acres of corn
- APH (average yield) is 160 bu/ac
- Announced Base Price is $3.75
- Choose 70% coverage level
- Initial Revenue Guarantee = 70% x 160 bu/ac x $3.75/bu x 100 ac = $42,000 (or $420/ac)
- Harvest time price announced as $4.00/bu
- Final Revenue Guarantee = 70% x 160 bu/ac x $4.00/bu x 100 ac = $44,800 (or $448/ac)
- Actual harvest from Unit is 10,500 bu (or 105 bu/ac), so actual revenue from Unit = $4.00 x 10,500 = $42,000
- Indemnity: $44,800 – $42,000 = $2,800 (or $28/ac)
- Again, guarantee and indemnity work at the unit level, but often talk about it at the per acre level

AYP Area Yield Protection
ARP Area Revenue Protection

- AYP = YP, except uses USDA-NASS county average yield (not your yield)
- ARP = RP except uses USDA-NASS county average yield
- ARP-HPE = RP-HPE except uses USDA-NASS county average yield
- Payments not made until Mar/Apr when USDA-NASS yields come out: cash flow issues?

WI Crop Insurance Policies: Corn & Soybeans

So Many Options!!	Individual (Farm)	Area-Wide (County)
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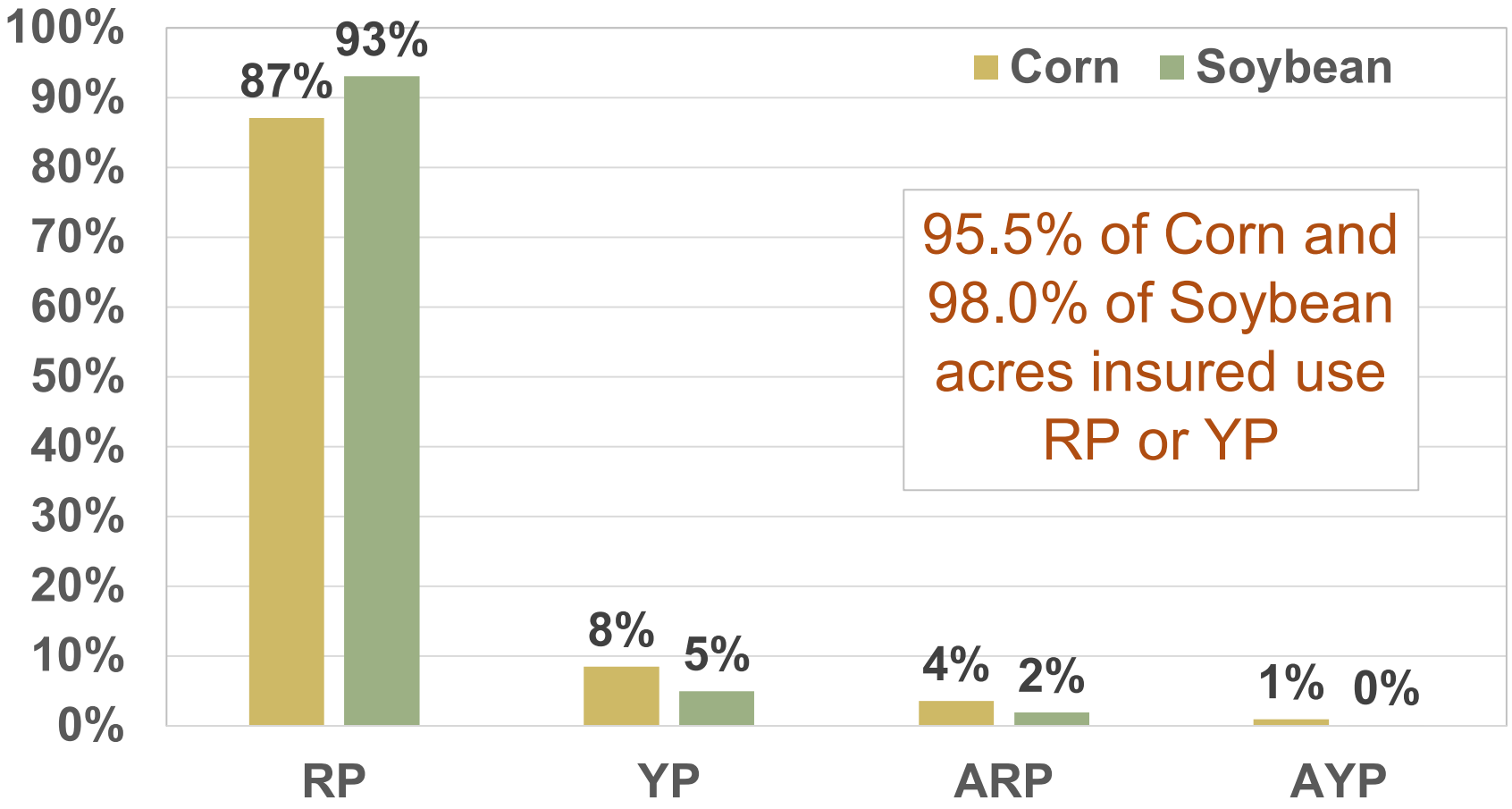
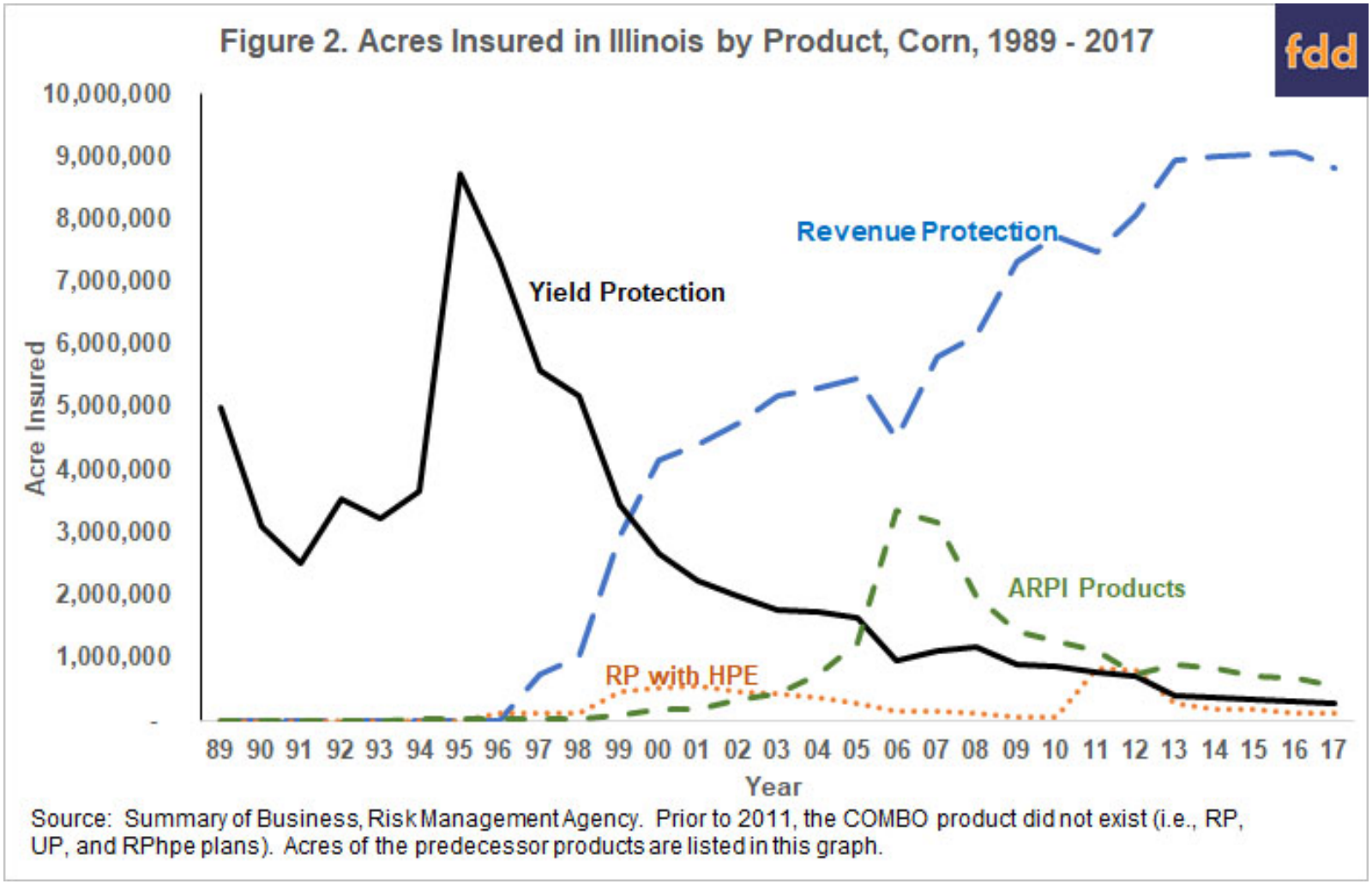
% of Insured Corn and Soybean Acres by Policy Type in 2017 in Wisconsin



