

# **The Economics of Pork Production in the United States**

Lee Schulz, Economics, Iowa State University

**12<sup>th</sup> Leman China Swine Conference — Breakout Session**  
**October 2023**

# KEY ISSUES FOR HOG/PORK MARKETS

- U.S. consumer-level demand THE KEY DRIVER of strong pork/hog prices in recent years – still respectable vs. history but below '21 & '22
- U.S. pork exports have been much stronger than expected in '23
- Production costs have entered a new era and likely not going back
- Prop 12 is the law of California – per SCOTUS decision
- Labor remains a constraint for both producers and packers
  - More people – primarily depends on immigration reform
  - More mechanization – a virtual certainty for plants
- ASF – Less chatter but obviously ALWAYS a risk when it is nearby
- Price discovery – no better but not top of mind when prices are not the leading issue

# U.S. Lean Hog Price Forecasts



Iowa/Minnesota

CME Group LM\_HG204

8/30/2023

8/11/2023

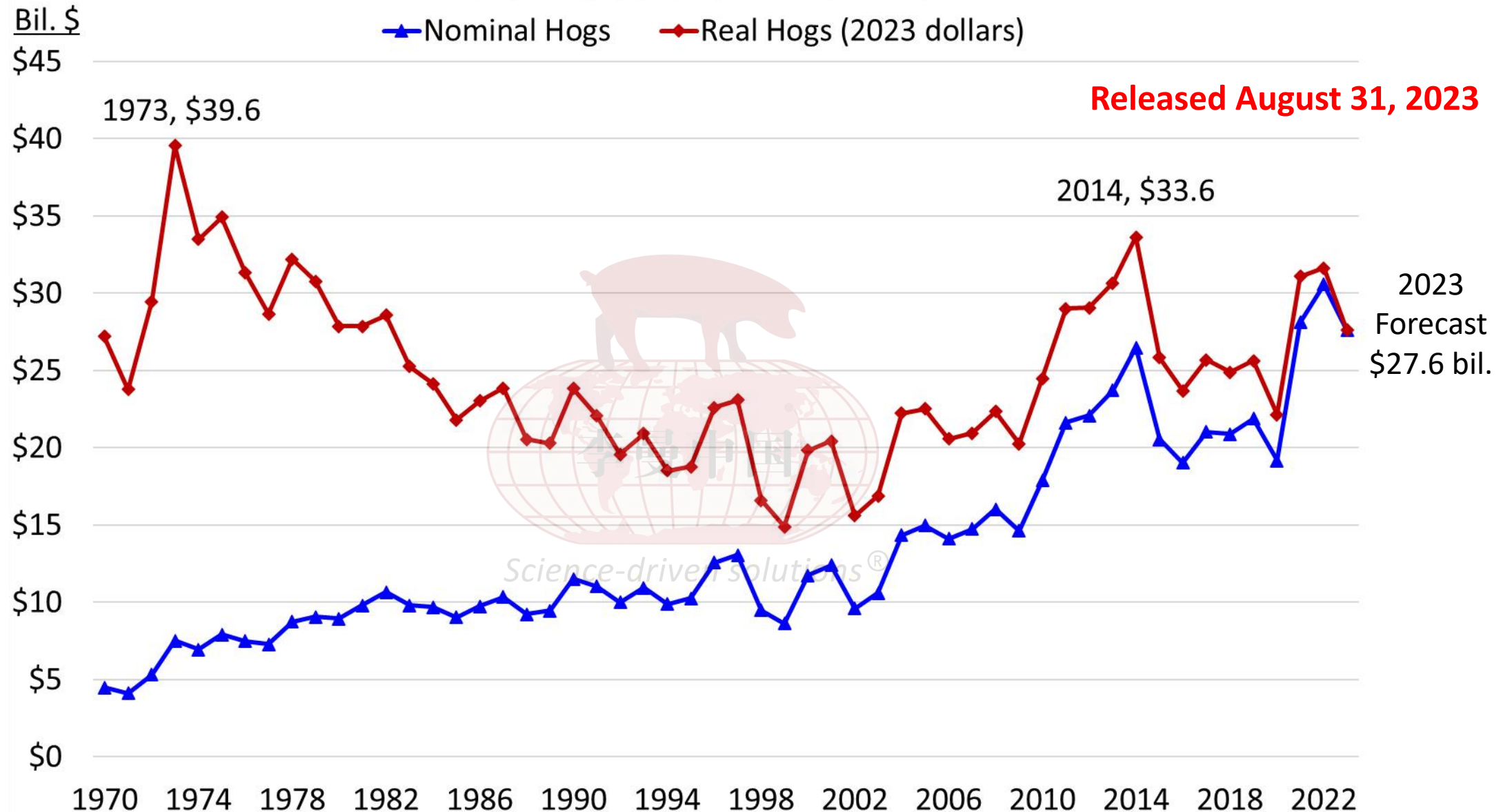
9/8/2023

		National Wtd Avg. Base	National Base 51-52% Lean	IA/MN All Prod Sold	Composite Price/Forecast	% Chg from Year Ago
2018		64.68	61.65	65.56		
2019		67.44	64.36	69.27		
2020		61.63	57.96	61.28		
2021		89.51	90.32	91.36		
2022		95.80	95.58	97.47		
2023	Q1	78.07	73.60	77.30	76.32	-14%
	Q2	80.19	76.09	80.43	78.90	-23%
	Q3	92	99	94	95	-12%
	Q4	80	85	76	80	-8%
	Year	83	83	82	83	-14%
2024	Q1	81	85	76	81	6%
	Q2	85	91	86	87	11%
	Q3	94		89	92	-4%
	Q4	82		77	79	-1%
	Year	86	87	82	85	3%
2025	Q1	81				
	Q2	84				
	Q3	94				
	Q4	81				
	Year	85				

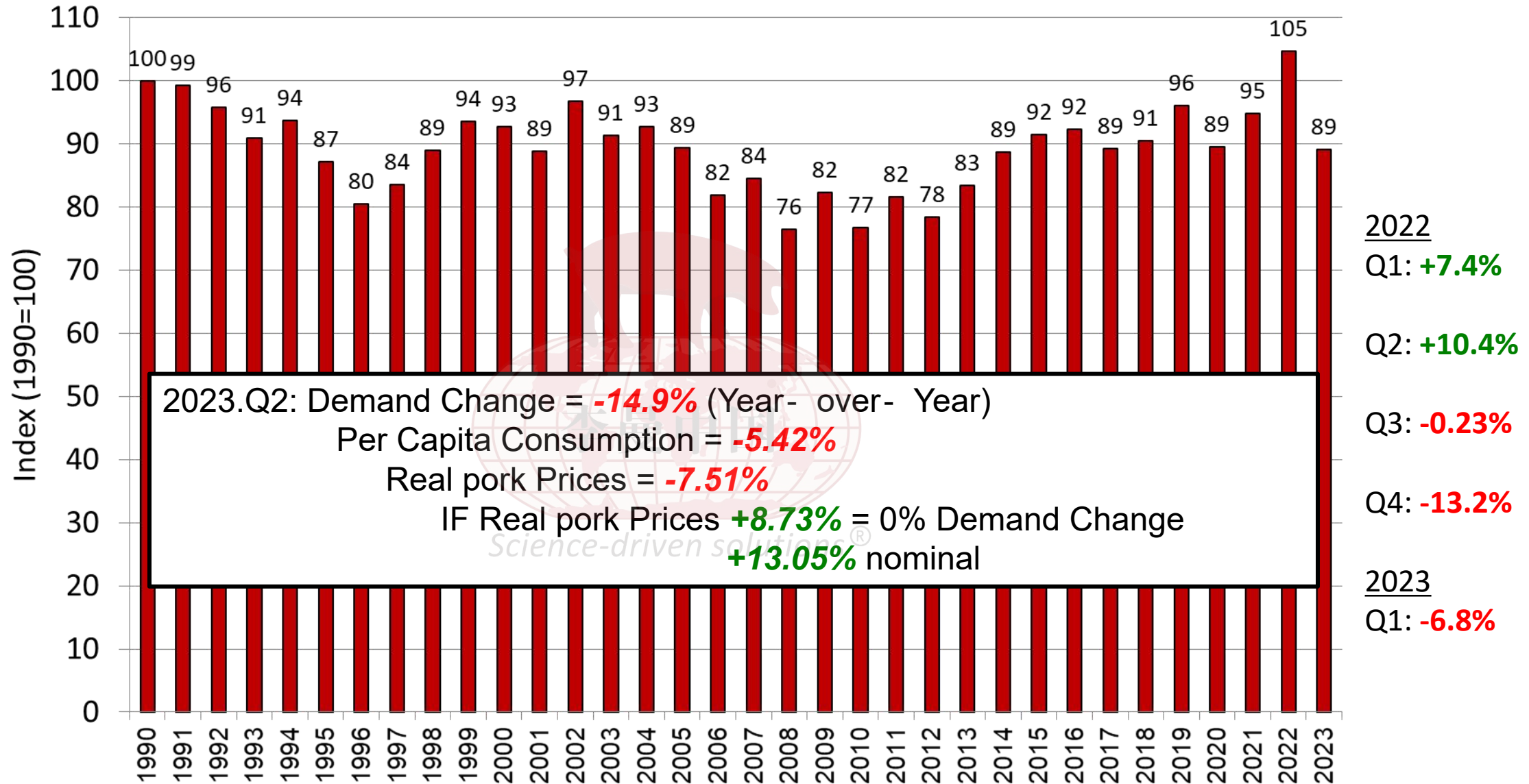
2<sup>nd</sup> highest to 2014  
\$100.64 (IA/MN)

Would be 7<sup>th</sup>  
highest (nominal)  
price ever

# U.S. HOGS CASH RECEIPTS



## 2nd Quarter (Apr-Jun), U.S. Retail Pork Demand





# MONTHLY ESTIMATED RETURNS TO FARROW TO FINISH, IOWA

January 1974 through February 2025

\$ per head

\$100

\$80

\$60

\$40

\$20

\$0

\$20

\$40

\$60

\$80

1994 = **-\$9.36**

2019 = **+\$8.68**

1995 = **-\$0.11**

2020 = **-\$4.87**

1996 = **+\$6.18**

2021 = **+\$21.69**

1997 = **+\$11.49**

2022 = **+\$4.57**

1998 = **-\$26.88**

2023<sup>f</sup> = **-\$30.97**

1999 = **-\$17.08**

2024<sup>f</sup> = **-\$13.09**

Projected

9/8/2023

1974 1976 1978 1980 1982 1984 1986 1988 1990 1992 1994 1996 1998 2000 2002 2004 2006 2008 2010 2012 2014 2016 2018 2020 2022 2024

# QUARTERLY COMMERCIAL HOG SLAUGHTER, PORK PRODUCTION, PER CAPITA PORK DISAPPEARANCE AND NATIONAL BASE HOG PRICE

Year Quarter	Comm'l Slaughter	% Chg. from Year Ago	Average Carcass Weight	% Chg. from Year Ago	Comm'l Pork Production	% Chg. from Year Ago	Per Capita Consumption	% Chg. from Year Ago
	(1,000 Head)		(Lbs.)		(Mil. Lbs.)		(Retail Wt.)	
2022								
I	31,604	-5.4	218	0.2	6,905	-5.3	13.1	0.3
II	30,619	-1.6	217	1.2	6,639	-0.4	12.4	5.3
III	30,967	-0.6	211	0.6	6,534	0.1	12.4	0.9
IV	32,132	-3.4	216	-0.2	6,919	-3.7	13.0	-6.5
Year	125,322	-2.8	216	0.5	26,996	-2.5	50.9	-0.3
2023								
I	32,569	3.1	217	-0.6	7,071	2.4	12.9	-1.2
II	30,780	0.5	214	-1.4	6,592	-0.7	11.8	-4.5
III a	30,994	0.1	210	-0.8	6,501	-0.5	11.6	-6.5
IV b	32,246	0.4	216	0.1	6,960	0.6	12.8	-1.9
Year	126,590	1.0	214	-0.7	27,124	0.5	49.1	-3.5
2024								
I	31,914	-2.0	217	0.2	6,938	-1.9	12.7	-2.1
II	30,334	-1.4	215	0.3	6,518	-1.1	11.7	-0.8
III	30,855	-0.4	210	0.2	6,488	-0.2	11.6	0.7
IV	32,518	0.8	216	0.1	7,027	1.0	12.9	0.9
Year	125,622	-0.8	215	0.2	26,971	-0.6	48.9	-0.4
2025								
I	31,730	-0.6	219	0.8	6,951	0.2	12.7	-0.1
II	30,631	1.0	216	0.6	6,624	1.6	11.9	1.9
III	31,128	0.9	211	0.5	6,577	1.4	11.8	1.1
IV	32,687	0.5	218	0.7	7,111	1.2	13.0	1.1
Year	126,177	0.4	216	0.6	27,263	1.1	49.4	1.0

a/ Estimated quarter

b/ Forecasted quarters

Note: Totals may not add due to rounding.

