

Illinois Farm Economic Summit 2021

Farmland Markets

Factors affecting values and rental rates

farmdoc**DAILY**

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Agricultural & Consumer Economics

COLLEGE OF AGRICULTURAL, CONSUMER
& ENVIRONMENTAL SCIENCES

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Fruin Professor of Farmland Economics



Compared to 1 year ago, have farmland values in the area where you live:

- Increased by more than 15%
- Increased by 10-15%
- Increased by 0-10%
- Stayed about the same value
- Decreased in value compared to a year ago

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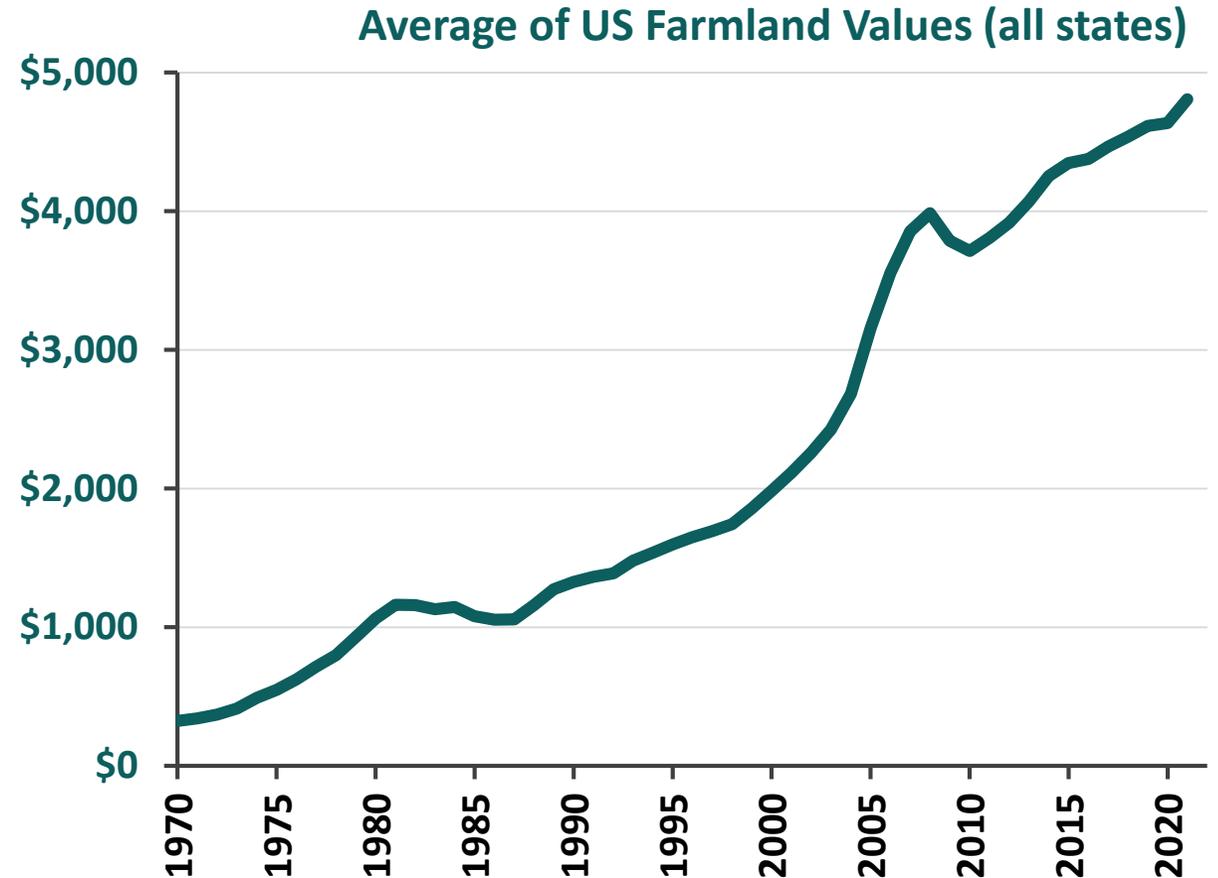
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Factors Affecting Farmland values rental rates

IFES Webinar Purpose:

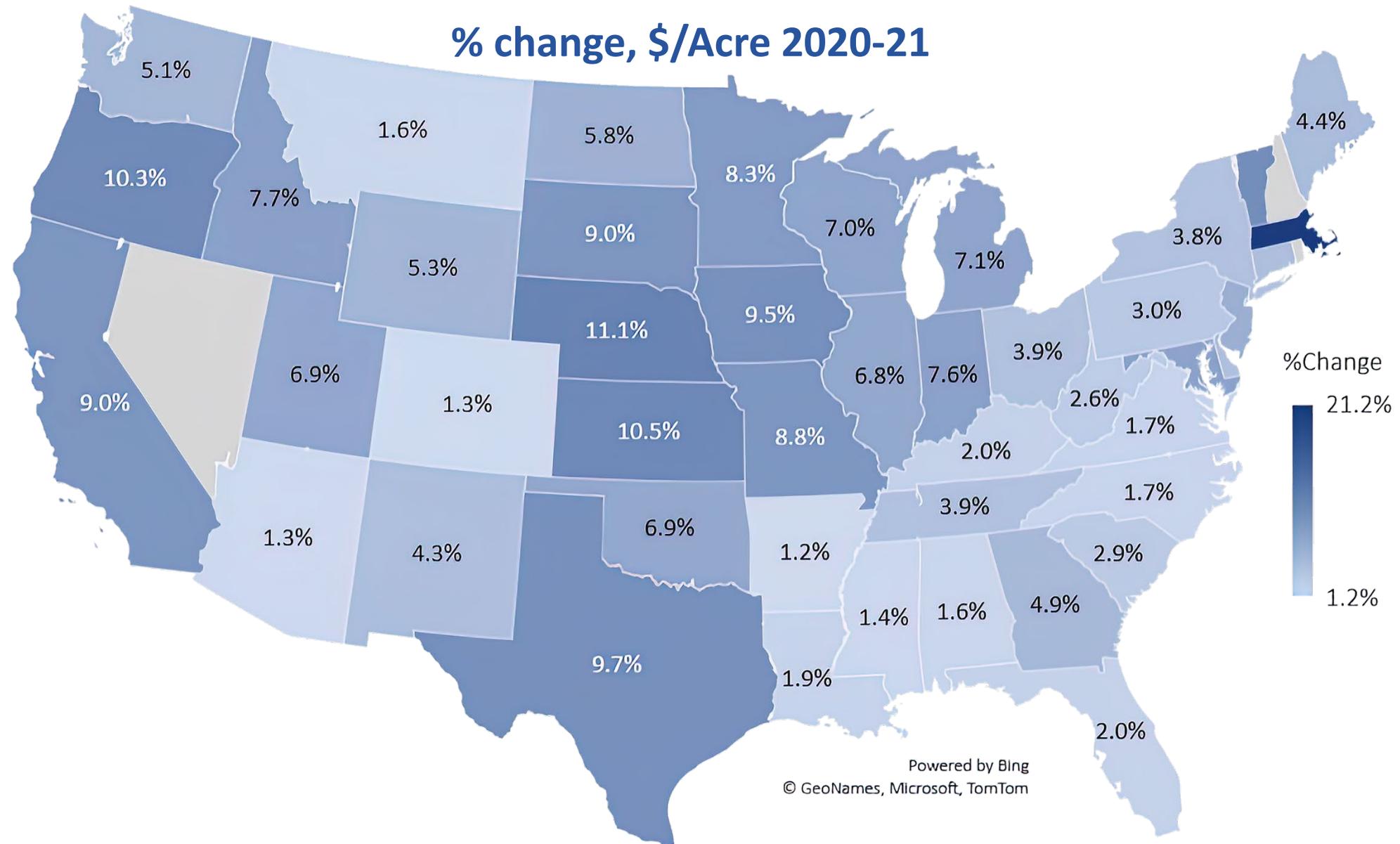
- Identify broad economic and farm-level factors that drive farmland values and rental rates.
- Provide context to help interpret recent macro-market events.
- Develop framework to anticipate future movements.