What policies have IL farmers used?



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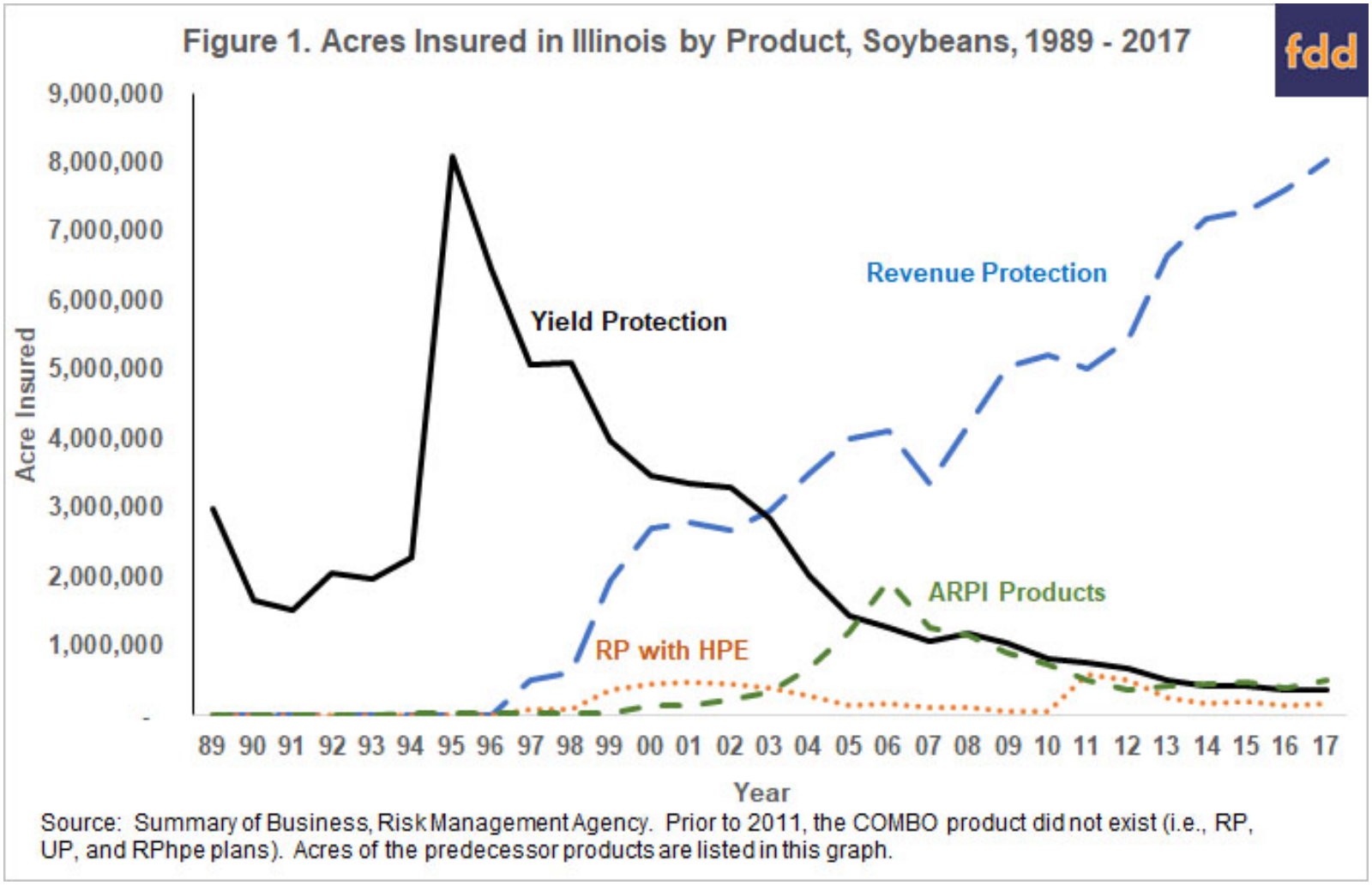
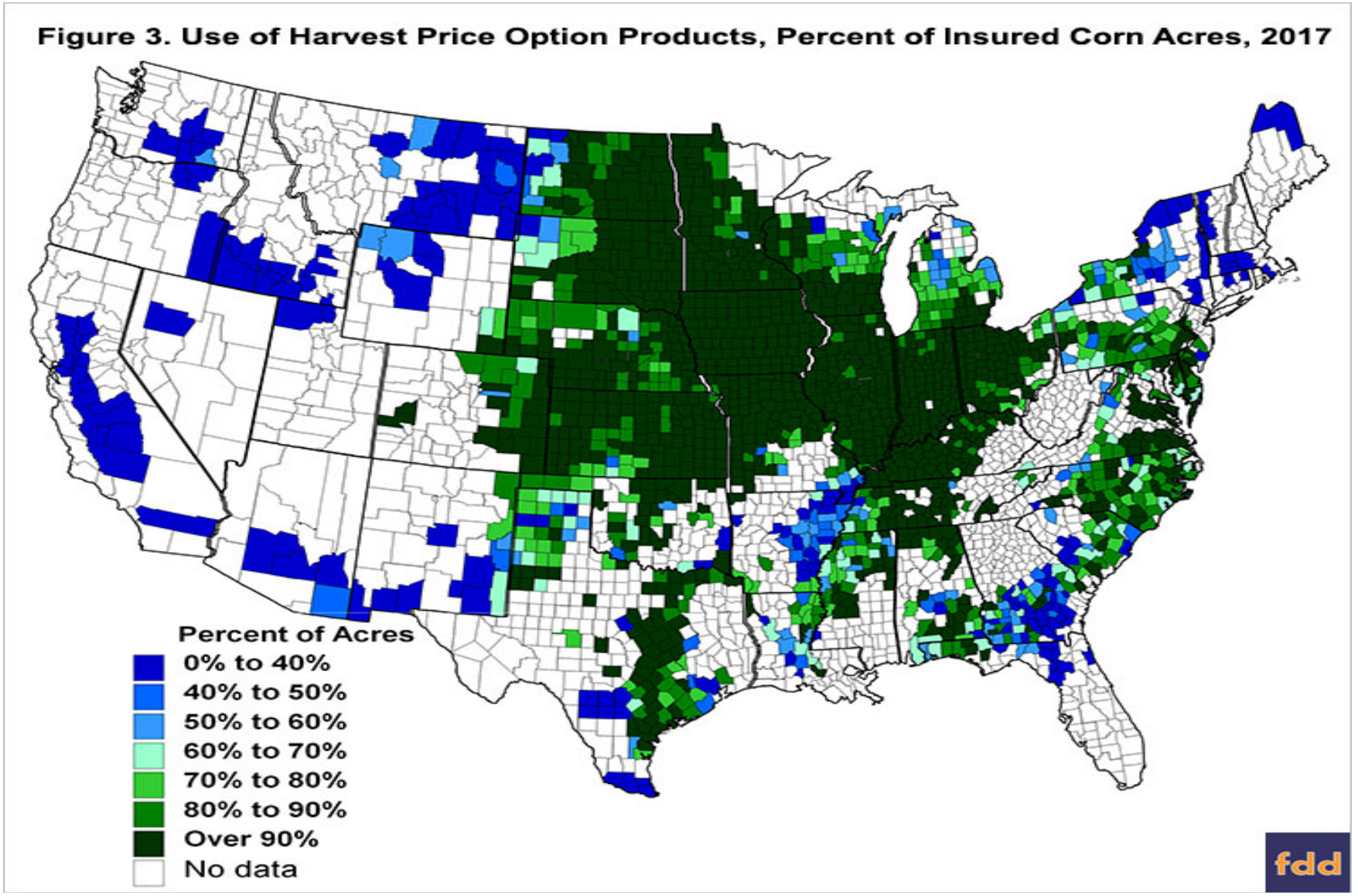