Sources: Livestock Slaughter - USDA Publications; USDA Livestock Market News; Forecasts - LMIC Projections

8/30/2023

# Records by Quarter – United States: 1866 to Present

[This table provides data users with record high estimates of all hogs and pigs, market hogs, pig crop, and pigs per litter since each data series began]

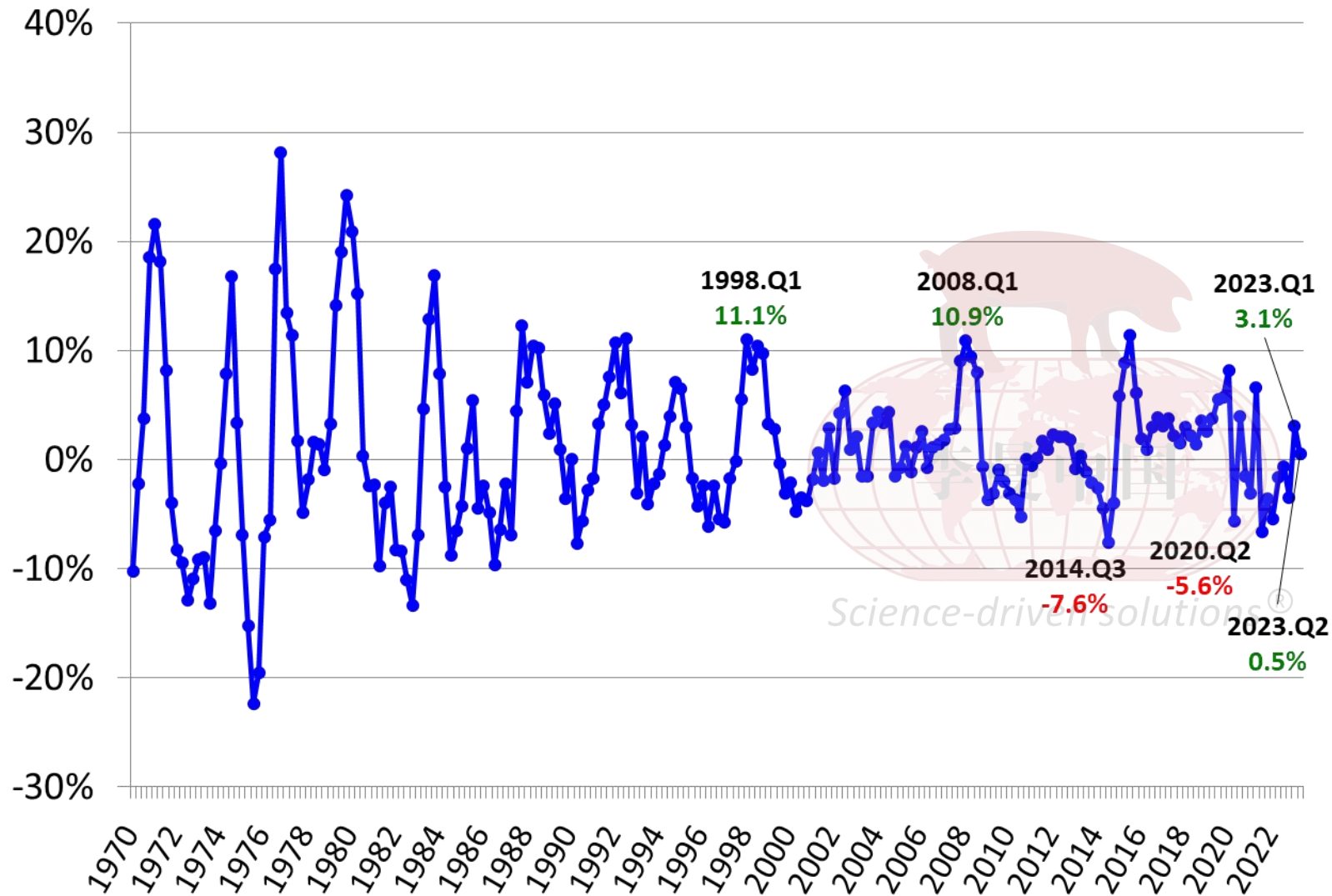
Item	Estimate	Record high	Series began
	(1,000 head)	(year)	(year)
All hogs and pigs .....			
March 1 .....	'23 = 72.394 75,164	2020	1988
June 1 .....	77,664	2020	1964
September 1 .....	78,583	2019	1988
December 1 .....	83,741	1943	1866
Market .....			
March 1 .....	'23 = 66,249 68,739	2020	1988
June 1 .....	71,238	2020	1964
September 1 .....	72,153	2019	1988
December 1 .....	71,136	2020	1963
Pig crop .....			
December-February <sup>1</sup> .....	35,016	2020	1970
March-May .....	34,621	2020	1970
June-August .....	36,370	2019	1970
September-November .....	34,987	2020	1970
	(number)	(year)	(year)
Pigs per litter .....			
December-February <sup>1</sup> .....	11.02	2023	1970
March-May .....	11.36	2023	1970
June-August .....	11.13	2022	1970
September-November .....	11.22	2022	1970

<sup>1</sup> December preceding year.



# U.S. HOG CYCLE

Annual Pct. Change Quarterly Commercial Hog Slaughter



## Biological lags

Pork consumed today is based on producer decisions made 10-18 months ago

## Asset fixity

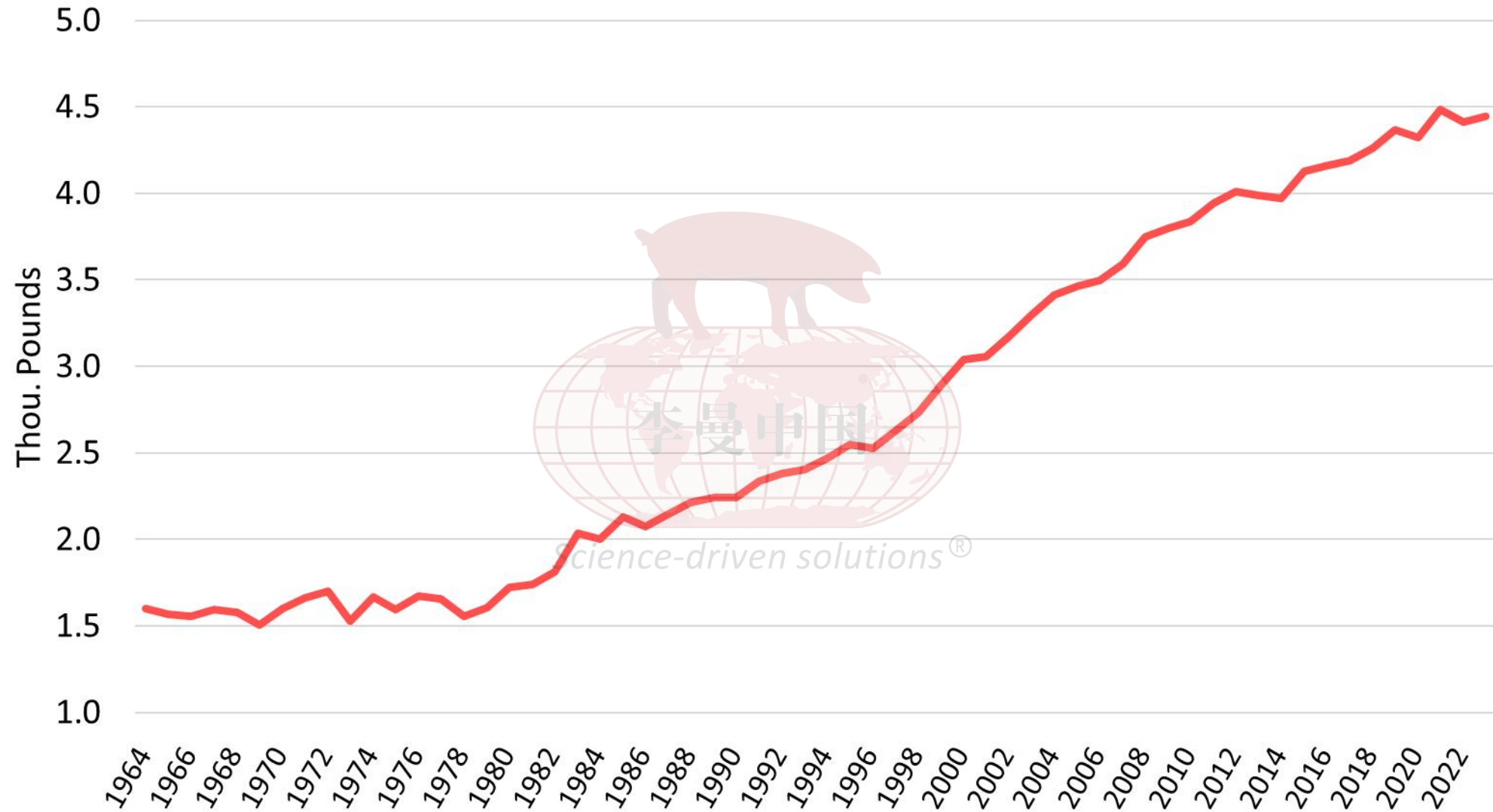
Tendency to continue to produce during low hog prices when asset (production facilities) values at acquisition and salvage are markedly different

## Asset specificity

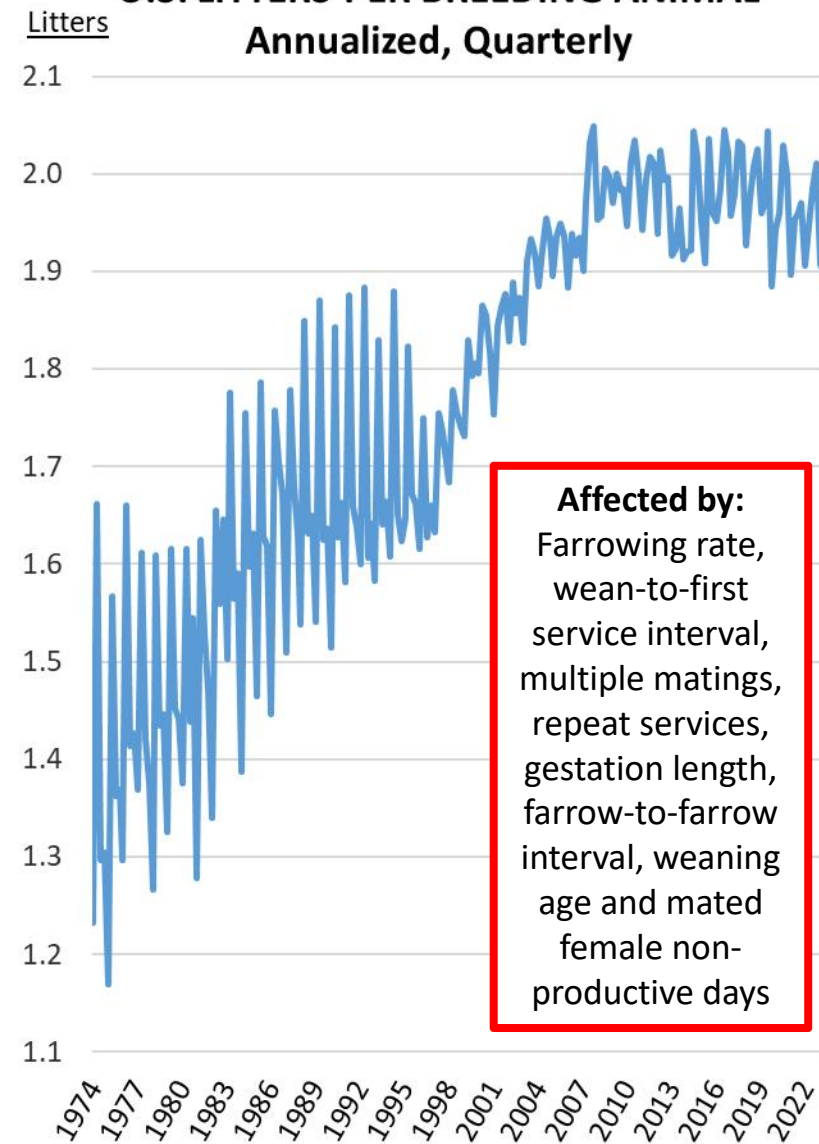
Tendency to continue to produce during low returns when transaction costs of converting assets to alternative use exceed value in current use