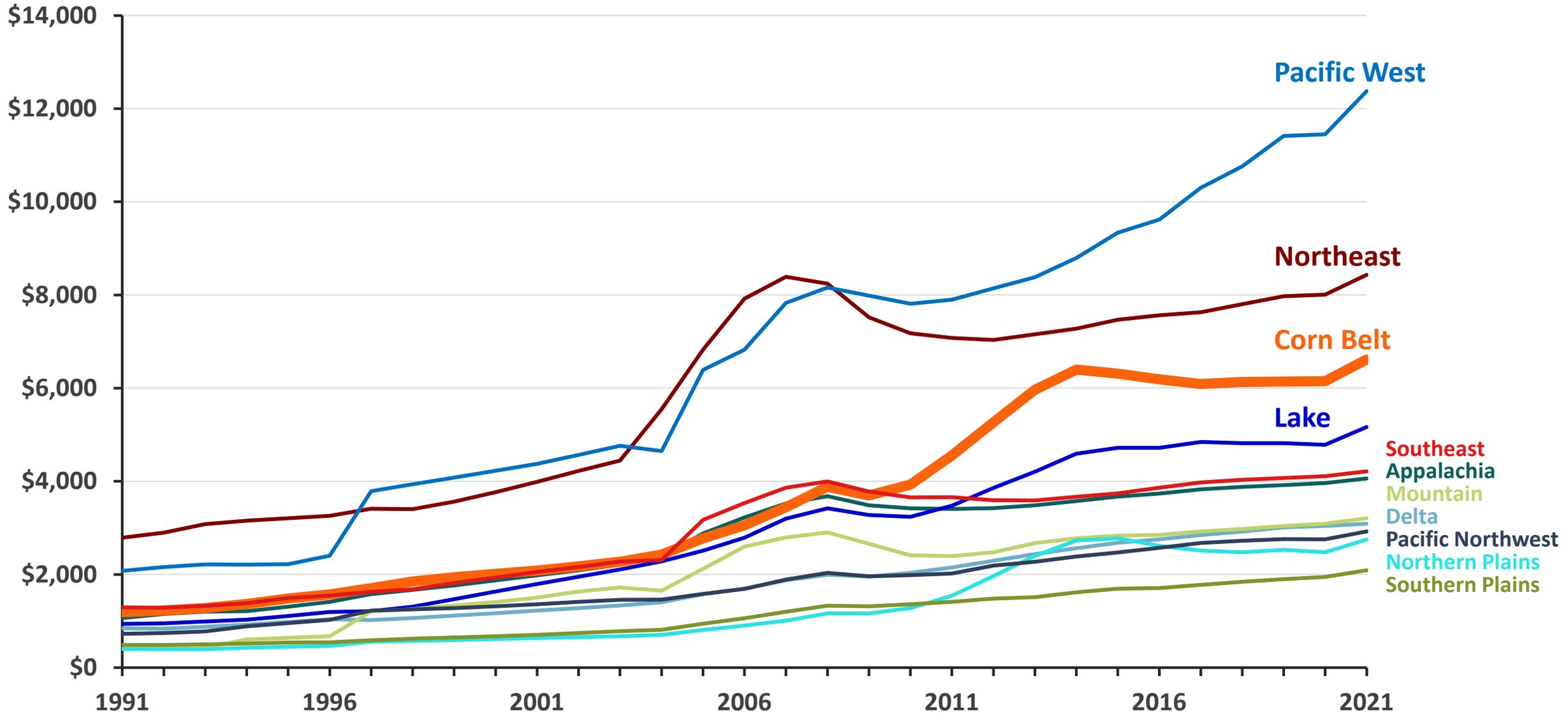
The *why* and *now what*?

- Massive support and fiscal stimulus payments, changing food preferences, and interest rate market interventions at unprecedented scale.
-Length of continued intervention?
- Inflation evidence solidifying. Ag input and output prices, energy, etc., but debate about permanence/transitory nature of inflation remains.
-Fed and ROW ability to manage growth?
- Increased commodity prices, long-term demand growth and stronger world incomes.
-Ex-US drivers for US asset values?
- Changed (?) policy targets and priorities; and concern about tax policies
-Eco-service payments, “practice” information in downstream demand?
- Low interest rates and “income multiple”, equity market connections
-Role of Farmland as an asset class, institutional role?

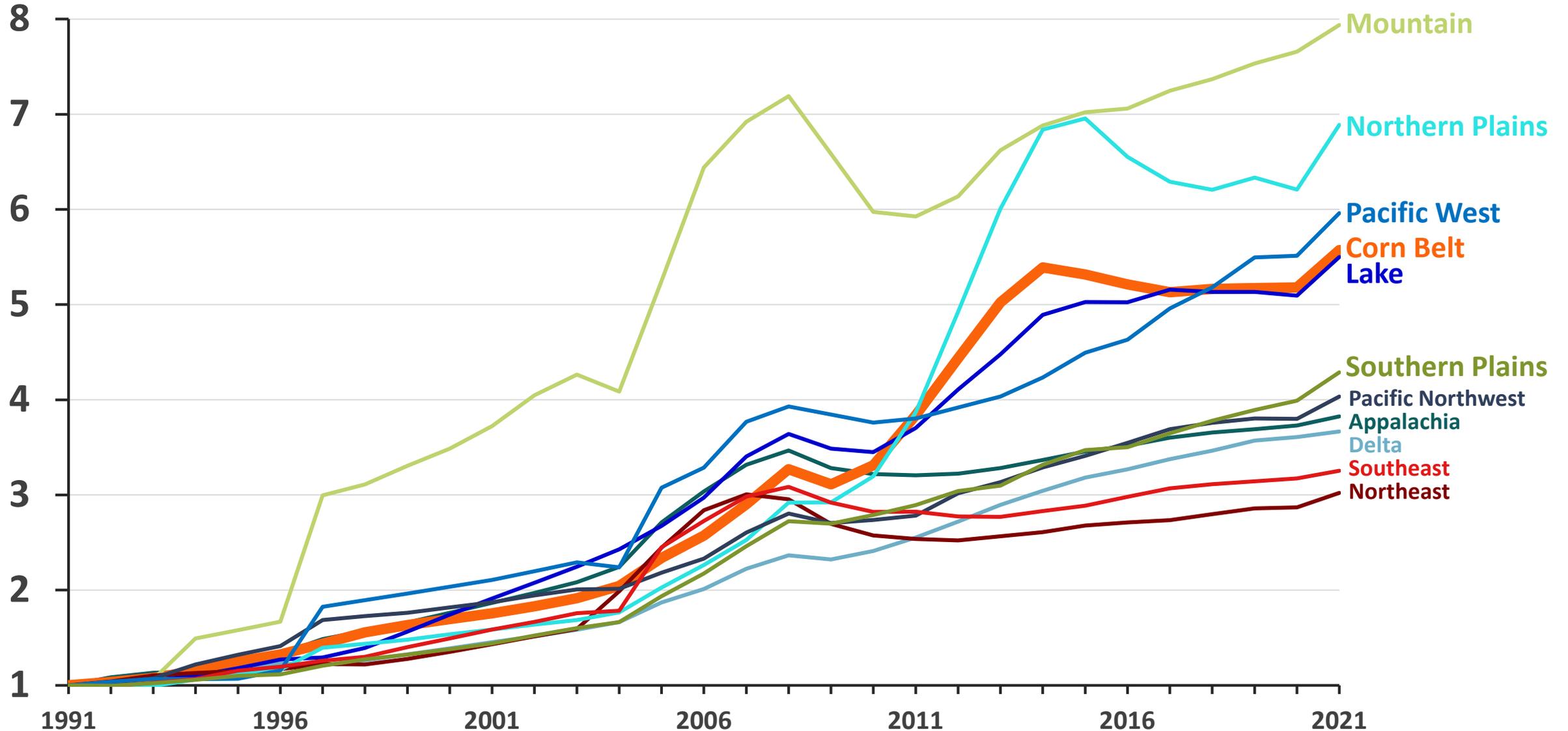
Farmland % increases (mid-year USDA estimates)



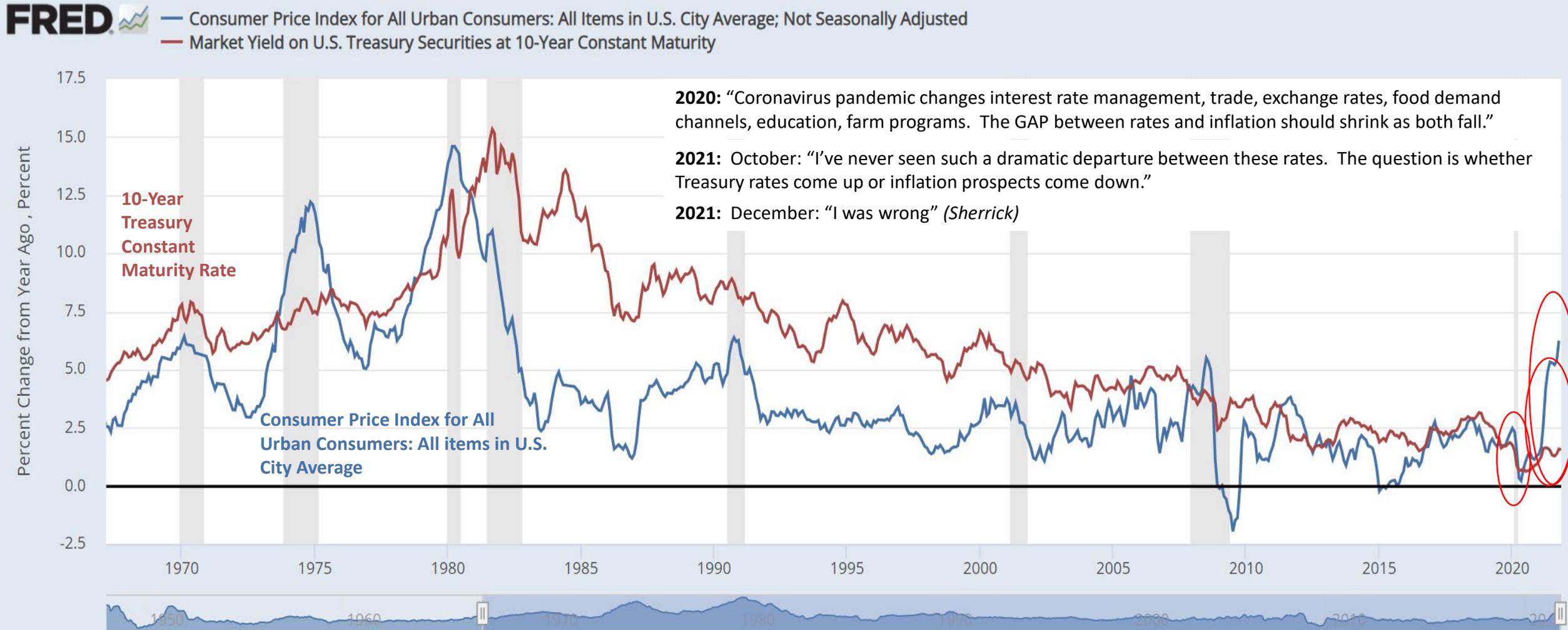
Farmland Prices through time \$/Acre by region



Farmland Prices \$/Acre relative to 1991



Historic Inflation and Interest Rate Relationships (*revised... again*)