Harvest Price Option on Corn, 2017



https://farmdocdaily.illinois.edu/2018/05/overwhelming-use-of-harvest-price-option.html

Lots of Crop Insurance Rules

- Lots rules: Planting dates, Late and prevented planting, Double cropping, Alternative crop uses, Corn maturity, Yield guarantees, Unit structures, Breaking new ground (CRP vs pasture)
- Can forfeit your coverage if break a rule
- Are ways to get the most out of your policy (use the rules to your advantage)
- Insurance agents don’t always know all the rules, but good agents do

Subsidies and Crop Insurance

- USDA-RMA runs crop insurance program, sets policy rules, sets premiums
- Premiums subsidized so farmers pay less than the “actuarially fair” premium
  - If on average, $100 indemnity paid once every 4 years, then “actuarially fair” premium is $25
- Private companies sell insurance policies, but government subsidizes their administrative costs
  - No premium load to cover costs
  - All companies sell exactly the same policies at the same prices
- Means that on average, farmers should make money from crop insurance

Premiums Subsidized: For RP and YP, % of the Fair Premium Farmers Pay

Coverage Level	Optional Units	Basic Units	Enterprise Units
50%	33%	33%	20%
55%	36%	36%	20%
60%	36%	36%	20%
65%	41%	41%	20%
70%	41%	41%	20%
75%	45%	45%	23%
80%	52%	52%	32%
85%	62%	62%	47%

Premiums Subsidized: For AYP and ARP, % of Fair Premium Farmers Pay

Coverage Level	AYP	ARP
70%	41%	41%
75%	41%	41%
80%	45%	45%
85%	45%	51%
90%	49%	56%

- Main point: Government and farmers share the premium cost
  - Higher coverage, farmer pays greater share
- CAT: 100% subsidized, just pay $300 admin fee

Premiums ($/A): Dane County WI, 2018

(165 Trend Adjusted APH) **Yield Protection**

Coverage	Enterprise	Basic	Optional	Guarantee
50%	1.01	1.66	2.55	82 bu
55%	1.41	2.53	3.79	91 bu
60%	1.88	3.38	4.98	99 bu
65%	2.48	5.08	7.36	107 bu
70%	3.34	6.86	9.74	115 bu
75%	4.93	9.65	13.5	124 bu
80%	9.24	15.43	21.16	132 bu
85%	16.72	22.67	30.58	140 bu

Premiums ($/A): Dane County WI, 2018

(165 Trend Adjusted APH) **Revenue Protection**

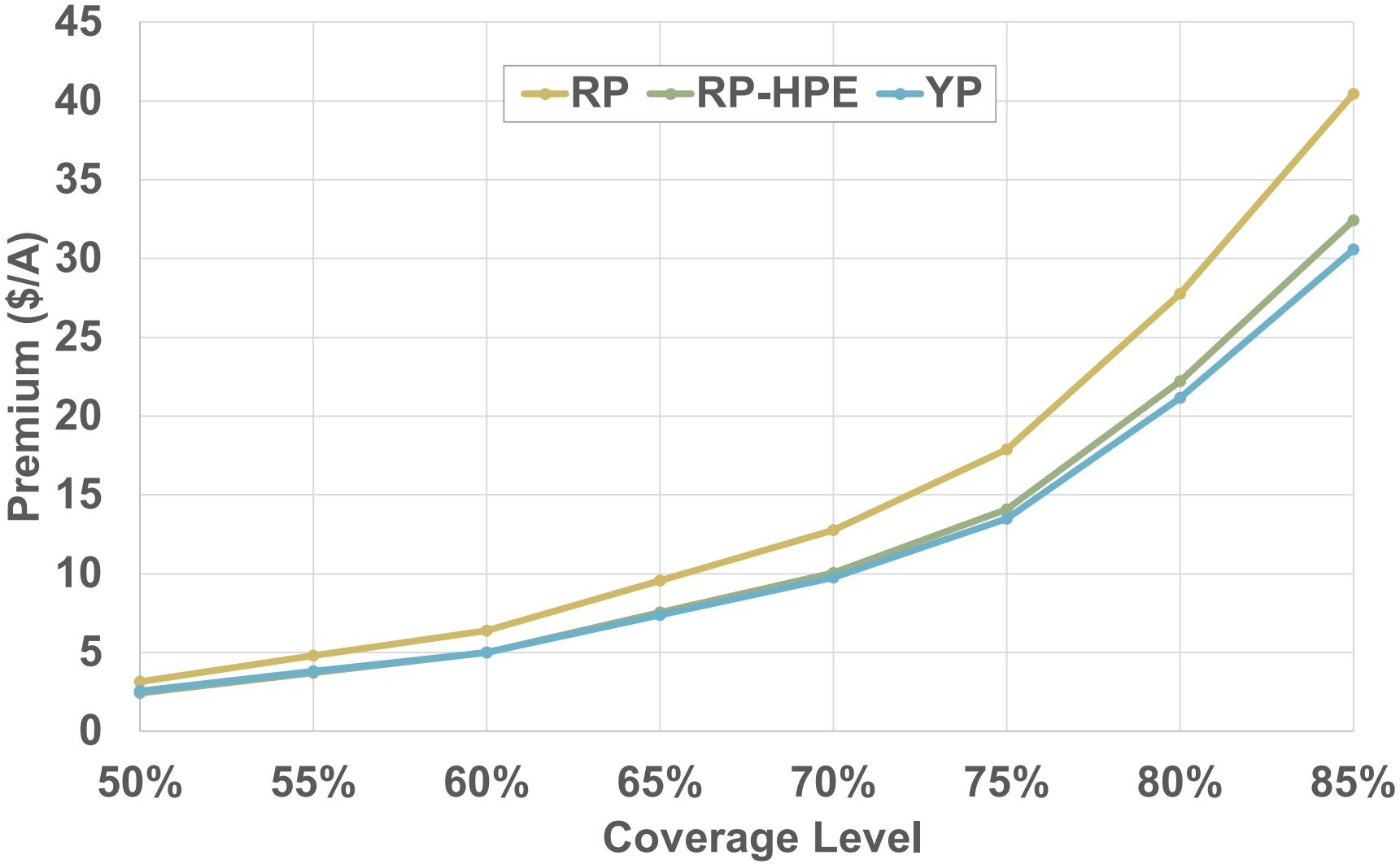
Coverage	Enterprise	Basic	Optional	Initial Guarantee
50%	1.21	2.00	3.13	$327/A
55%	1.78	3.25	4.79	$359/A
60%	2.32	4.46	6.39	$392/A
65%	3.16	6.92	9.54	$424/A
70%	4.47	9.53	12.75	$457/A
75%	6.81	13.66	17.88	$490/A
80%	12.56	21.76	27.76	$522/A
85%	23.02	32.36	40.44	$555/A