# U.S. PORK PRODUCTION PER BREEDING HOG

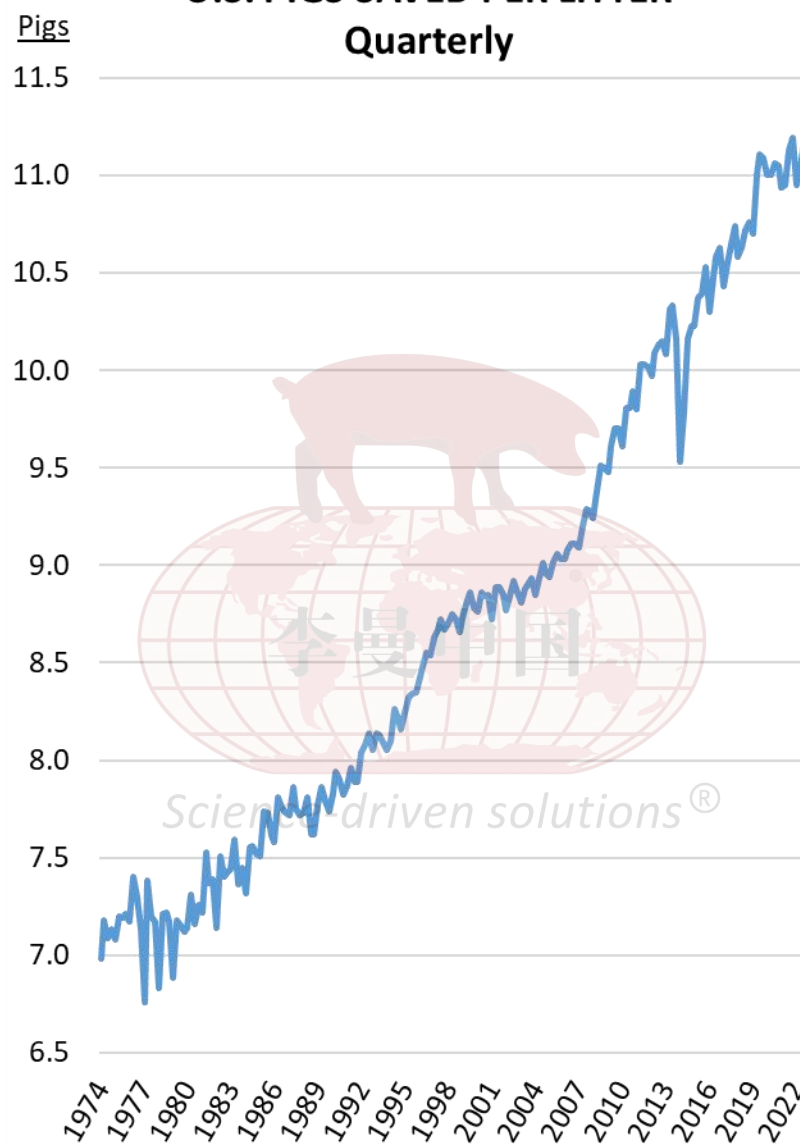
1964-2023 (Est.), Annual



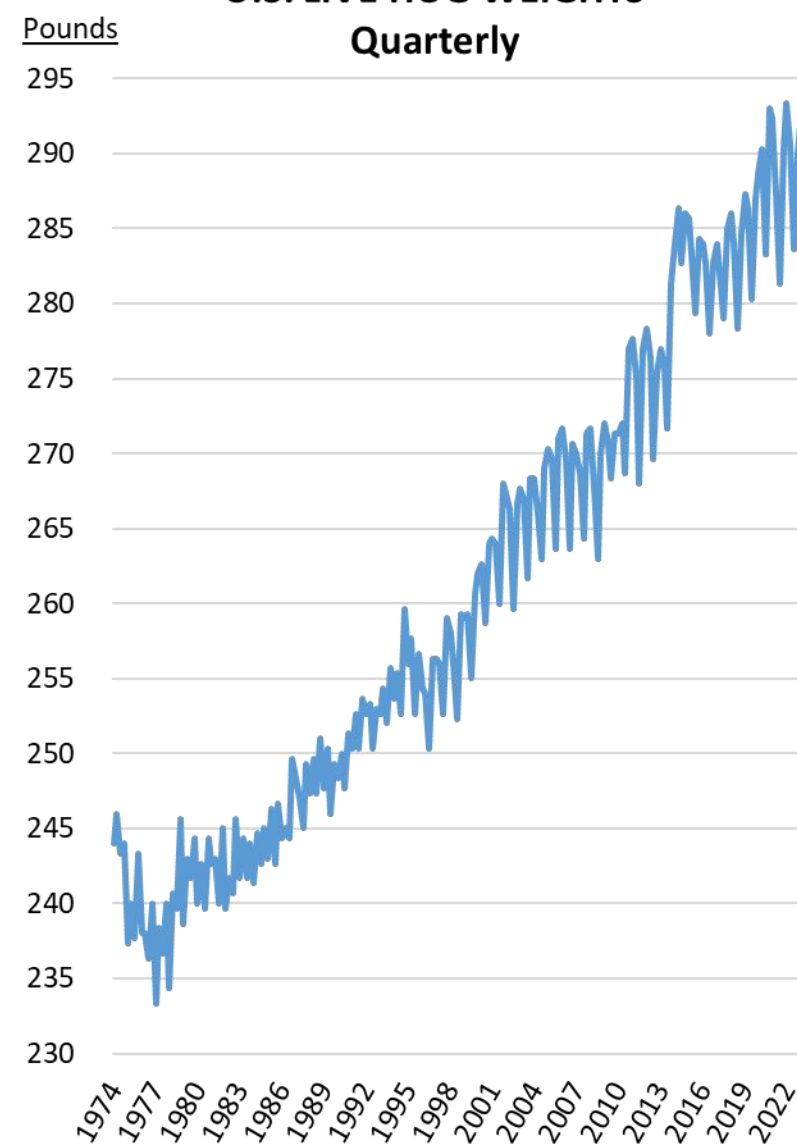
**U.S. LITTERS PER BREEDING ANIMAL**  
Annualized, Quarterly



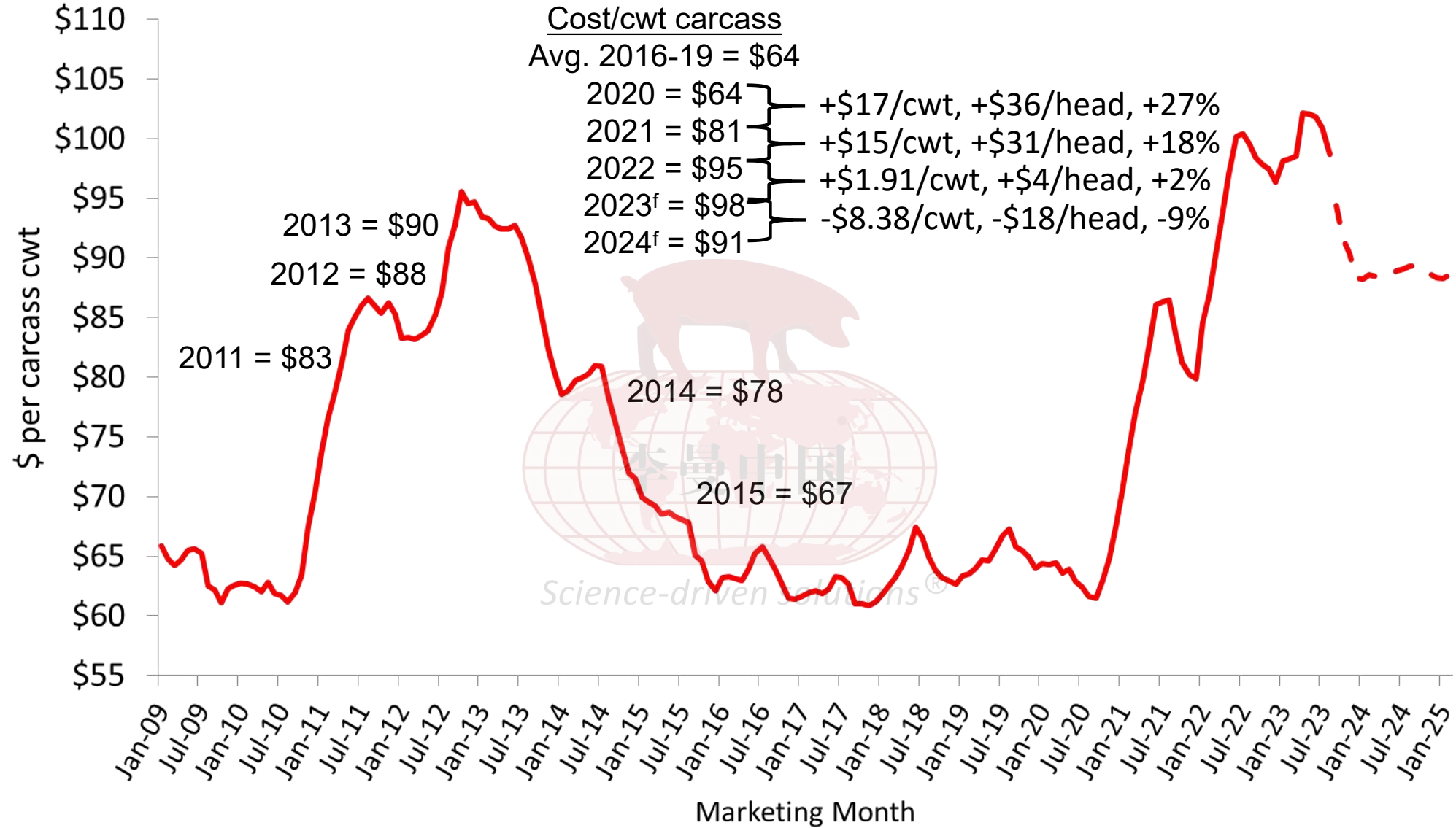
**U.S. PIGS SAVED PER LITTER**  
Quarterly