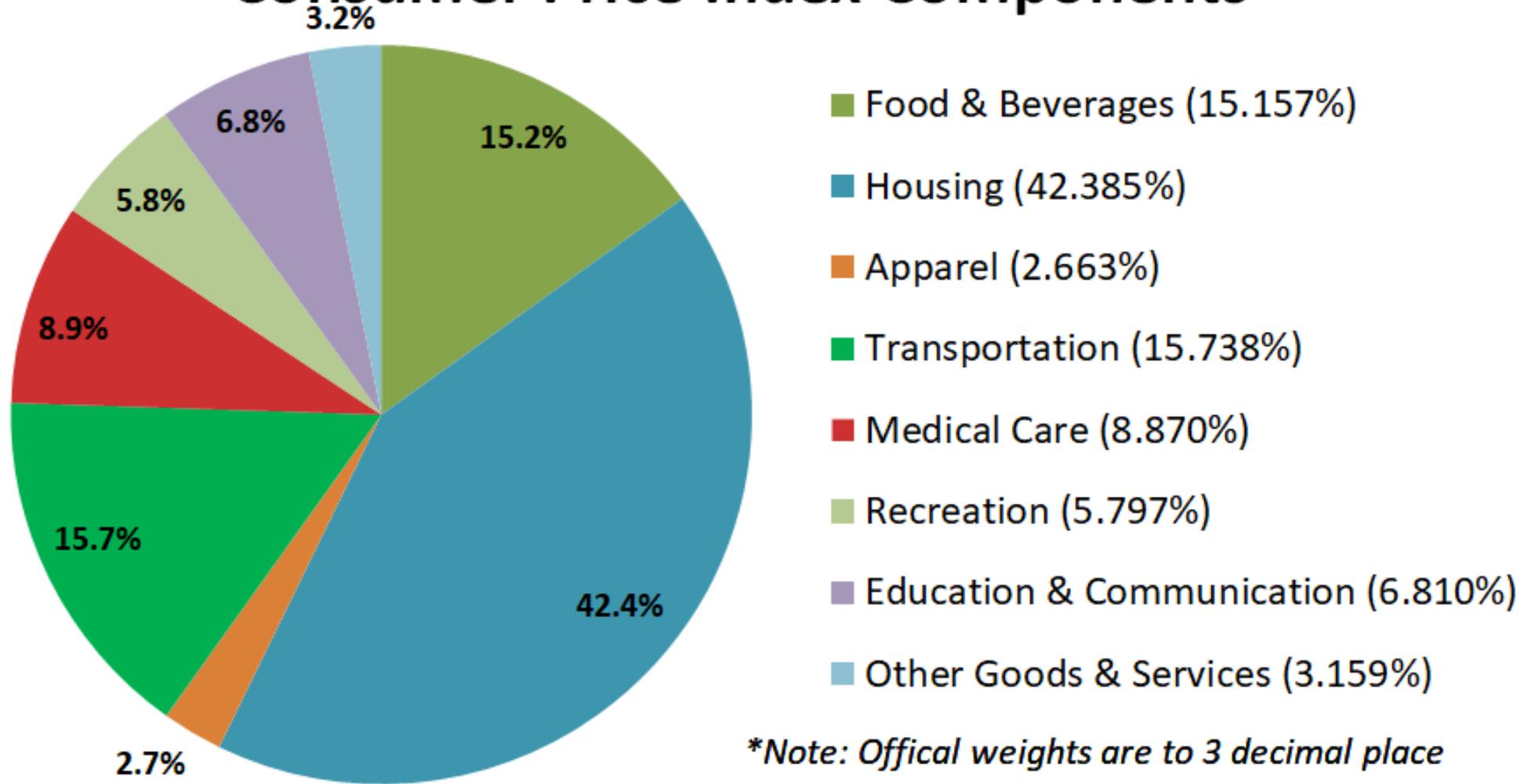
Shaded areas indicate U.S. recessions.

Sources: BLS; Board of Governors

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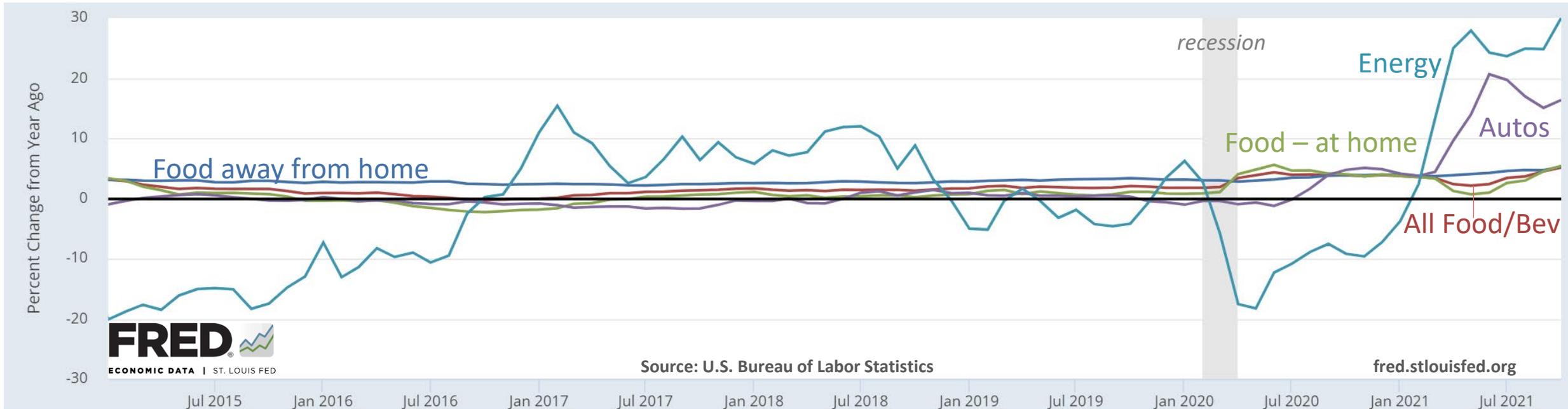


Consumer Price Index Components*



Source: BLS; The most recent annual reweighting was in December 2020

CPI Sub-Categories – *Percent annual change*



Food, Housing, Vehicles, and related components of inflation:

- Share of food consumed at Home – still up
- Cost of Food at Home - up/down/up
- Share of food away from Home - down, but recovering
- Cost of food away from Home - up
- Housing – up (not shown)
- Automobiles – up
- Energy – sharply up
- Offices and retail space inflation?
- Education costs - up
- Farmland - up

Do you expect inflation for the next 3-4 years to:

- Exceed 3% inflation/year
- Average 2-3% inflation/year
- Average 1-2% inflation/year
- Average 0-1% inflation/year
- Be negative (experience deflation)

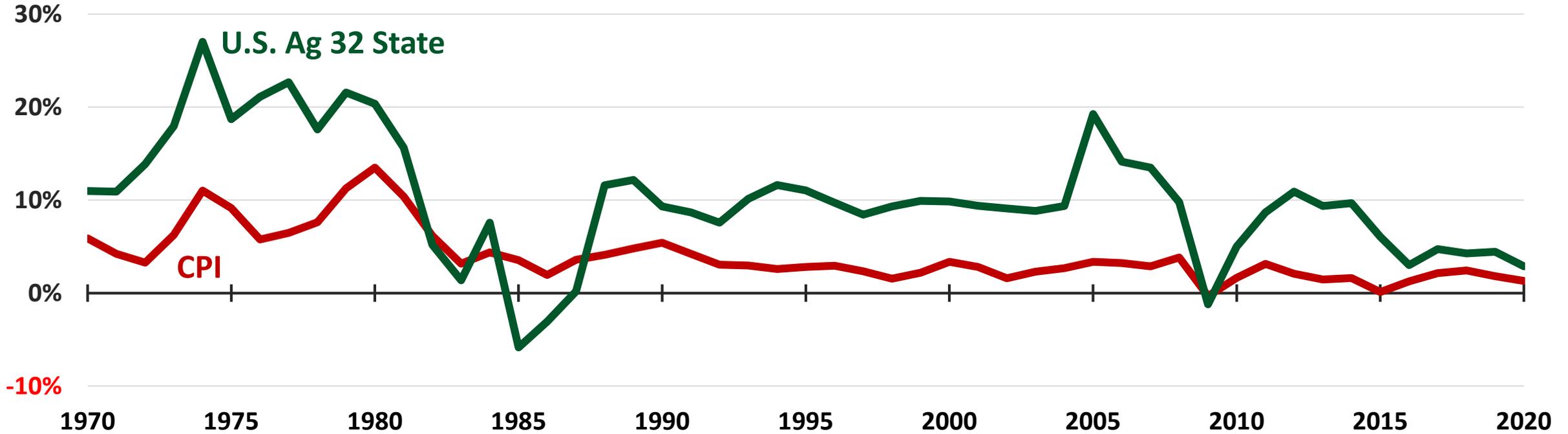
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Farmland Returns and farmland returns minus inflation (spread)



Decade	Farmland to CPI Spread
1970 to 1979	11.1%
1980 to 1989	1.0%
1990 to 1999	6.6%
2000 to 2009	7.6%
2010 to 2020	4.8%
1970 to 2020	6.1%

- Farmland returns have been remarkably stable with positive alpha
- Perfect Storm in 1980s – still relatively good performance
- Low volatility annual returns, appreciation positive except 1980s
- Different Monetary Regimes
- Different Insurance Regimes
- Different Demand Regimes?
- Different Production Regimes?