Premiums ($/A): Dane County WI, 2018

(165 Trend Adjusted APH) **Revenue Protection-HPE**

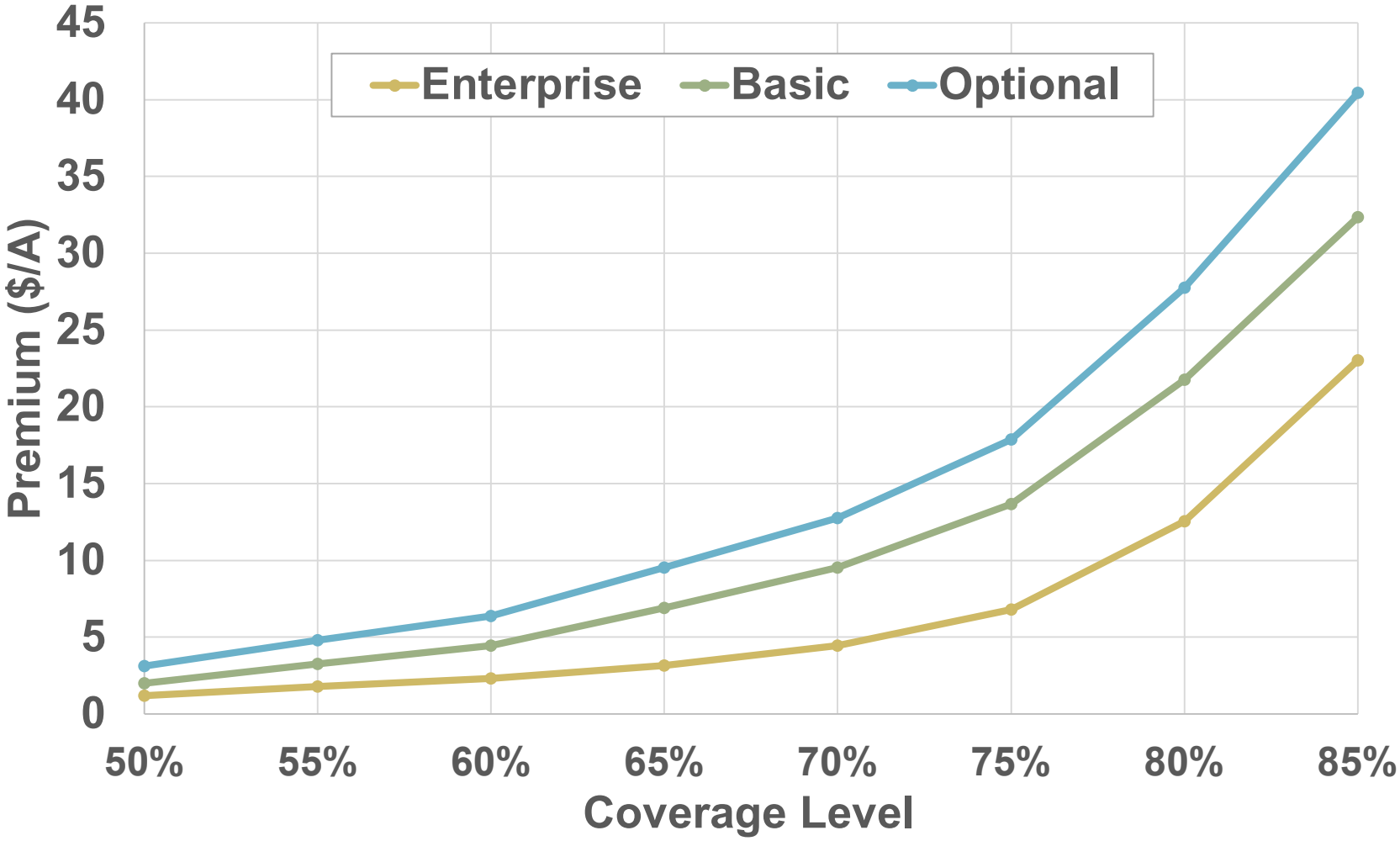
Coverage	Enterprise	Basic	Optional	Guarantee
50%	0.92	1.52	2.41	$327/A
55%	1.30	2.40	3.71	$359/A
60%	1.68	3.31	4.99	$392/A
65%	2.33	5.21	7.53	$424/A
70%	3.35	7.24	10.06	$457/A
75%	5.10	10.32	14.08	$490/A
80%	9.39	16.62	22.21	$522/A
85%	17.27	24.78	32.42	$555/A