**U.S. LIVE HOG WEIGHTS**  
Quarterly



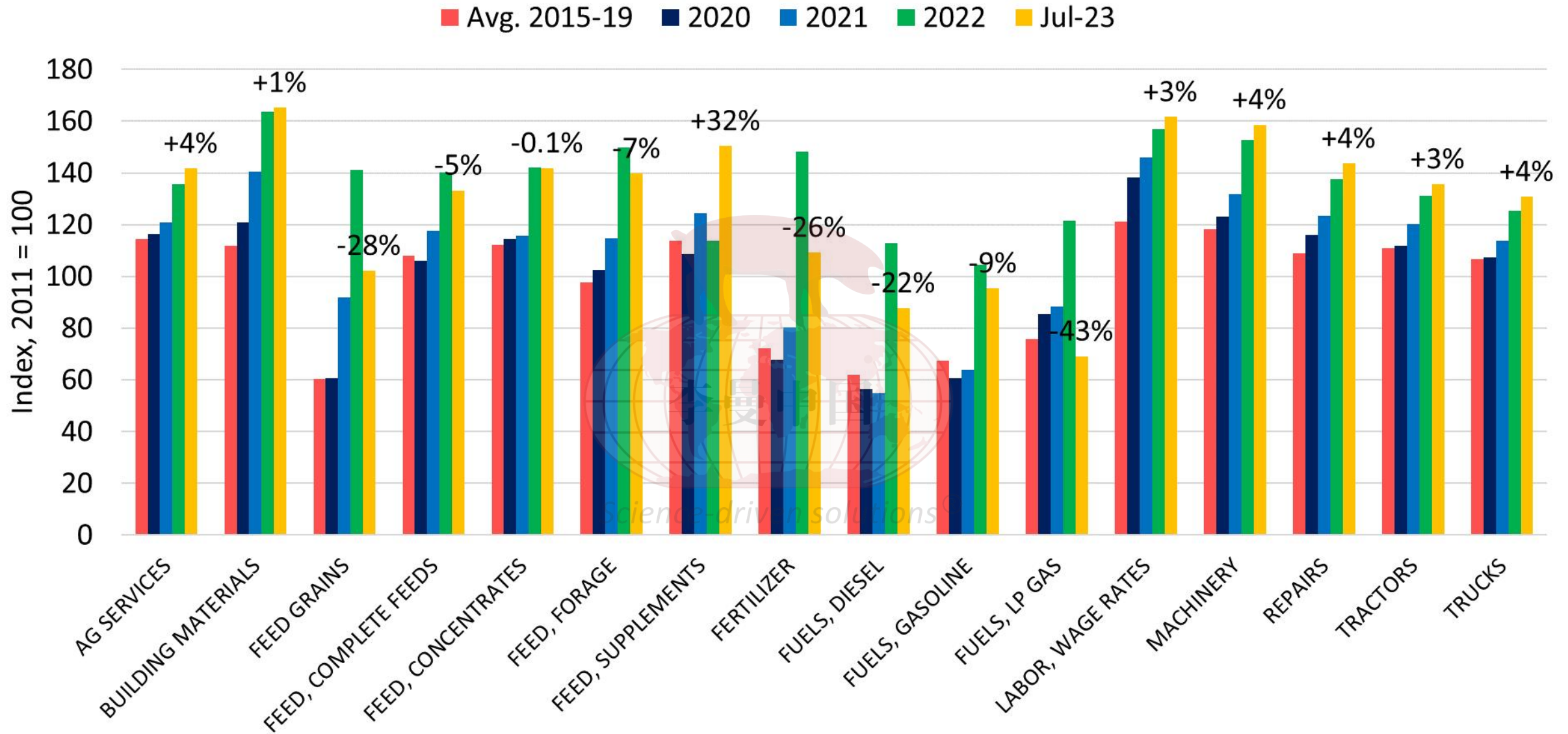
# BREAKEVEN—FARROW TO FINISH, IOWA



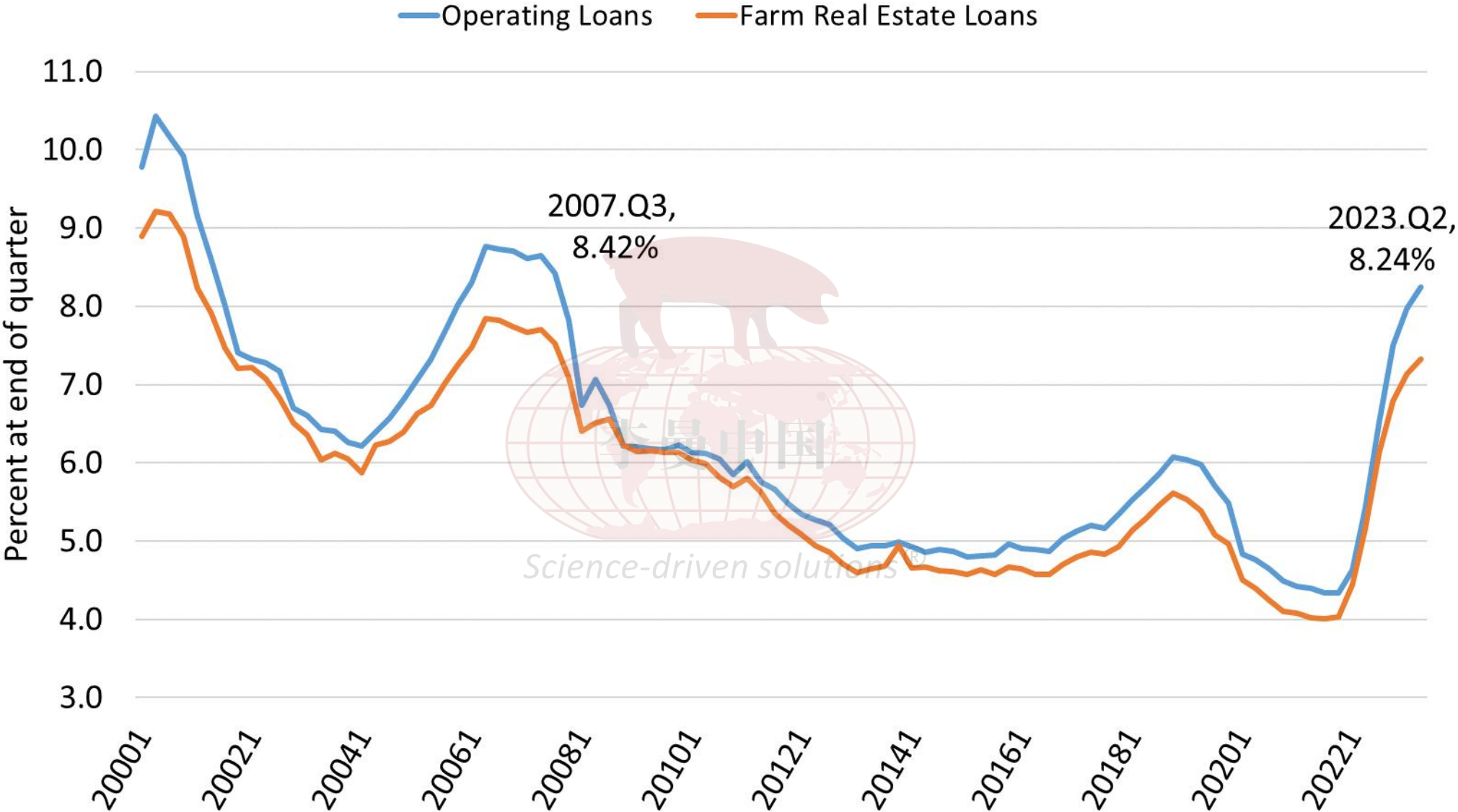
Source: Iowa State University



# PRICES PAID BY FARMERS FOR SELECT INPUTS

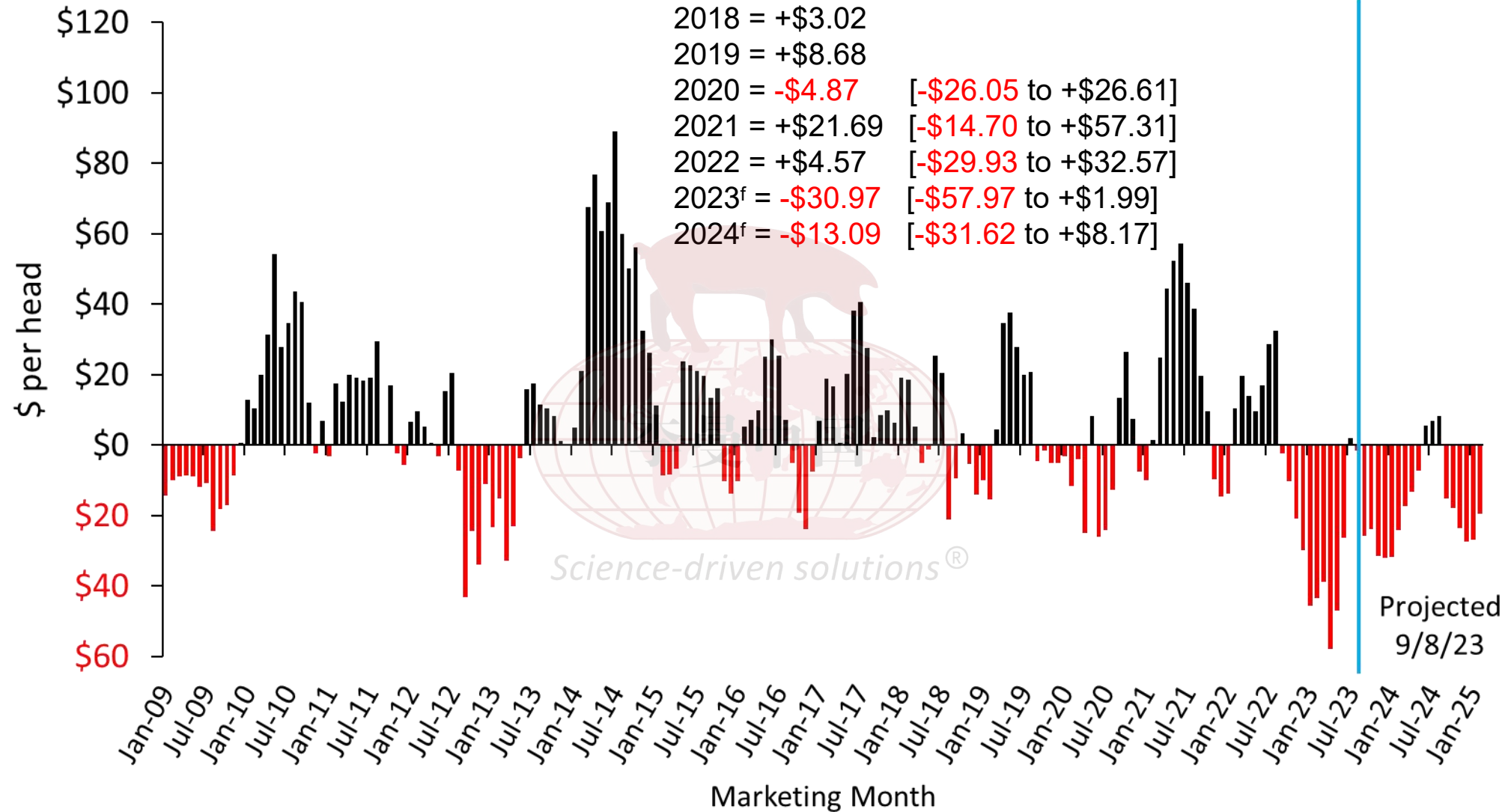


# Seventh District Agricultural Interest Rates



# Estimated Returns to Farrow to Finish, Iowa

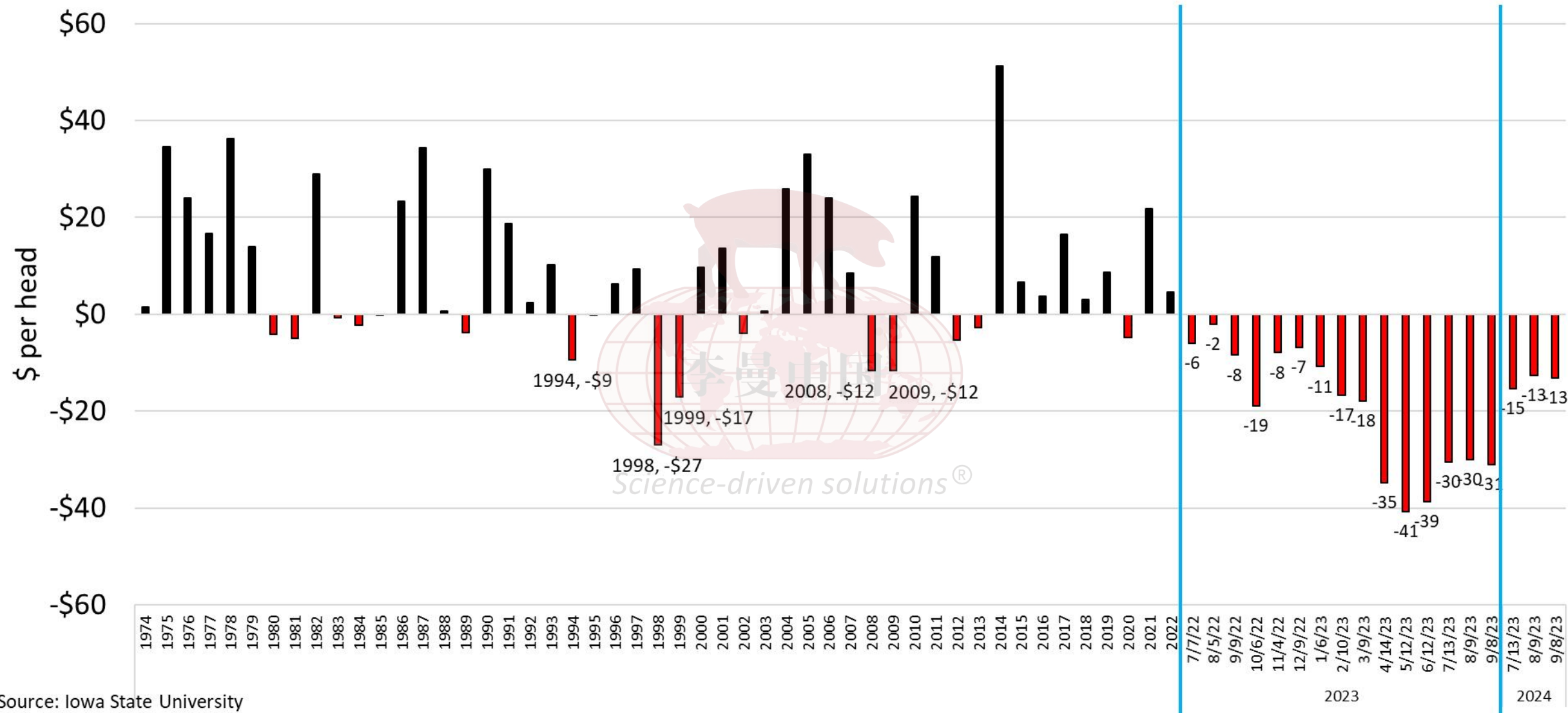
Past and Projected with Basis Adjusted Futures



Source: Iowa State University