Balance Sheet of Ag Sector -- US

	1970	1980	1990	2000	2010	2016	2018	2020(p)
	(\$ millions, except ratios - source ERS-USDA)							
Farm Assets	278,823	1,000,422	840,609	1,203,215	2,170,832	2,914,441	3,026,679	3,120,623
Real Estate	202,418	782,820	619,149	946,428	1,660,114	2,443,444	2,519,026	2,575,178
Non Real Estate	76,405	217,602	221,459	256,787	510,718	470,996	507,653	545,445
Farm Debt	48,501	162,432	131,116	163,930	278,931	374,164	401,992	435,175
Real Estate	27,238	85,272	67,633	84,724	154,065	225,980	245,663	283,050
Non Real Estate	21,263	77,160	63,483	79,206	124,865	148,184	156,329	152,125
Equity	230,322	837,990	709,493	1,039,285	1,891,902	2,540,277	2,624,687	2,685,449
Selected Indicators								
Debt/Equity	21.1%	19.4%	18.5%	15.8%	14.7%	14.5%	15.3%	16.2%
Debt/Assets	17.4%	16.2%	15.6%	13.6%	12.8%	12.8%	13.3%	13.9%
Real Estate/Equity	87.9%	93.4%	87.3%	91.1%	87.7%	94.6%	96.1%	95.9%
Real Estate/Assets	72.6%	78.2%	73.7%	78.7%	76.5%	83.8%	83.2%	82.5%
Real Estate D/Tota	56.2%	52.5%	51.6%	51.7%	55.2%	60.4%	61.1%	65.0%

Farmland Returns in Context

Asset/Index	Annual Ave. Return	Standard Deviation	Coefficient of Variation	US Ag 32 States Correlation	Minimum Return	Maximum Return
----- 1990 - 2021 -----						
US Ag 32 States	8.6%	3.7%	0.43	1.00	-1.2%	19.3%
Illinois	9.2%	5.5%	0.60	0.79	0.8%	26.0%
Iowa	10.6%	7.2%	0.68	0.64	-5.3%	24.9%
Indiana	8.9%	4.9%	0.55	0.65	-1.0%	22.0%
Minnesota	10.4%	5.4%	0.52	0.78	-1.8%	20.3%
California	9.0%	5.3%	0.59	0.57	2.5%	32.2%
Washington	13.6%	4.0%	0.29	0.69	5.4%	24.1%
Oregon	11.1%	5.0%	0.45	0.56	-1.6%	23.5%
Kansas	9.9%	6.4%	0.65	0.67	-4.6%	22.7%
Nebraska	11.5%	7.0%	0.61	0.59	-0.8%	31.0%
Wisconsin	8.5%	5.3%	0.62	0.63	-2.2%	18.8%
----- 1990 - 2020 -----						
TCM10Y	4.39%	2.0%	0.45	0.32	0.9%	8.6%
S&P500	7.62%	16.7%	2.20	-0.10	-48.6%	29.3%
Gold	5.02%	14.0%	2.79	0.04	-31.9%	27.7%
CPI	2.34%	1.1%	0.46	0.24	0.1%	5.9%

Average Annual Return to Farmland by Region and Holding Period

Region	1-year	5-year	10-year	15-year	20-year
Delta	4.94%	5.66%	6.75%	7.18%	8.22%
Lake	9.58%	4.50%	6.45%	6.41%	7.76%
Southeast	4.70%	3.93%	3.49%	3.06%	5.12%
Mountain	6.80%	5.56%	6.38%	5.54%	8.18%
Pacific West	10.51%	8.42%	7.32%	7.17%	9.02%
Northeast	5.41%	2.95%	2.82%	1.67%	4.56%
Corn Belt	9.66%	4.32%	6.61%	7.90%	8.75%
Northern Plains	11.72%	4.14%	9.14%	10.64%	11.26%
Appalachia	4.07%	3.31%	3.37%	3.36%	5.14%
Southern Plains	9.50%	6.05%	5.93%	6.64%	7.91%
Pacific Northwest	13.83%	9.05%	9.84%	10.24%	11.19%
<i>NCREIF Ann. Cropland</i>	<i>7.73%</i>	<i>5.40%</i>	<i>7.73%</i>	<i>9.42%</i>	<i>10.62%</i>
<i>NCREIF Perm. Cropland</i>	<i>0.32%</i>	<i>4.69%</i>	<i>12.23%</i>	<i>12.22%</i>	<i>14.71%</i>
<i>NCREIF Total Farmland</i>	<i>4.73%</i>	<i>5.11%</i>	<i>9.51%</i>	<i>10.48%</i>	<i>12.46%</i>

*NCREIF through Q2 2021 estimates

Farmland Price Appreciation by date acquired

Cumulative to Present Total Farmland Price Appreciation

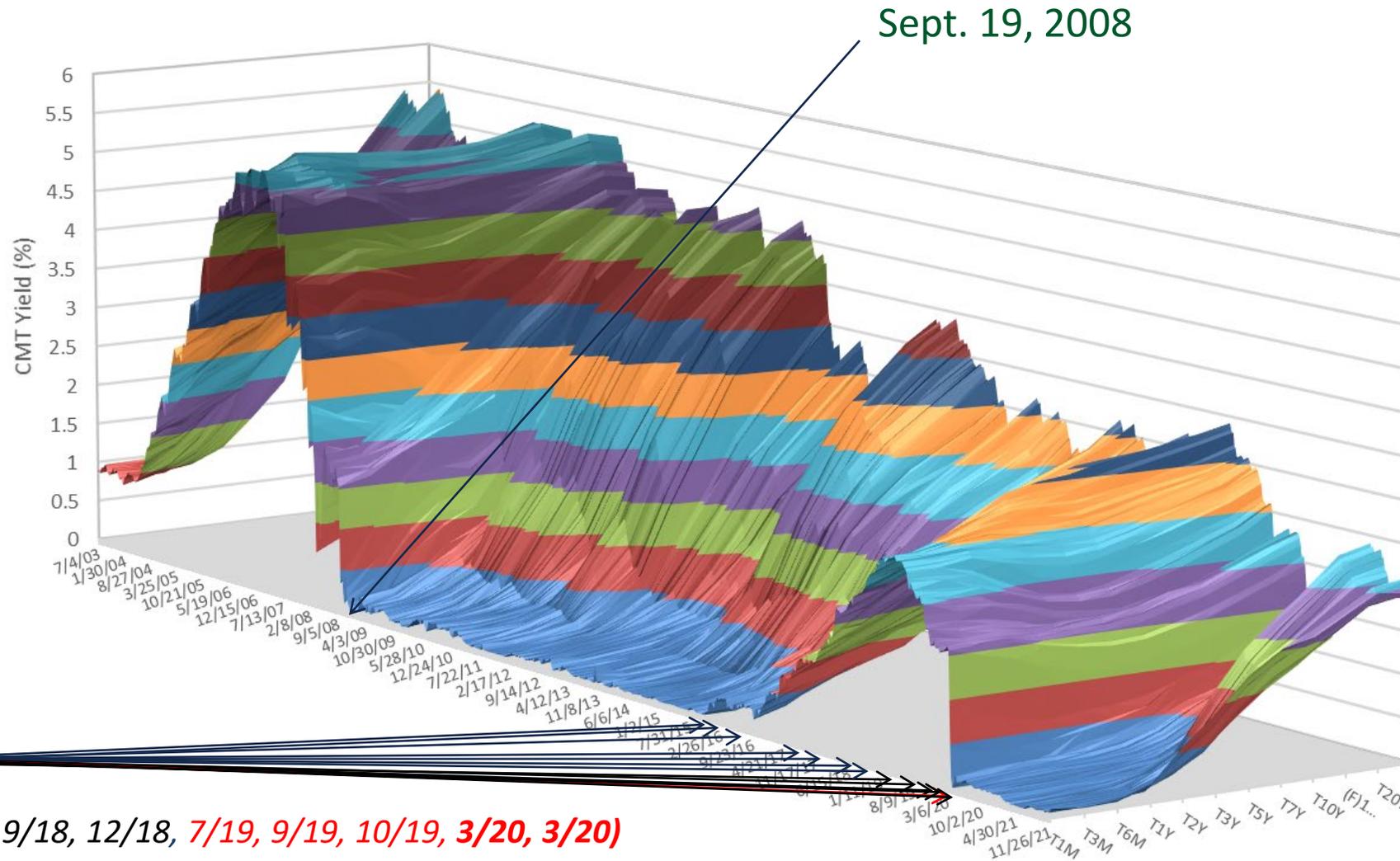
from:	2000	2002	2004	2006	2008	2010	2012	2014	2016	2018	2020
CALIFORNIA	263%	221%	187%	103%	69%	64%	58%	48%	34.9%	16.6%	9.0%
ILLINOIS	250%	236%	209%	120%	74%	67%	27%	6%	8.2%	8.5%	6.8%
INDIANA	214%	189%	158%	118%	73%	70%	22%	4%	4.0%	7.9%	7.6%
IOWA	330%	303%	252%	166%	96%	78%	19%	-7%	5.0%	6.5%	9.5%
KANSAS	236%	216%	200%	141%	106%	98%	39%	2%	9.9%	13.5%	10.5%
MICHIGAN	154%	115%	83%	57%	36%	52%	36%	12%	8.2%	6.9%	7.1%
MINNESOTA	297%	249%	193%	124%	76%	83%	40%	10%	9.4%	8.0%	8.3%
MISSOURI	201%	168%	137%	94%	61%	63%	37%	21%	14.9%	9.5%	8.8%
NEBRASKA	337%	308%	283%	201%	133%	111%	28%	0%	7.3%	12.7%	11.1%
NORTH DAKOTA	349%	339%	296%	214%	136%	122%	57%	2%	4.0%	6.4%	5.8%
OHIO	183%	154%	127%	93%	64%	71%	42%	17%	10.6%	6.5%	3.9%
OKLAHOMA	216%	197%	169%	108%	76%	68%	47%	30%	19.5%	12.2%	6.9%
OREGON	166%	143%	121%	90%	47%	52%	42%	35%	24.6%	14.8%	10.3%
SOUTH DAKOTA	476%	409%	347%	222%	138%	132%	65%	7%	0.0%	5.8%	9.0%
TEXAS	250%	207%	183%	100%	54%	49%	41%	31%	29.3%	16.1%	9.7%
WASHINGTON	132%	109%	91%	69%	44%	43%	28%	18%	8.2%	2.1%	5.1%
WISCONSIN	205%	141%	110%	67%	35%	42%	26%	20%	14.8%	5.9%	7.0%