Compare 2018 Policy Prices (Optional Units) in Dane County



Revenue Protection Farmer Premiums in 2018

Dane County, WI 165 bu/A Yield, $3.96/bu Base Price



WI Farmers Practices and Experiences with Crop Insurance

- Quick overview of WI farmer practices
  - Which policies popular
  - Which coverage levels
- Quick overview of WI farmer experiences
  - What are loss ratios
  - Farmer Loss Ratios for corn and soybeans

Coverage Levels used by WI farmers for RP and YP in **2019** for Corn and Soybeans

Coverage Level	Corn RP	Soy RP	Corn YP	Soy YP
50%	1%	1%	**51%**	**45%**
55%	0%	0%	1%	1%
60%	1%	1%	4%	8%
65%	3%	3%	7%	10%
70%	15%	15%	**18%**	**21%**
75%	**44%**	**42%**	15%	11%
80%	30%	31%	3%	3%
85%	5%	6%	0%	0%

Coverage Levels used by WI farmers for RP and YP in **2019** for Corn and Soybeans

Coverage Level	Corn RP	Soy RP	Corn YP	Soy YP
50%	1%	1%	51%	45%
55%	0%	0%		
60%	1%	1%		
65%	3%	3%		
70%	15%	15%		
75%	44%	42%		
80%	30%	31%	3%	3%
85%	5%	6%	0%	0%

65%-70% of all corn & soybean acres planted in WI use RP with a 70% to 80% coverage level

89% of RP

88% of RP

Average Number of Units per Policy in WI

Year	CORN RP	SOY RP	CORN YP	SOY YP
2011	1.98	1.73	1.84	1.57
2012	1.78	1.58	1.80	1.54
2013	1.71	1.53	1.78	1.49
2014	1.67	1.51	1.74	1.38
2015	1.60	1.50	1.67	1.39
2016	1.56	1.48	1.64	1.43
2017	1.51	1.47	1.57	1.31
2018	1.48	1.44	1.55	1.41
2019	1.49	1.40	1.56	1.32

- **More and more WI farmers are using Enterprise Units**

Crop Insurance Subsidies

- Administered by USDA-Risk Management Agency (RMA) and Federal Crop Insurance Corporation (FCIC)
- USDA develops policies, rules, and premium rates
  - Development & administration costs paid by the public
- USDA subsidizes the premiums
  - Farmers pay about ⅓ of fair premiums on average
- USDA pays subsidy to companies for Administration and Operating (A&O) ~20-25% of total premiums
- FCIC reinsures the insurance companies, plus retains some of the policies
  - Means FCIC pays some of the indemnities

Loss Ratio

- Loss ratio is the insurance's average payout for a year
- Program Loss Ratio = Total Indemnities / Total Premiums
- Total Premium = Farmer Premium + Premium Subsidy
- Farmer Loss Ratio = Total Indemnities / Farmer Premium
- By law, USDA-RMA is supposed to target a total crop insurance program loss ratio of 1.0
- Farmers pay less than actuarially fair premiums, and so on average they should make money on crop insurance