# Estimated Returns to Farrow to Finish, Iowa

Locking in Prices with Basis Adjusted Futures



Source: Iowa State University



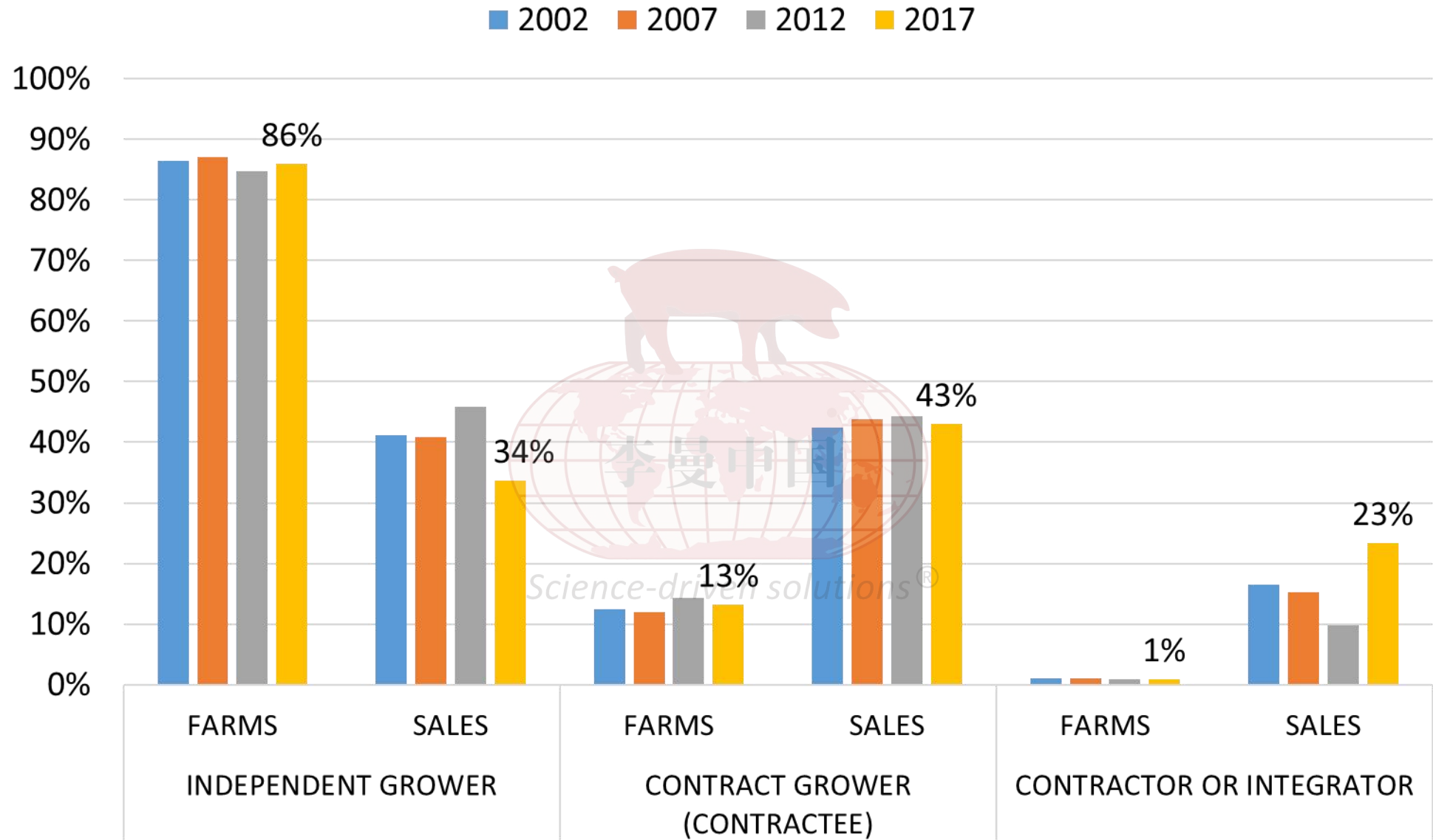
# ESTIMATED MANURE CREDIT

Farrow to Finish Production

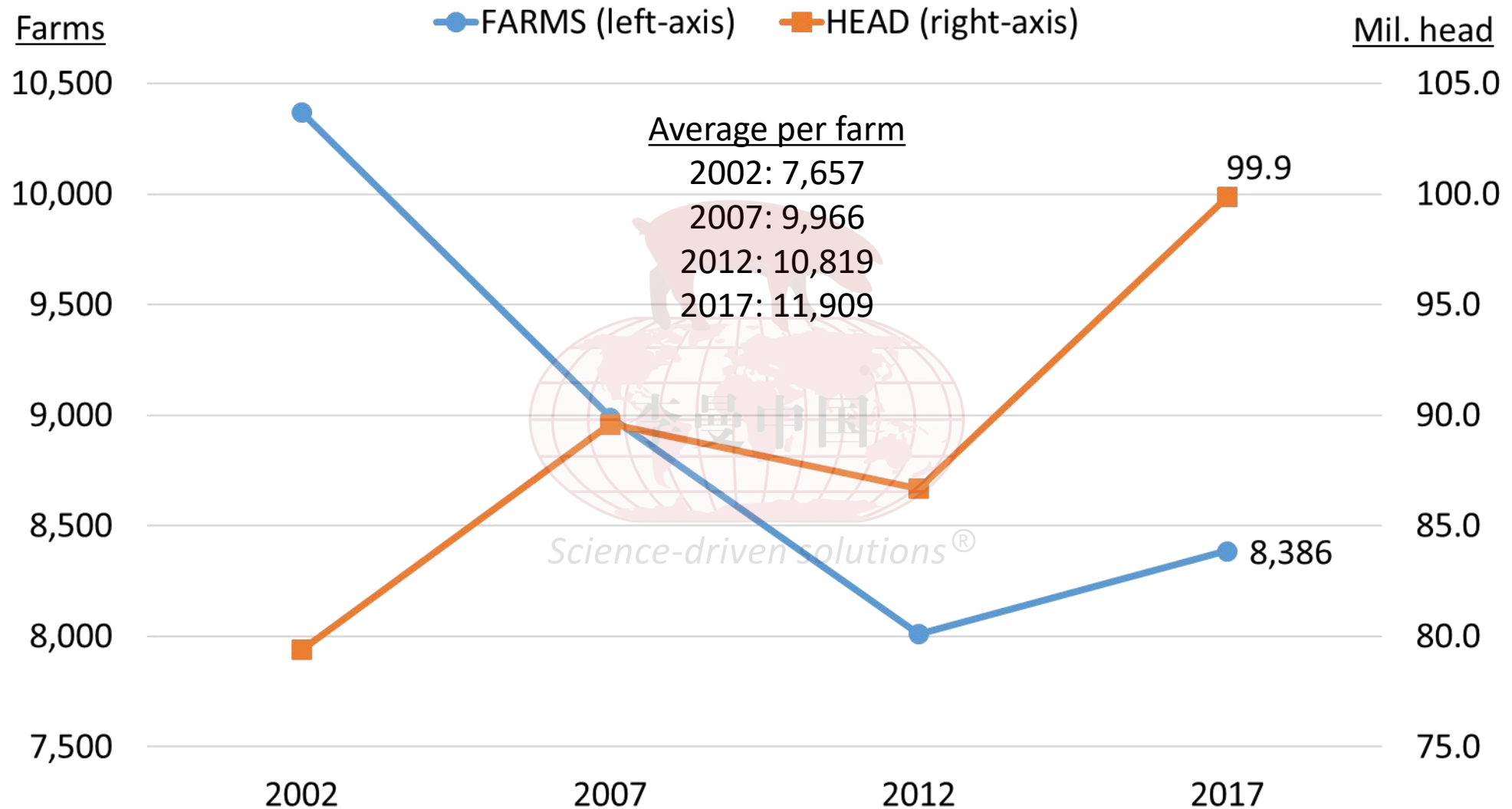
\$ per head



# FARMS AND SALES BY TYPE OF PRODUCER



# HOGS AND PIGS RAISED AND DELIVERED UNDER PRODUCTION CONTRACT





## Typology

Selected Census statistics by typology categories that group farms with similar characteristics.