(Source: USDA and TIAA Center for Farmland Research)

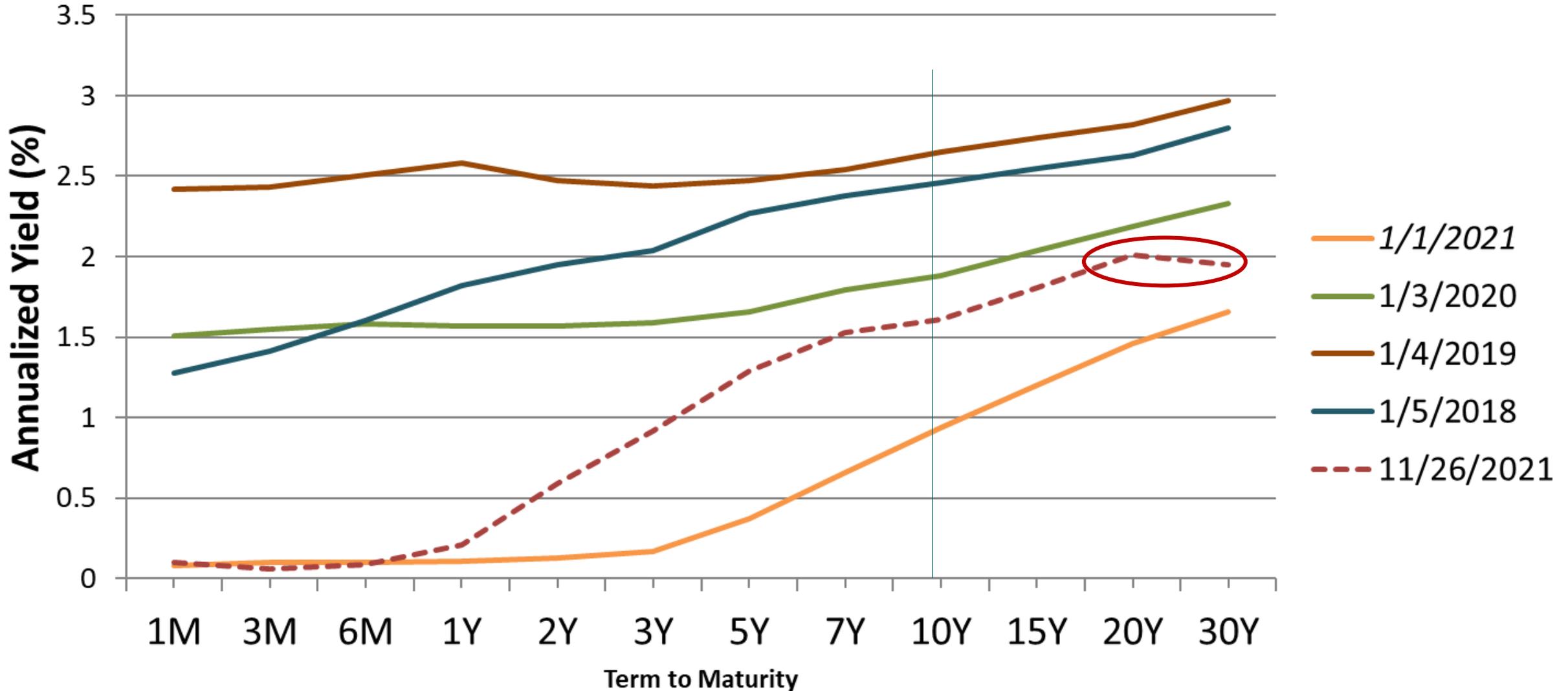
Yield Curve July 2003 – November 26, 2021 (weekly)

- Credit easing events *since 2008, and start of pandemic*
- Multiple expansion natural
- Massive stimulus on top is a somewhat different effect
- Fed Purchases as tool to manage interest rates
- Forward Inflation forecasts largely ignored
- Tapering debate settling on sooner/smaller

IMPACT ON REAL ESTATE?



Expected future rates, and the discount rate for Ag



Do you expect Interest Rates on farm mortgage loans in one year to:

- Increase by more than 3%
- Increase 2-3%
- Increase 1-2%
- Increase by 0-1%
- Decrease

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Farm Income Expectations – prices and expense projections

- Forward Market Prices maintaining reasonable levels (today's PP forecasts below)

Projected Prices, Harvest Prices, and Volatilities, Corn and Soybeans, SCD 3/15 (RMA)

Corn	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022(f)
Proj Price	6.01	5.68	5.65	4.62	4.15	3.86	3.96	3.96	4.00	3.88	4.58	5.34
Harvest Price	6.32	7.50	4.39	3.49	3.83	3.49	3.49	3.68	3.90	3.99	5.37	
Volatility	0.29	0.22	0.20	0.19	0.21	0.17	0.19	0.15	0.15	0.15	0.23	0.25
Soybeans												
Proj Price	13.49	12.55	12.87	11.36	9.73	8.85	10.19	10.16	9.54	9.17	11.87	12.15
Harvest Price	12.14	15.39	12.87	9.65	8.91	9.75	9.75	8.60	9.25	10.55	12.30	
Volatility	0.23	0.18	0.17	0.13	0.16	0.12	0.16	0.14	0.12	0.12	0.19	0.18

- Input expenses (especially fertilizer and energy) dramatically higher
- Demand Expansion thesis for Rest of World (ROW) positive but unproven
- Export demand growth also dependent on strength of the dollar

Market's expected Dec 2022 Corn Prices *(as of 12/5/21)*



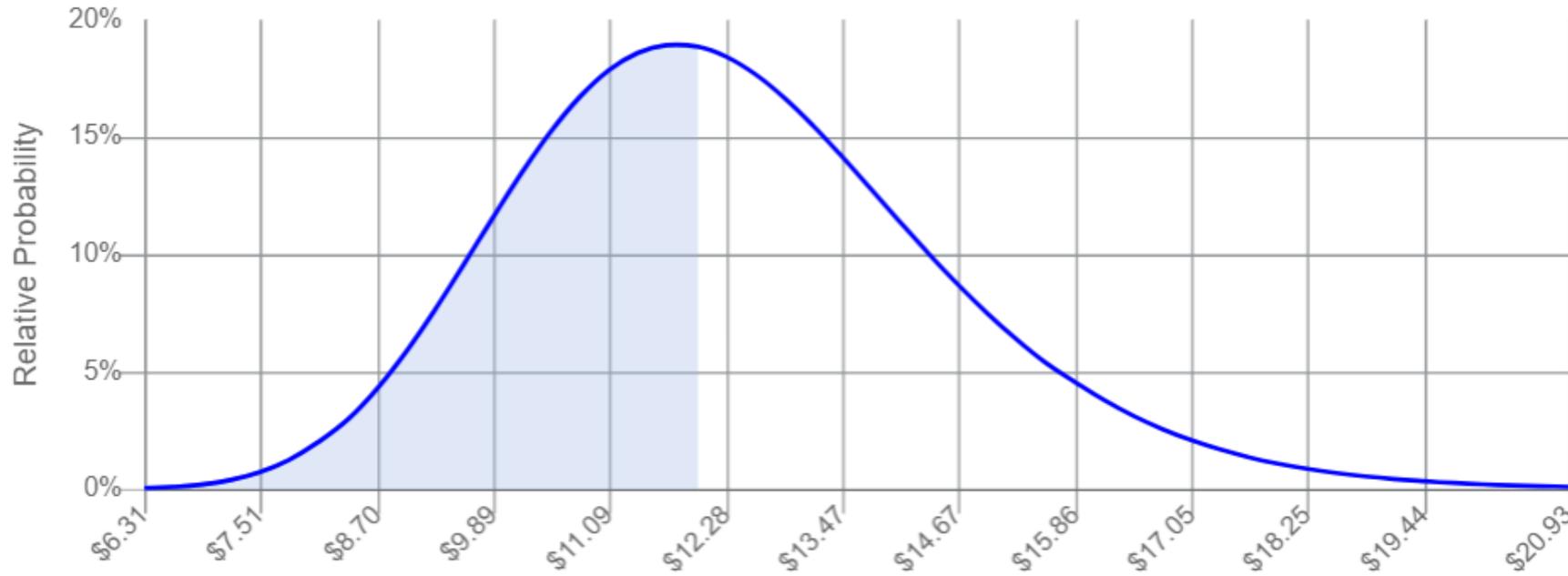
Enter Price to Evaluate: \$ 5.34

The implied distribution indicates that there is a 49.88% probability that the price will be below \$5.34 at expiration.