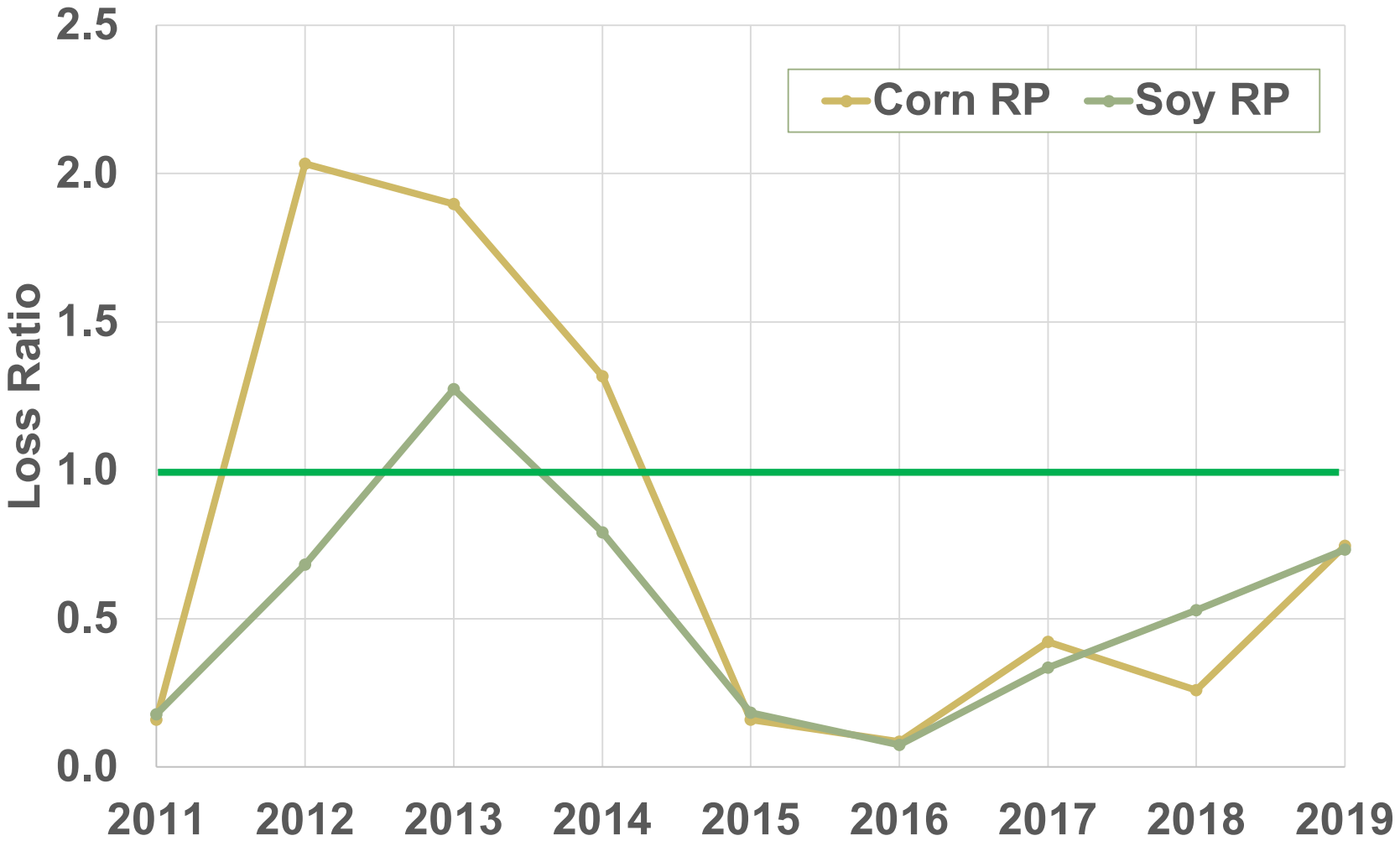
- Break it down by crop, policy, region and year
- WI for 2011 to 2019 for RP and YP for corn and soybean

RP Loss Ratios in WI for Corn and Soy

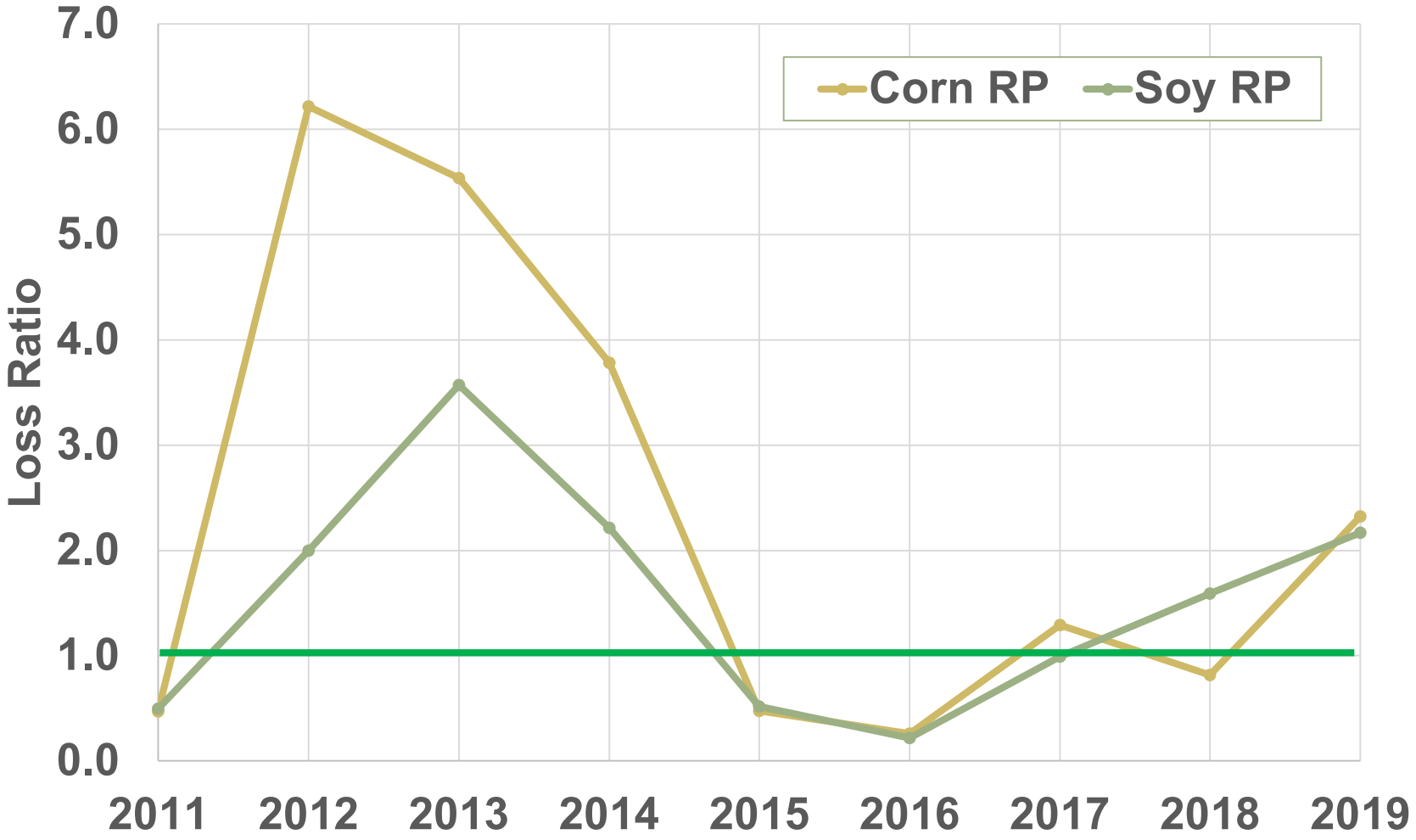
	Program Loss Ratio		Farmer Loss Ratio	
Year	Corn RP	Soy RP	Corn RP	Soy RP
2011	0.160	0.179	0.470	0.496
2012	2.033	0.682	6.216	1.997
2013	1.897	1.274	5.536	3.571
2014	1.317	0.792	3.780	2.214
2015	0.159	0.183	0.475	0.519
2016	0.085	0.076	0.259	0.220
2017	0.421	0.336	1.289	0.992
2018	0.259	0.529	0.815	1.590
2019*	0.745	0.733	2.322	2.167