Released

**Jan 22, 2021**

### FARM TYPOLOGY OF HOGS & PIGS FARMS BY GROSS CASH FARM INCOME, 2017

			Small family farms		Midsized family farms	Large family farms		Non-family farms
			GCFI less than \$150,000	GCFI \$150,000 to \$349,999	GCFI \$350,000 to \$999,999	GCFI \$1,000,000 to \$4,999,999	GCFI \$5,000,000 and more	
Hogs & pigs inventory	farms	66,439	50,879	4,245	4,783	3,186	557	2,789
	number	72,381,007	5,130,641	7,545,243	12,803,373	15,521,342	17,391,470	13,988,938
Farms with-								
1 to 24		46,475	43,454	1,164	613	152	13	1,079
25 to 49		3,759	3,208	227	134	27	2	161
50 to 99		1,889	1,418	190	147	42	-	92
100 to 199		1,220	726	198	169	43	1	83
200 to 499		1,451	501	393	357	117	1	82
500 or more		11,645	1,572	2,073	3,363	2,805	540	1,292
Hogs & pigs sold	farms	64,871	48,688	4,430	5,151	3,330	557	2,715
	number	235,282,860	14,526,848	23,824,903	35,853,120	46,673,434	59,742,460	54,662,095
	\$1,000	26,266,765	1,579,758	2,921,543	4,931,376	5,588,925	6,353,487	4,891,676



# FARM TYPOLOGY OF HOGS & PIGS FARMS BY GROSS CASH FARM INCOME, 2017

			Small family farms		Midsize family farms	Large family farms		Non-family farms
Total			GCFI less than \$150,000	GCFI \$150,000 to \$349,999	GCFI \$350,000 to \$999,999	GCFI \$1,000,000 to \$4,999,999	GCFI \$5,000,000 and more	
Hogs & pigs inventory	farms	66,439	50,879	4,245	4,783	3,186	557	2,789
	number	72,381,007	5,130,641	7,545,243	12,803,373	15,521,342	17,391,470	13,988,938
Farms with-								
1 to 24		46,475	43,454	1,164	613	152	13	1,079
25 to 49		3,759	3,208	227	134	27	2	161
50 to 99		1,889	1,418	190	147	42	-	92
100 to 199		1,220	726	198	169	43	1	83
200 to 499		1,451	501	393	357	117	1	82
500 or more		11,645	1,572	2,073	3,363	2,805	540	1,292
Hogs & pigs sold	farms	64,871	48,688	4,430	5,151	3,330	557	2,715
	number	235,282,860	14,526,848	23,824,903	35,853,120	46,673,434	59,742,460	54,662,095
	\$1,000	26,266,765	1,579,758	2,921,543	4,931,376	5,588,925	6,353,487	4,891,676

**96% of farms**  
**81% of inventory**  
**81% of sales \$**

# FARM TYPOLOGY OF HOGS & PIGS FARMS BY GROSS CASH FARM INCOME, 2017

Total			Small family farms		Midsize family farms GCFI \$350,000 to \$999,999	Large family farms		Non-family farms
			GCFI less than \$150,000	GCFI \$150,000 to \$349,999		GCFI \$1,000,000 to \$4,999,999	GCFI \$5,000,000 and more	
Hogs & pigs inventory	farms	66,439	50,879	4,245	4,783	3,186	557	2,789
	number	72,381,007	5,130,641	7,545,243	12,803,373	15,521,342	17,391,470	13,988,938
Farms with-								
1 to 24		46,475	43,454	1,164	613	152	13	1,079
25 to 49		3,759	3,208	227	134	27	2	161
50 to 99		1,889	1,418	190	147	42	-	92
100 to 199		1,220	726	198	169	43	1	83
200 to 499		1,451	501	393	357	117	1	82
500 or more		11,645	1,572	2,073	3,363	2,805	540	1,292
Hogs & pigs sold	farms	64,871	48,688	4,430	5,151	3,330	557	2,715
	number	235,282,860	14,526,848	23,824,903	35,853,120	46,673,434	59,742,460	54,662,095
	\$1,000	26,266,765	1,579,758	2,921,543	4,931,376	5,588,925	6,353,487	4,891,676

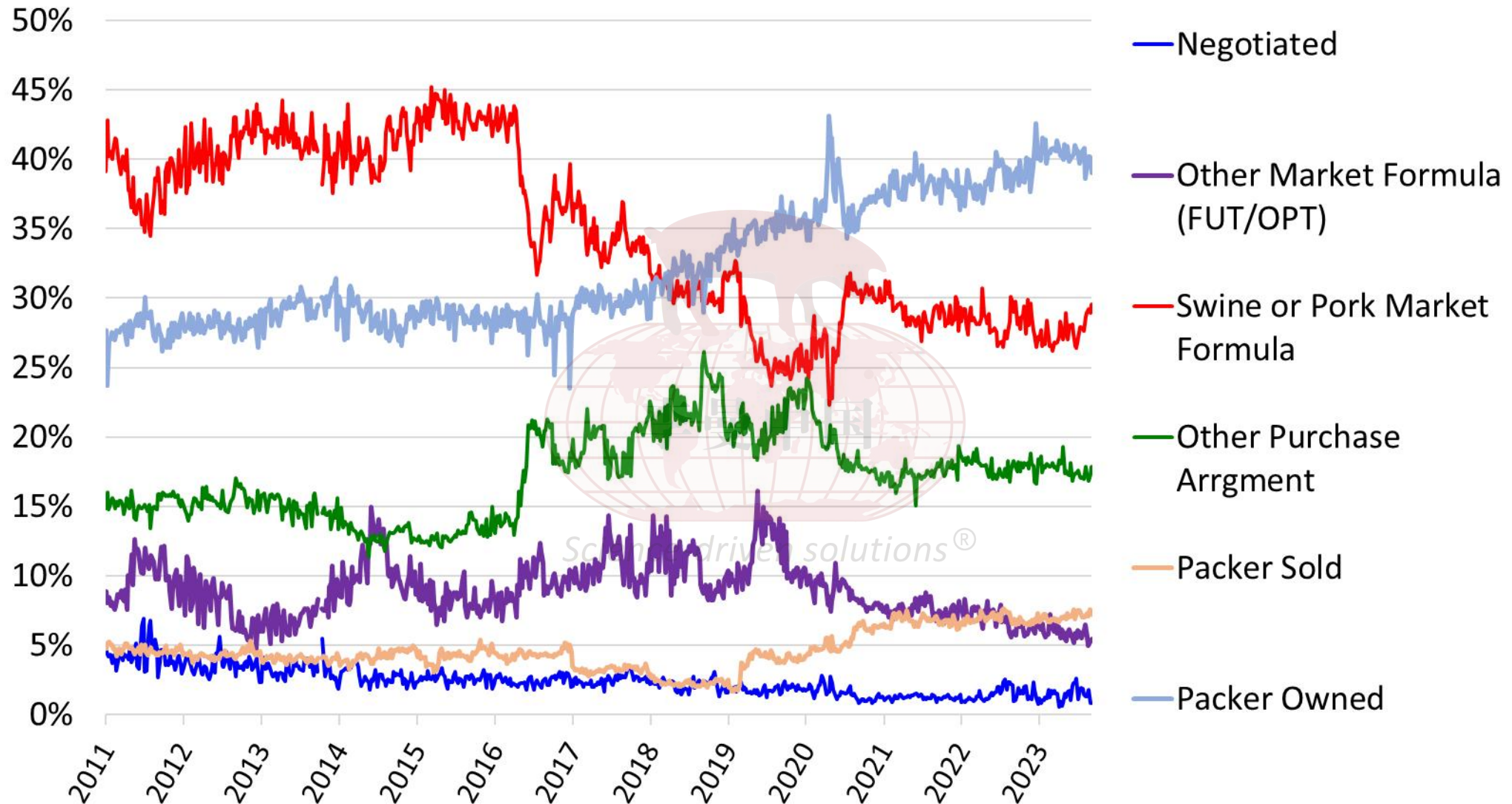
**83% of farms**  
**18% of inventory**  
**17% of sales \$**

**6% of farms**  
**45% of inventory**  
**45% of sales \$**



# NATIONAL HEAD COUNT BY PURCHASE TYPE

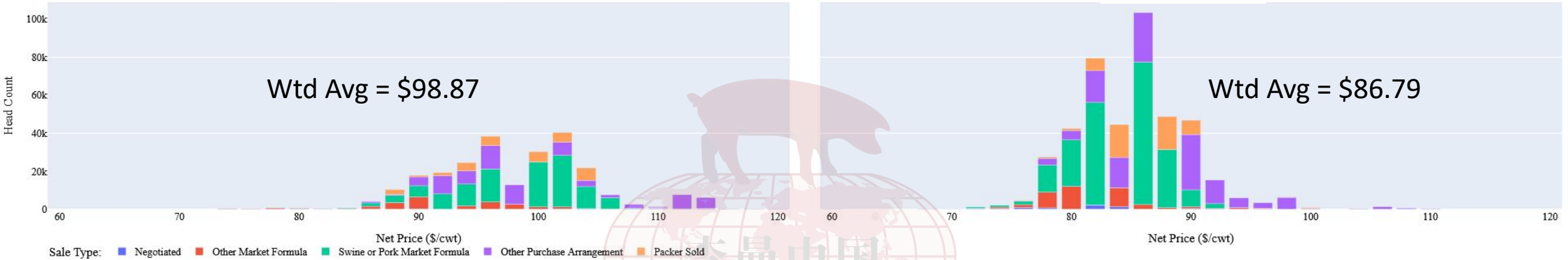
Weekly, Barrows & Gilts, Producer and Packer Sold/Owned



# CARD Hog Price and Volume Distribution Tool

[Click for instructions](#)

2022-09-08 2023-09-08



Sale Type	Head Count Sum		Wtd Avg Net Price	
	2022-09-08	2023-09-08	2022-09-08	2023-09-08
Negotiated	2,449	6,461	\$100.81	\$80.85
Other Market Formula	24,966	38,763	\$92.71	\$83.14
Swine or Pork Market Formula	118,038	213,635	\$98.97	\$86.31
Other Purchase Arrangement	74,098	126,769	\$100.72	\$89.02
Packer Sold	31,107	51,373	\$100.19	\$86.59

**Notes:** Data for this tool is derived from the USDA-AMS report *Daily Direct Hog Prior Day Net Price Distribution* (LM\_HG215). For more information and definitions of Sale Types, see [Hog Price and Volume Comparisons across Alternative Sale Types, Emphasis on COVID-19 Disruptions](#)

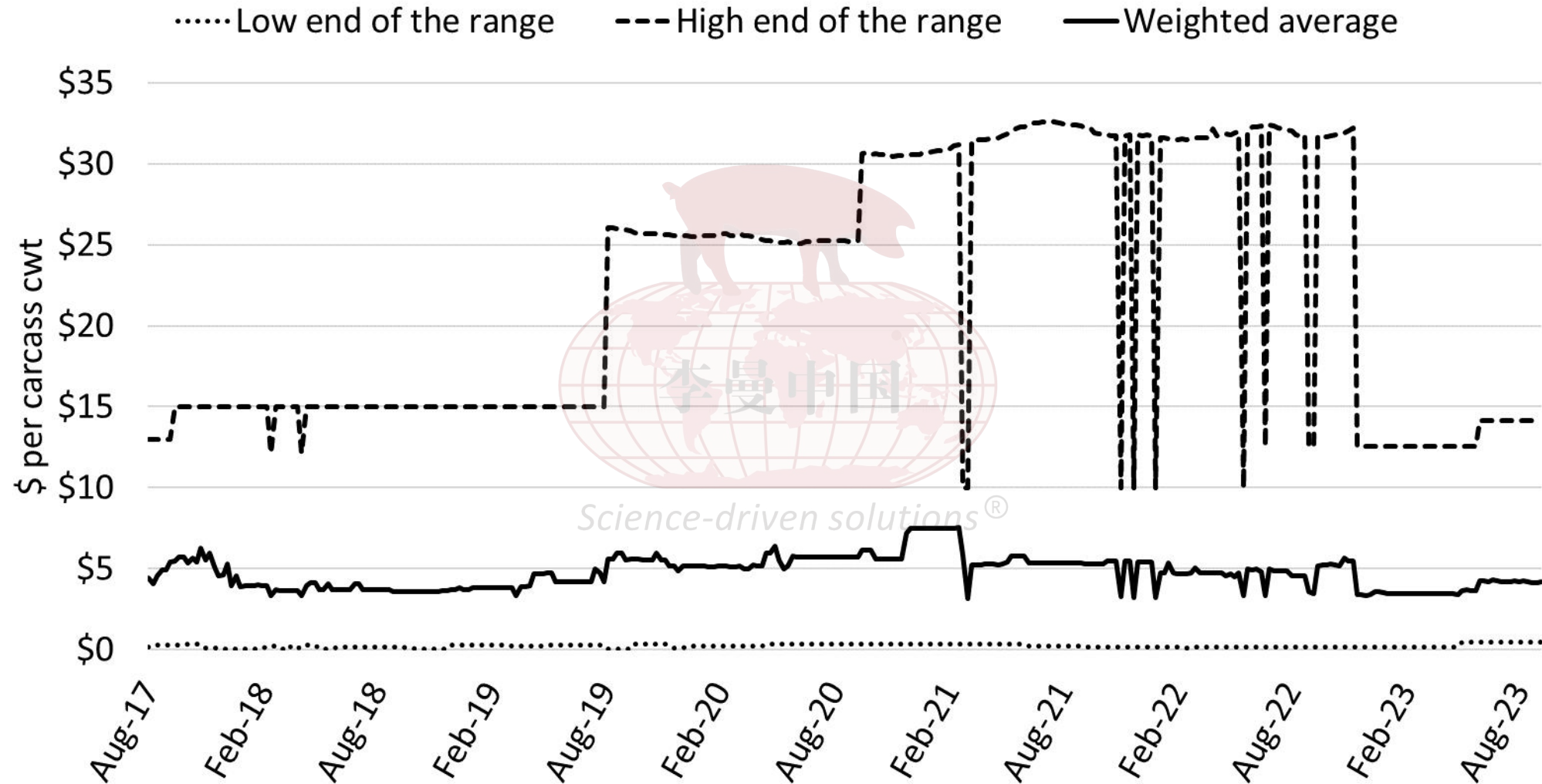
**Acknowledgement:** This work is funded by the USDA National Institute of Food and Agriculture (NIFA) Rapid Response to Novel Coronavirus (SARS-CoV-2) Impacts Across Food and Agricultural Systems Award 2020-68006-32790. The contents are solely the responsibility of the authors and do not necessarily represent the official views of the USDA or NIFA.