Probability Below ▲	Price at Expiration ▲
5%	\$3.53
15%	\$4.12
25%	\$4.51
35%	\$4.85
45%	\$5.18
50%	\$5.34
55%	\$5.52
65%	\$5.89
75%	\$6.33
85%	\$6.94
95%	\$8.08

Market's expected Nov 2022 Soybean Prices (as of 12/5/21)

Probability of Prices at Expiration

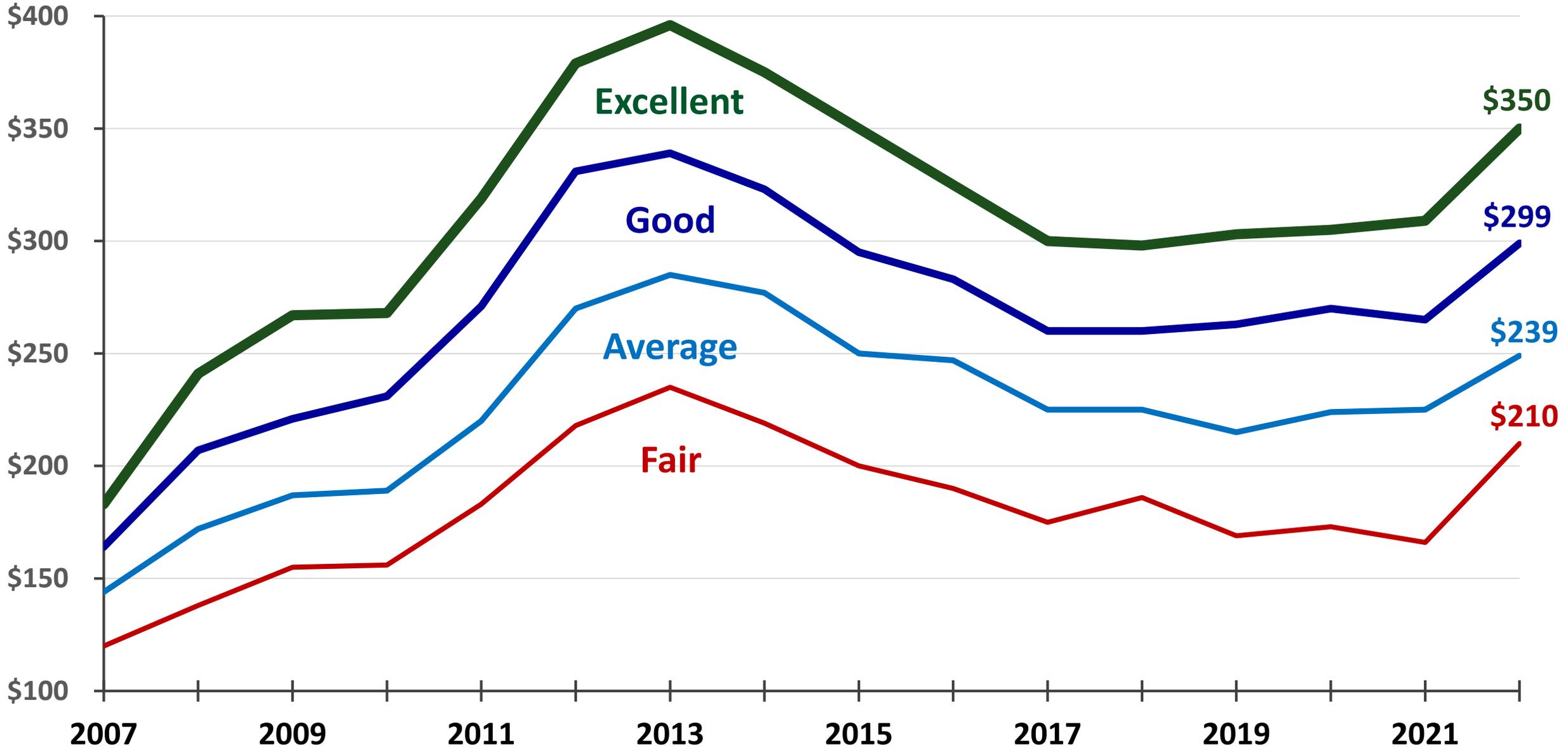


Enter Price to Evaluate: \$ 12.15

The implied distribution indicates that there is a 50.01% probability that the price will be below \$12.15 at expiration.

Probability Below ▲	Price at Expiration ▲
5%	\$9.10
15%	\$10.12
25%	\$10.79
35%	\$11.35
45%	\$11.88
50%	\$12.15
55%	\$12.42
65%	\$13.00
75%	\$13.68
85%	\$14.58
95%	\$16.23

Cash Rent History from IL Society Survey (\$/Acre)



Capitalized Value

A very simple (and reasonably accurate) capitalization formula

$$\textit{Capitalized Value} = \frac{\textit{Cash Rent}}{(r - g)}$$

Example:

Cash rent = \$350 per acre

r = 6.5% (required rate of return)

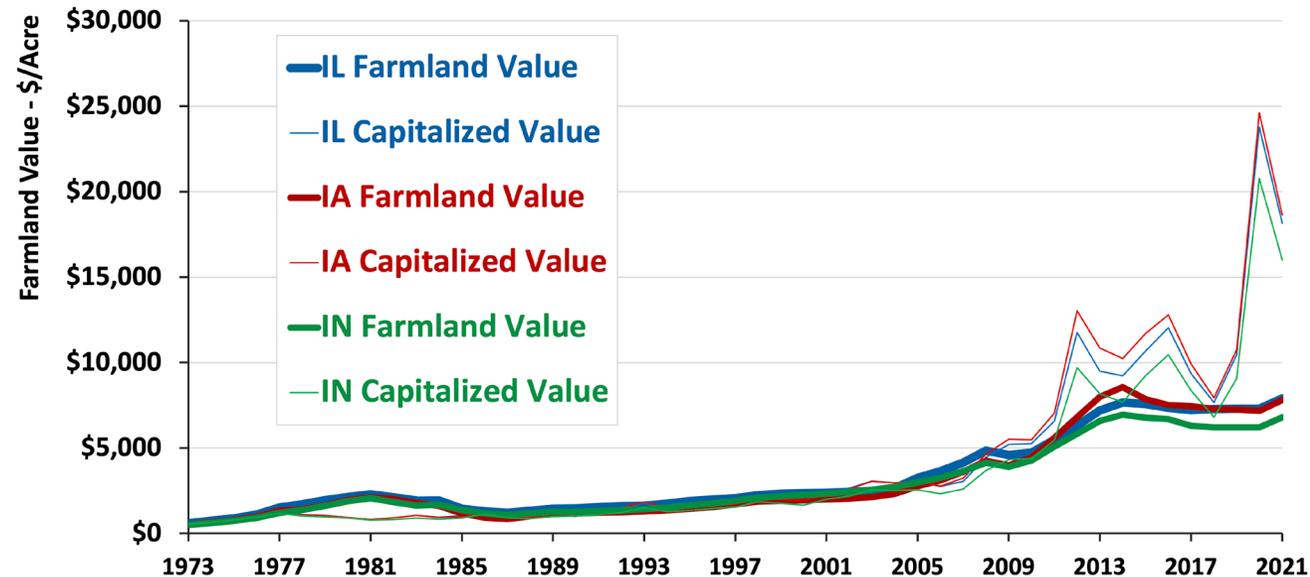
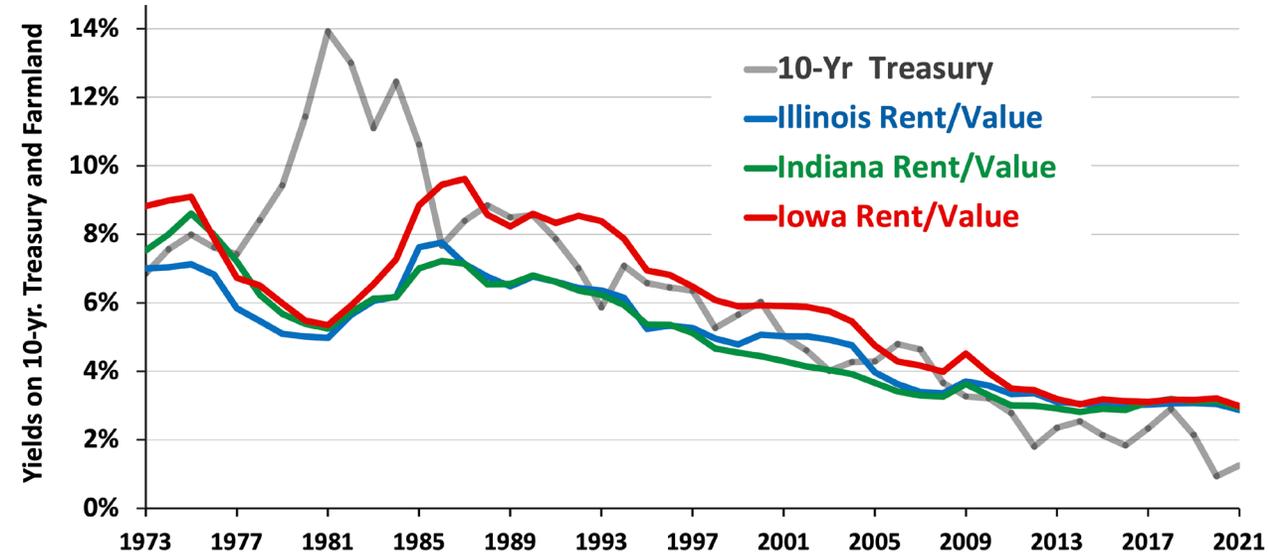
g = 4% (growth rate in return or asset appreciation)

Capitalized value = \$14,000 = \$350 / .025

Do Farm Assets behave like other Financial Assets?

Why/Not?