*As of 12/02/2019

RP Program Loss Ratio in WI



RP Farmer Loss Ratio in WI



Crop Insurance for Other Crops

- Almost all major WI crops have a standard crop insurance policy for them, usually YP
  - Forage production and seeding
  - Corn silage is a type of corn
  - Small Grains: wheat, oats, rye, barley, sorghum
  - Vegetables: Potatoes, sweet corn, snap beans, green peas, cabbage, cucumbers, dry beans
  - Miscellaneous crops: Cranberries, hybrid seed corn, mint, apples, tart cherries

Alternative Crop Insurance Policies

- Whole Farm Revenue Protection (WFRP): Insure a farm's Schedule F income (used to be called AGR-lite)
  - Multiple crops & livestock, specialty crop and organic growers
- Alternatives if no policy exists
  - USDA-FSA non-insured crop assistance program (NAP policy): FSA sells CAT policy if none available
  - Written Agreement: apply RMA policy from a similar area to your crop (e.g., grapes in WI based on MI policy)
- Organic prices now available for many crops
  - Corn, soybeans, wheat, etc.
- Livestock price (not production) policies
  - Livestock Gross Margin (LGM): LGM Dairy was somewhat popular, but has MPP and now DMC killed it?
  - Dairy Revenue Protection (Dairy RP): new in 2018
- Pasture Rangeland Forage (PRF): insure weather station precipitation and temperature ranges

Dairy Revenue Protection (Dairy RP)

- Area-wide revenue protection against declines in quarterly revenue from milk sales
  - Not dairy margin like LGM Dairy (and DMC)
- Uses futures prices and production data to create revenue guarantee, with payments triggered when actual market prices fall below the guarantee
  - Milk Prices: USDA-AMS monthly average
  - Milk Production: USDA-NASS Milk Production Report
- 2 pricing options: mix of class III/IV or component prices (fat, protein, other solids), you choose price weights
- Can cover up to 5 quarters into the future, depending on futures price data

Figure 3. Dairy Revenue Protection Example

Guarantee Calculations			
Quarterly Average CME Milk Futures Value		**Farmer's Choice % of Price**	**Calculated Price**
Class III	$17.00	75.00%	$12.75000
Class IV	$16.25	25.00%	$4.06250
		Price Guarantee/CWT	$16.81250

Farmer's Choice Milk Covered/Lbs	**Price Guarantee/ CWT**	**Total Revenue Guarantee**
4,000,000	$16.81	$672,500
	Coverage Level	90%
	Producer's Revenue Guarantee	$605,250

Actual Revenue Calculations			
Quarterly Average CME Milk Futures Value		**Farmer's Choice % of Price**	**Calculated Price**
Class III	$14.45	75.00%	$10.83750
Class IV	$13.81	25.00%	$3.45312
		Price Guarantee/CWT	$14.29

State-Indexed Actual Production/Lbs	**Actual Price/ CWT**	**Actual Revenue**
3,920,000	$14.29	$560,192

This is an example of realized prices and only applies to 1 quarter.
In this example, the producer would not have to pay all 5 quarters to get just one coverage.

Indemnity Calculations	
Prod Rev Guarantee	$605,250
Actual Prod Revenue	$560,192
Indemnity	$45,058

- Farmer chooses
  1. Price Election (%'s)
  2. Milk Covered
  3. Coverage Level
- Used to set guarantee
- I do not understand State-Indexed Actual Production and options for farmer's choice of Milk Covered
- Sales in 2019
- US: 2,500 policies, 30 B lbs
- WI: 800 policies, 5 B lbs
- Average cows/policy
- US ~ 480, WI ~250

Main Point

- Crop insurance has become the core of commodity support from the federal government
  - Most acres are insured and most government spending for ag support is for crop insurance premium subsidies
- Why crop insurance is popular in Congress
  - Market-based, not government run program
  - Farmers share in cost of program
  - Farmers receive payments only if demonstrated losses
  - Public-private partnership btwn government & insurance companies, who both bear some of the risk & costs
  - Historically, program has been financially solid
- Budget hawks target premium subsidies for reduction

Summary

- Overviewed 4 main types of crop insurance
  - YP, RP, AYP, ARP
  - Individual vs. Area-wide, Yield vs. Revenue
  - Choices farmers make: policy type, coverage level, unit structure (& price election)
  - Know typical choices for each
- Know how payments are made for each type of policy
- Talked about subsidies and pricing: know how subsidies done and relative costs of each policy (RP > YP premium)
- Talked about government policy issues, program cost
- Lots of issues not covered (e.g., Prevented Plant)