**Contributors:** [Ezra Butcher](#), Lee Schulz

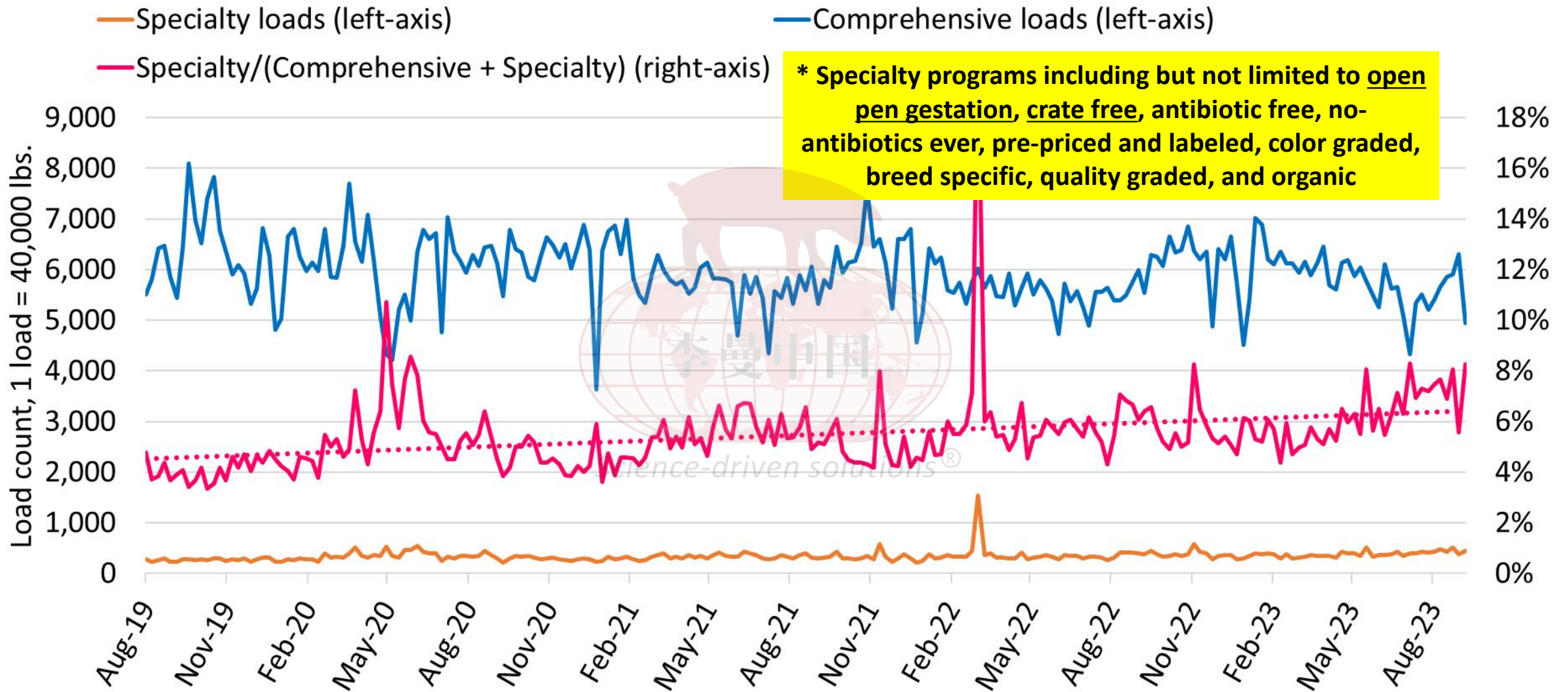


# National Weekly Direct Swine Non-Carcass Merit Premiums

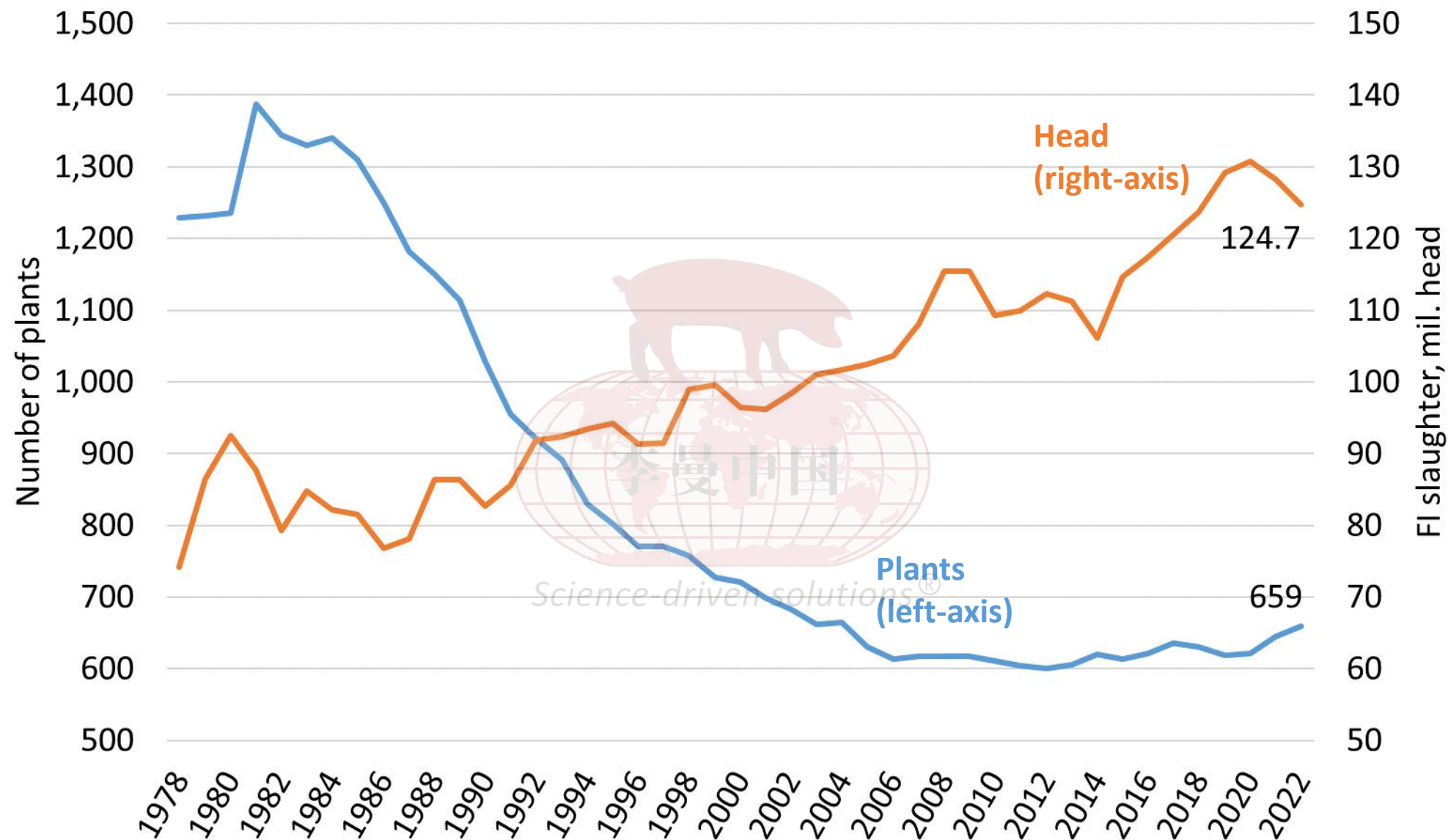
Other = Animal Welfare, Antibiotic Free, Diet/Feed, Genetics, Meat Quality,  
Process Verified Program, Sow Housing, and Weight



# Load Count of Pork Cuts, Trimmings, Processed Products, Specialty and Comprehensive, August 2, 2019 to September 8, 2023



# U.S. FI HOG SLAUGHTER—PLANTS AND HEAD SLAUGHTERED





# Hogs Federally Inspected Plants and Head Slaughtered by Size Group –United States: 2022

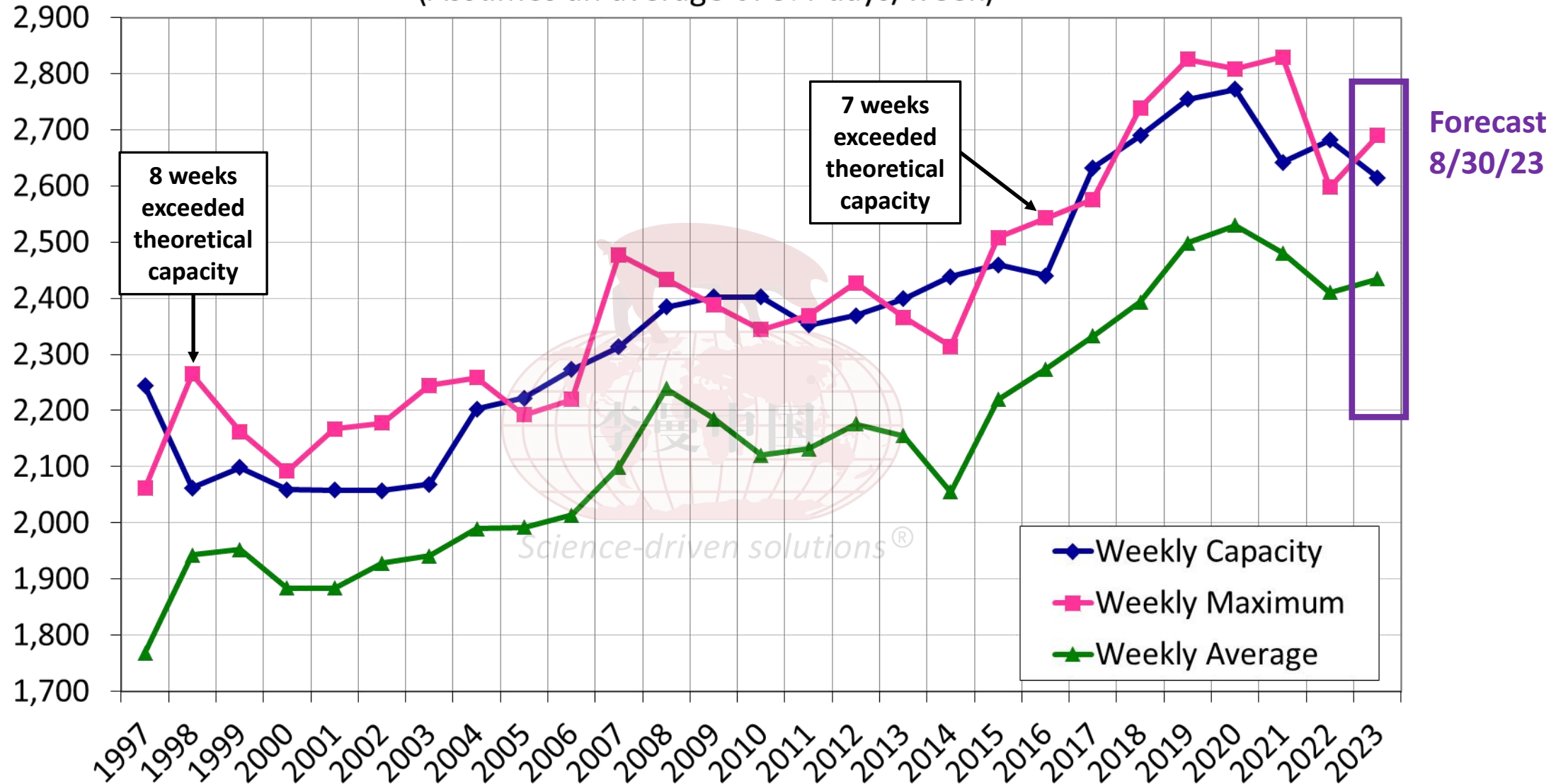
Size group	Plants		Head		Head per		
	Num.	Pct.	Thou	Pct.	Year	Week	Day
1 - 999	448	68.0%	124.2	0.1%	277	5	1
1,000 - 9,999	113	17.1%	307.6	0.2%	2,722	53	10
10,000 - 99,999	39	5.9%	1,449.1	1.2%	37,156	729	135
100,000 - 249,999	14	2.1%	2,182.4	1.8%	155,886	3,057	566
250,000 - 499,999	8	1.2%	2,740.2	2.2%	342,525	6,716	1,244
500,000 - 999,999	6	0.9%	4,486.8	3.6%	747,800	14,663	2,715
1,000,000 - 1,999,999	5	0.8%	7,479.5	6.0%	1,495,900	29,331	5,432
2,000,000 - 2,999,999	10	1.5%	25,578.8	20.5%	2,557,880	50,155	9,288
3,000,000 - 3,999,999	2	0.3%	6,407.4	5.1%	3,203,700	62,818	11,633
4,000,000 +	14	2.1%	73,917.7	59.3%	5,279,836	103,526	19,172
Total	659		124,673.6		<b>Mid-point of ranges</b> <b>51 slaughter weeks per year</b> <b>5.4 slaughter days per week</b>		