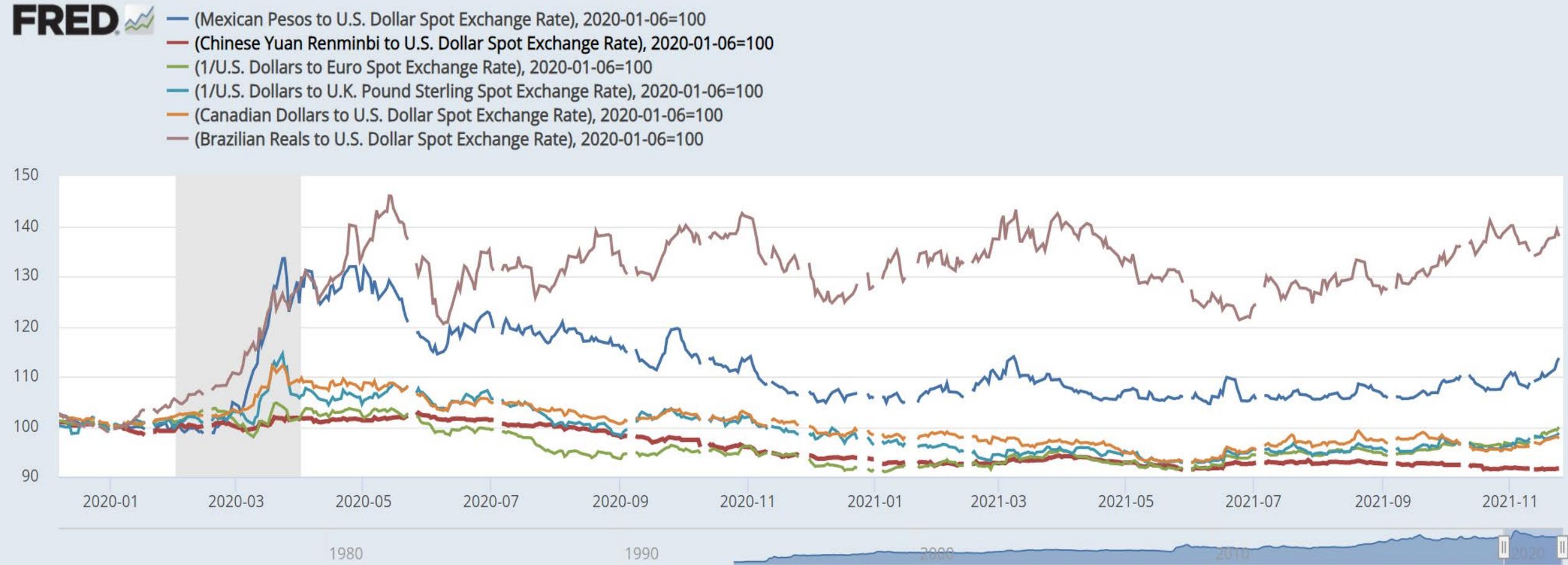
- Farmland returns are positively correlated with inflation, and T-Rates
- Income expectations and growth drivers uncertain, but “room to run”
- Very different from 1980s – only **negative** divergence
- Low cap rates supportive of values – implied current cap rate = **2.95%**
- Relative yield attractive compared to fixed income, low risk bonds
- Ag income prospects reasonable over long period forward



U.S. Ag Returns - correlation by rolling period intervals

Roll length	PPI	CPI	Gold	U.S. 10-year bonds	U.S. corporate bonds	U.S. listed real estate	European equities	U.S. equities
1	65.3%	59.6%	29.9%	15.1%	9.2%	-12.7%	-22.7%	-24.7%
2	70.3%	70.0%	31.6%	16.2%	10.5%	-11.8%	-19.7%	-23.9%
3	75.7%	71.4%	38.8%	17.1%	12.1%	-11.8%	-18.6%	-27.8%
4	80.4%	72.3%	45.6%	18.6%	14.3%	-14.5%	-20.6%	-35.5%
5	84.0%	72.9%	52.3%	20.9%	17.1%	-15.4%	-21.9%	-41.1%
6	86.2%	72.6%	57.5%	23.5%	20.2%	-13.8%	-21.1%	-46.9%
7	87.4%	72.1%	60.3%	26.3%	23.6%	-15.5%	-20.3%	-52.2%
8	86.9%	71.6%	60.1%	29.5%	27.4%	-17.4%	-18.7%	-55.2%
9	86.7%	71.1%	57.7%	33.0%	32.1%	-13.1%	-21.3%	-54.3%
10	86.3%	70.6%	54.9%	37.1%	36.6%	-8.8%	-21.7%	-52.5%

What About the Strength of *the* Dollar?...“well, it’s still complicated...”



Shaded areas indicate U.S. recessions.

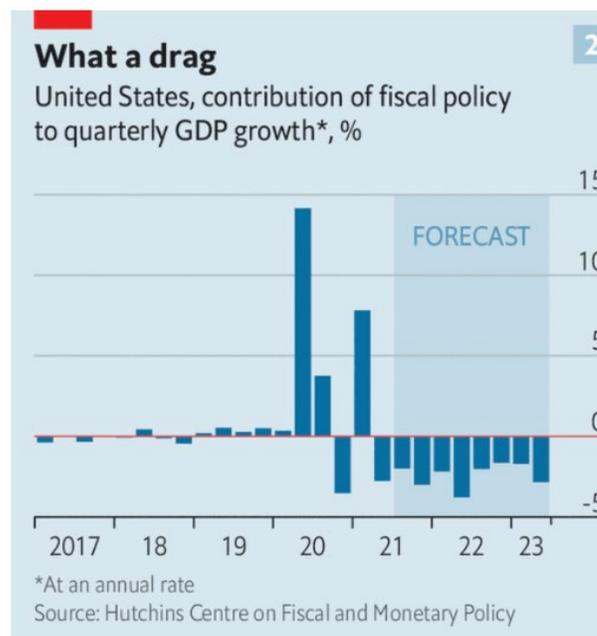
Source: Board of Governors of the Federal Reserve System (US)

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One way to sum it up

- Money Supply – in circulation share
- Effect of Stimulus on Production
 - distinct from *spending*
- Relative to Trend Rates pre-Covid
- Effects on Spending
 - distinct from *production*



The Economist

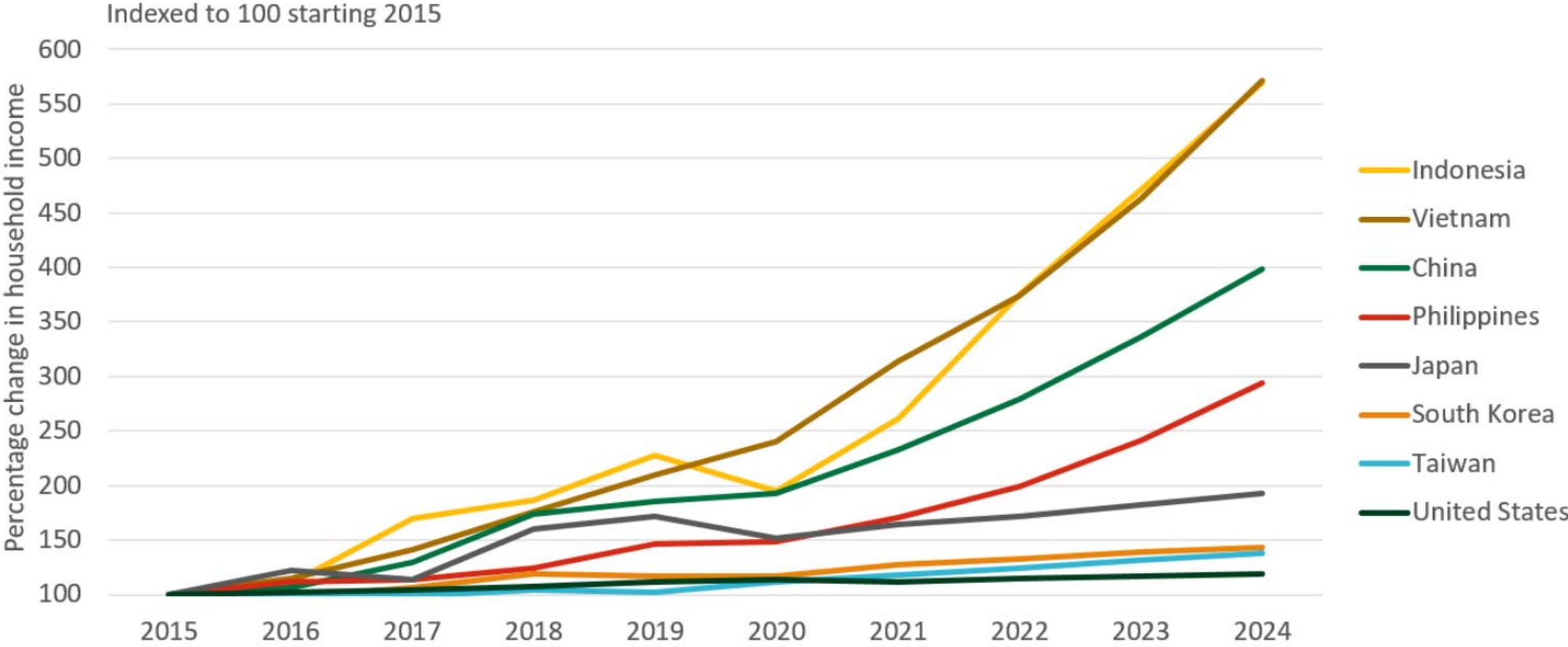


The Economist

Key issues impacting farmland

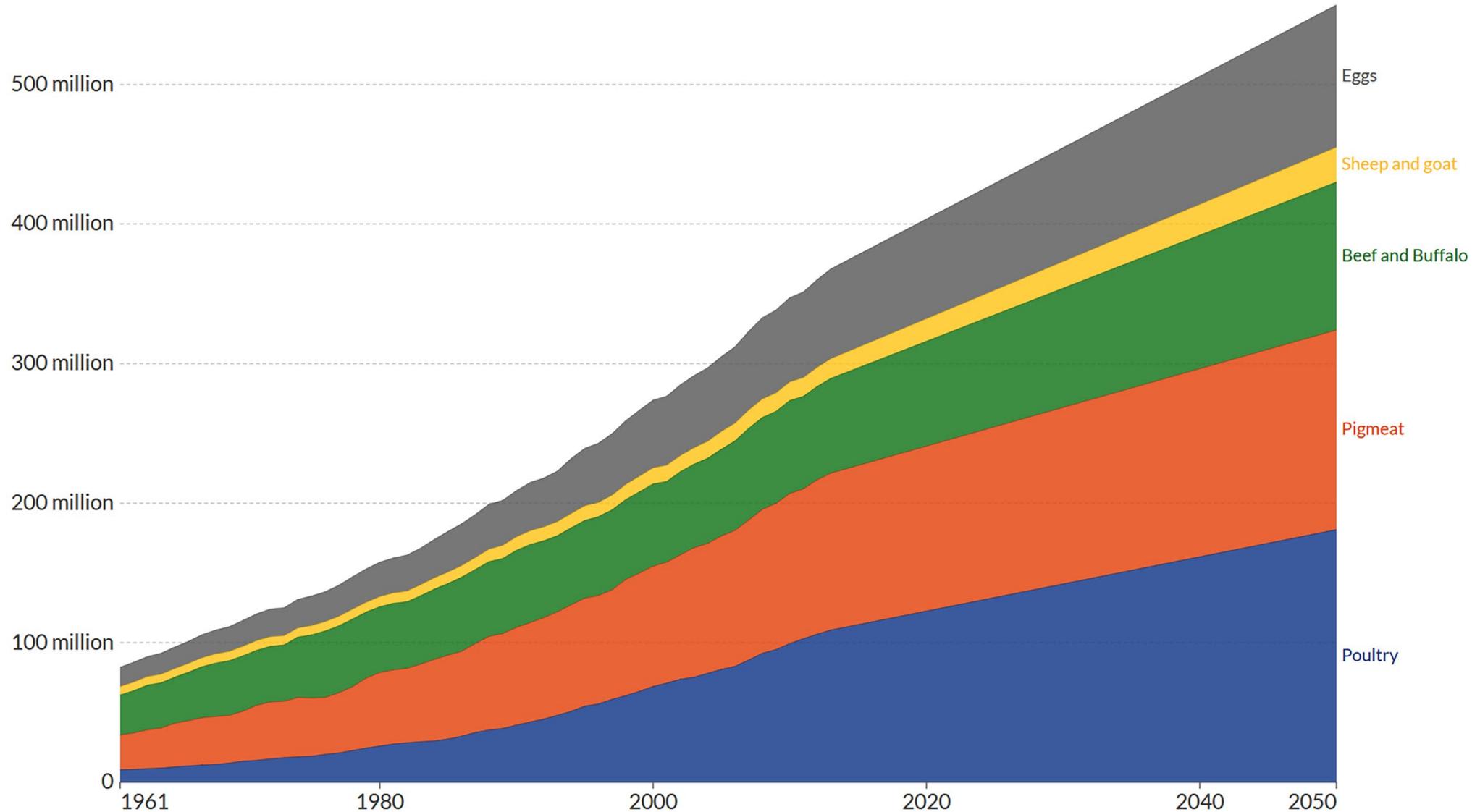
- Inflation or stagflation? Term structure resolution and productivity growth interaction – *(note: trend productivity has not returned)*
 - FOMC stance becoming forced, world markets coordinated/integrated
 - Transitory vs. permanent inflation balance moving toward higher inflation side - tapering inevitable at this point, when is only question
- Continued demand growth for commodities in export markets
- Tax Policy impacts on transactions, and resulting market strength
 - More Buyers and Sellers due to recent incomes and tax concerns

Growth in household income (US\$35,000+)



Source: Fitch Connect

Global Demand for meat to drive commodities



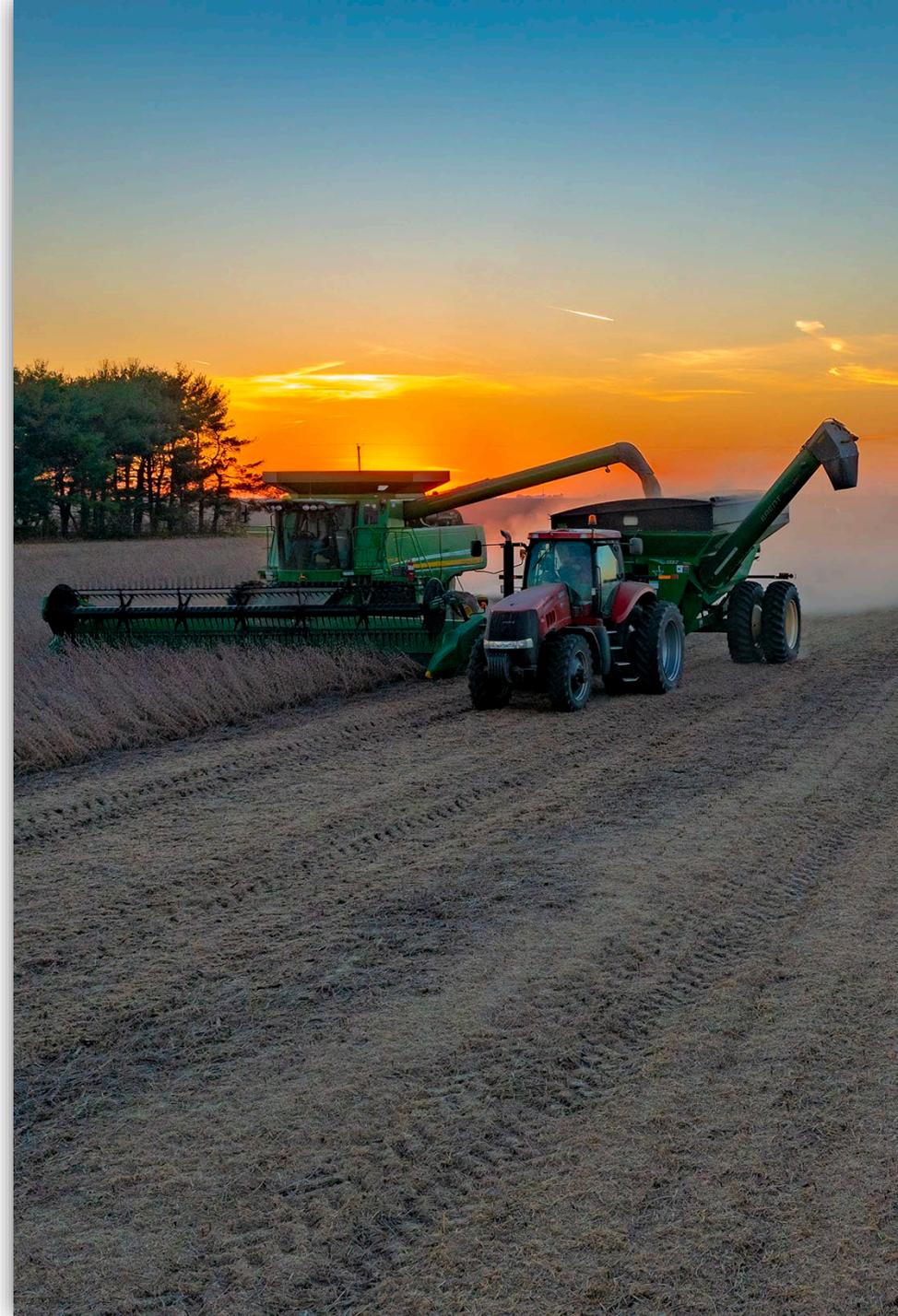
Source: UN Food and Agriculture Organization (FAO)

Key issues impacting farmland

- Water issues likely to create pressures in other areas for production shifts – declining aquifer and changing regulation
- Ethanol Demand and use of corn in energy markets – EV impacts?
Biodiesel and use of soybeans in energy markets
- Farm Bill Titles and use of federal programs for new agendas
 - Ag increasingly part of climate and carbon conversations
 - Developing markets for payments vs. regulatory overhead
 - “Carbon farming” issues far from settled, but only industry with enough capacity to make material change.

Key issues impacting farmland

- Consumer preferences and sustainability goals above individual producer level
- Controlled environment production facilities and proximity to final use
- Rental markets are slow moving and sticky, may require new characteristics, flex payments, eco-service payments



Key issues impacting farmland

- Crop Insurance, changing technologies, and “practices” that overlap programs
- Financialization (“we’ve been 2 years away for the last 10”) - new players (see Expo)
 - Public vehicles (REITs, ETFs, Adjacency funds)
 - De-Fi vehicles (mAigma, AcreTrader, FarmTogether, Steward, etc)
 - Institutional investors, large HNW positions, role in farm-level scale expansion
 - Rationalization of debt within asset class while rates are low?



Do you expect farmland values in 5 years to be:

- More than 25% higher (increase more than 5% per year)
- 10-25% higher in total (increase 2-5% per year)
- 0-10% higher in total (increase 0-2% per year)
- Decline by 0-5% (decrease 0-1% per year)
- Decline by more 5% (decrease more than 1% per year)

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Upcoming Webinar

December 10, 2021

Policy Update for 2022

by Nick Paulson, Krista Swanson, Jonathan Coppess

While no major changes have been made to crop insurance or commodity programs for 2022, major legislation has been moving through Congress this fall that will have impacts on agriculture. The Infrastructure Investment and Jobs Act includes funding for a range of investments that will impact agriculture and rural communities. The Build Back Better framework's focus on climate change includes support for clean energy, conservation, and climate smart agriculture. This policy update will focus discussion on the current state of support for agriculture and the potential impacts new legislation might introduce.

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Latest Article

Prospects for Swine Feed Costs in 2022
December 3, 2021
Michael Langemeier

Corn prices and soybean prices were very volatile in 2021. The average corn price in Indiana was \$4.32 per bushel in January, increased to \$6.32 in June, and will likely be around \$5.50 at the end of the year. Average...

[Read the Article](#)

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