# U.S. WEEKLY HOG SLAUGHTER & CAPACITY

Thous. Head

(Assumes an average of 5.4 days/week)



## Why Sept. 5 will be an unprecedented day for U.S. pork industry

<https://www.nationalhogfarmer.com/marketing/red-letter-day-industry-red-ink-still-horizon>

The harvest capacity will grow more in one day than it has in any single year. It means room to grow for the pork industry but from what point.

Steve Meyer | Sep 04, 2017



Tuesday, Sept. 5, 2017, will be a red letter day in the history of the U.S. pork industry. The industry will see its harvest capacity grow by more on that one day than it has seen it grow and *any single year* within the memory of anyone alive today — and perhaps ever. The only reason I am not more certain of an “ever” designation is that we don’t have records of when the old plants opened in the late-1800s and early 1900s. Given those plants’ relatively small size, I think the statement is safe. The only other year that is close was 1995 when Smithfield Foods opened its mammoth plant in Tarheel, N.C. But that plant had a capacity of “just” 16,500 head per day on opening day and was not expanded to its full capacity of 32,000 per day for another three years.

## Red-letter day for industry; red ink still on horizon

Visit with your management and marketing advisers now to develop a plan to protect your business — and hopefully still allow opportunities to profit should things get better in the second half of 2019.

Steve Meyer | Mar 04, 2019



Today is another red-letter day for the U.S. pork industry. The latest slaughter plant began operations this morning in Wright County, Iowa. The Prestage Foods plant has (no more future tense for this discussion) an initial one-shift capacity of 10,000 head per day. It will operate well below that level initially, of course, as the plant and equipment are proven and workers are trained.



<https://www.nationalhogfarmer.com/marketing/why-sept-5-will-be-unprecedented-day-us-pork-industry>



# New U.S. Pork Packing Capacity

Company	Location	Fall 2016		Fall 2017		Fall 2018		Fall 2019		Fall 2020	
		Daily head	Ann head	Daily head	Ann head	Daily head	Ann head	Daily head	Ann head	Daily head	Ann head
MoonRidge Pork	Pleasant Hope, MO	2,500	637,500	2,500	637,500						
Prime Pork	Windom, MN			5,100	1,300,500	5,100	1,300,500	5,100	1,300,500	5,100	1,300,500
Seaboard Triumph Foods	Sioux City, IA			10,200	2,601,000	20,400	5,202,000	20,400	5,202,000	20,400	5,202,000
Clemens Food Group	Coldwater, MI			12,000	3,060,000	12,000	3,060,000	12,000	3,060,000	12,000	3,060,000
Prestage Foods	Wright County, IA							10,000	2,550,000	10,000	2,550,000
<b>Total</b>		2,500	637,500	29,800	7,599,000	37,500	9,562,500	47,500	12,112,500	47,500	12,112,500
<b>Head per week</b>			12,549		149,000		187,500		236,572		238,435
<b>Percent of fall '15 capacity</b>			0.6%		6.6%		8.3%		10.5%		10.5%
<b>Total daily capacity</b>		454,320		487,435		498,135		510,070		512,370	
<b>Weekly capacity @ 5.4 days</b>		2,453,328		2,632,149		2,689,929		2,754,378		2,766,798	

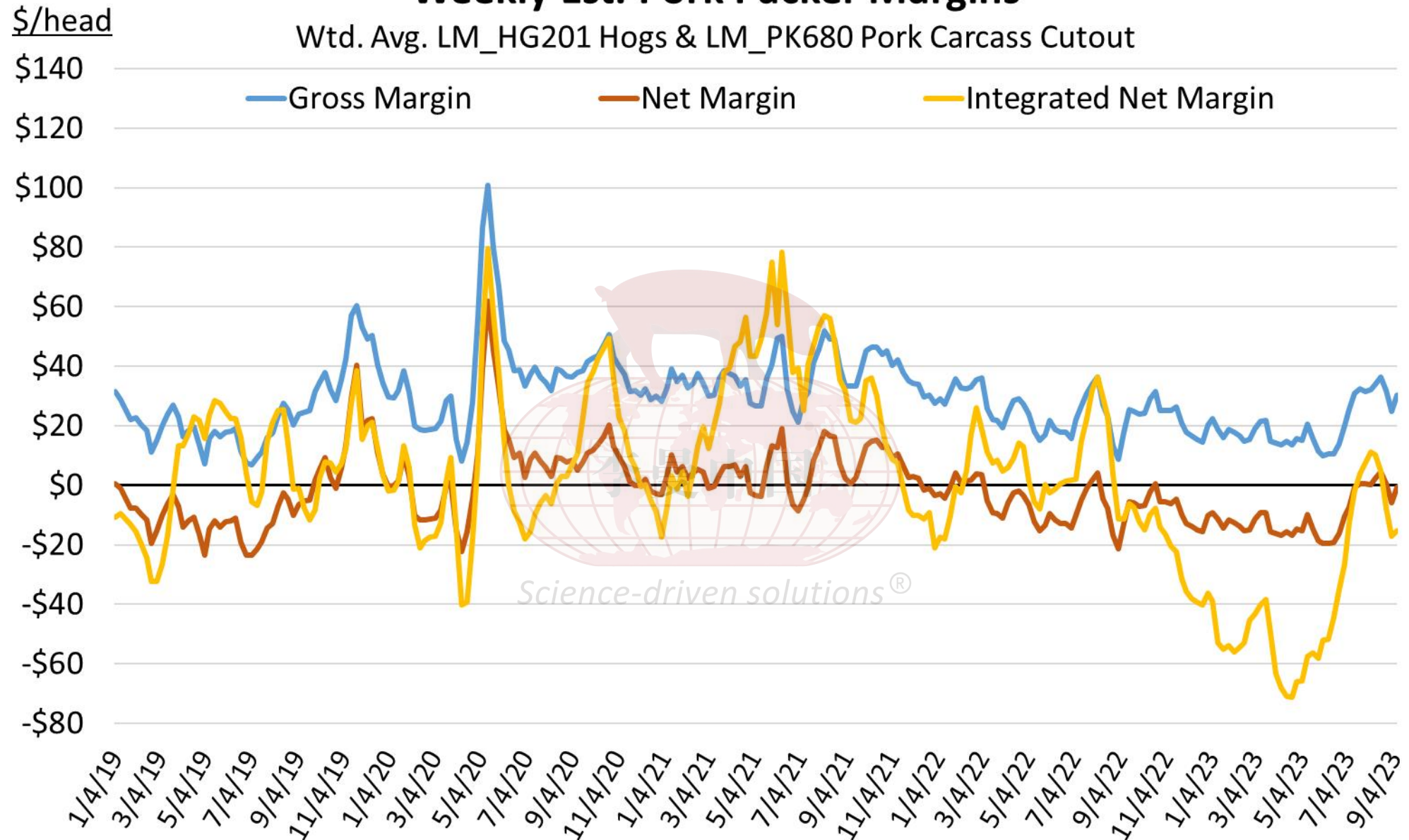
# U.S. pork packing plant closures

Location	Fall 2021		Fall 2022		Fall 2023	
	Daily Hd	Ann Hd	Daily Hd	Ann Hd	Daily Hd	Ann Hd
Gwaltney, VA	-10,400	-2,864,160	-10,400	-2,864,160	-10,400	-2,864,160
Los Angeles, CA					-7,300	-2,010,420
Windom, MN					-5,100	-1,404,540
Total	-10,400	-2,864,160	-10,400	-2,864,160	-22,800	-6,279,120
Head per week		-56,160		-56,160		-123,120
Pct. of '20 avg = 2.754 mil.		-2.0%		-2.0%		-4.5%



# Weekly Est. Pork Packer Margins

Wtd. Avg. LM\_HG201 Hogs & LM\_PK680 Pork Carcass Cutout



# WHAT DO I EXPECT FOR THE NEXT FEW YEARS?

- **A smaller sow herd given current financial losses & outlook**
  - NO growth until there is a known increase in capacity
- **A return to 1.0% – 1.5% per year growth in litter size?**
- **Some decline in aggregate litters/breeding animal?**
  - Primarily due to Prop 12 farms – no breeding crates = lower farrowing rate
- **Slower growth for exports**
  - USDA forecasts exports up 7.2% in '23 and up 1.5% in '24
- **Domestic demand – softer at present & maybe no respite!**
  - Consumers' incomes and savings are past their surge, now inflation, higher interest rates, potential economic slowdown?
- **A reshuffling (restructuring???) of the U.S. pork industry**

**WallacesFarmer.** Serving: **IA**

Lee Schulz is the Iowa State University Extension livestock economist.



LIVESTOCK

Outside forces dampen hog industry expansion

APR 18, 2023 | 7 MIN READ

<https://www.farmprogress.com/author/lee-schulz>

**ISU Livestock Crush Margins**

**Iowa State University**

**Extension and Outreach**

<http://www2.econ.iastate.edu/margins/>

**IOWA STATE UNIVERSITY**  
Extension and Outreach

**Ag Decision Maker**

An agricultural economics and business website for farm business decisions being made today

<https://www.extension.iastate.edu/agdm/>

**IOWA STATE UNIVERSITY**  
Extension and Outreach  
**Healthy People. Environments. Economies.**

**Estimated Livestock Returns**

<http://www2.econ.iastate.edu/estimated-returns/>



*A monthly barometer of livestock profitability*

**IOWA STATE UNIVERSITY**  
Extension and Outreach  
**Iowa Beef Center**

<https://www.iowabeefcenter.org/>

**IOWA STATE UNIVERSITY**  
**Department of Economics**

<https://www.econ.iastate.edu/people/lee-schulz>



*Science-driven solutions®*