Presentation of Dr. Joseph V. Balagtas at the USDA National Federal Milk Marketing Order Hearing

Zionsville, IN

December 7, 2023

Education and work history

- Professor of Agricultural Economics at Purdue University since 2004
- Director of the Center for Food Demand Analysis and Sustainability

- BA Economics, Miami University (1992)
- MS Agricultural Economics, Iowa State University (1998)
- PhD Agricultural Economics, UC Davis (2004)

- Council of Economic Advisers, White House (2019-2020)
- Fulbright Senior Scholar, IRRI (2011-12)

Research and expertise

- Conduct economic research on agricultural and food markets, with a focus on consumer behavior, competition, and public policy
  - Dozens of published papers on US and international agricultural and food markets, including US dairy markets and FMMOs
  - Multiple awards for quality of research
  - > $1 million in funding to conduct my research
  - Editorial responsibilities at top field journals
  - Current focus (with CFDAS) on consumer behavior in food markets

Task

- Hired by counsel for IDFA in August 2023 to evaluate the market effects of Proposal 19

- Conducting my analysis as a private consultant, not representing Purdue or CFDAS

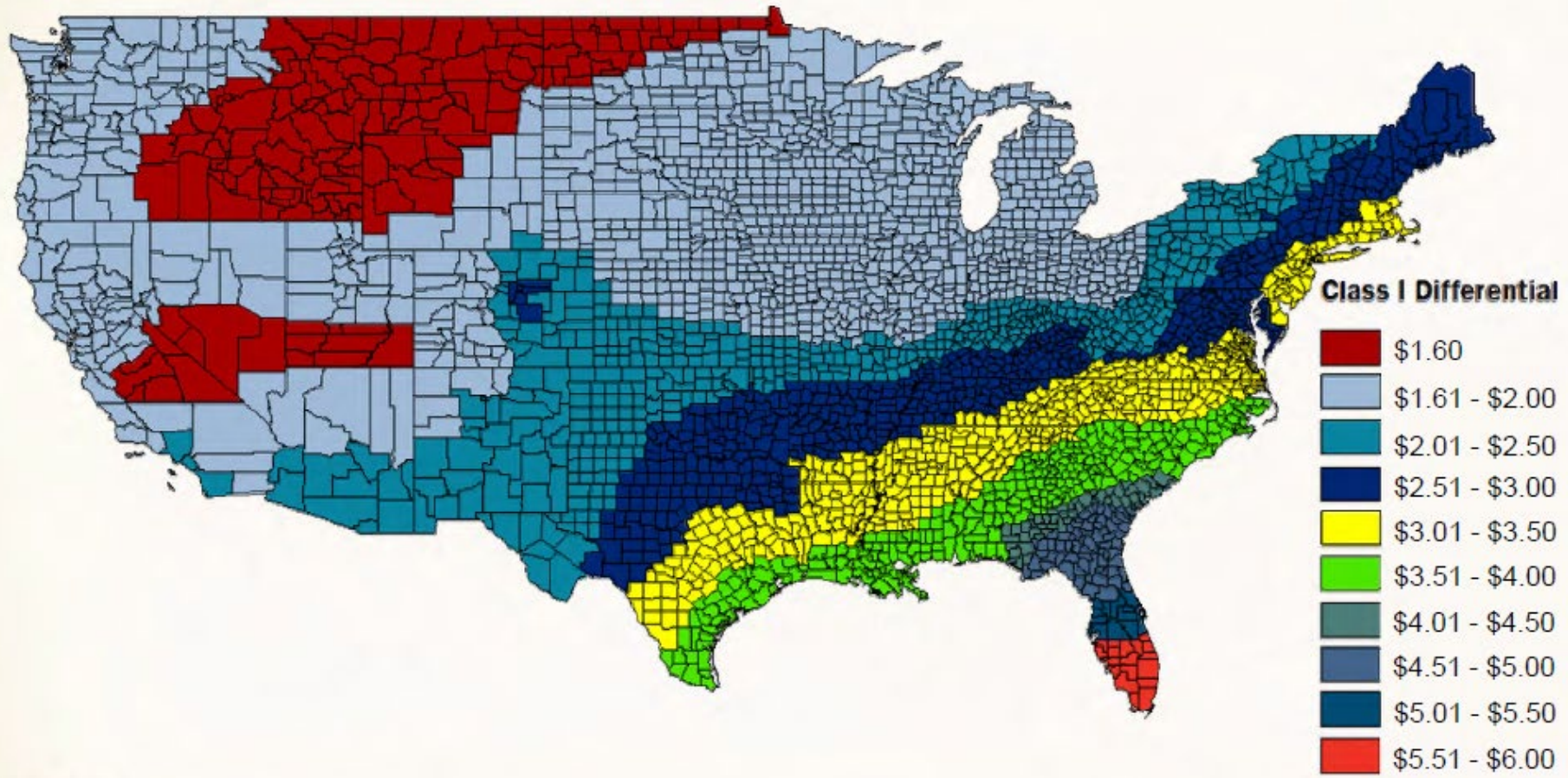
Proposal 19

- Raises Class I differentials to an average of $4.07/cwt
  - Higher in every county, ranging from $2.20 (Idaho) to $7.90 (Florida)

- Proposed increases in Class 1 differentials average $1.50
  - From $0.25/cwt to $2.70/cwt

- Relative to 2023 Average Class I Price of $19.20, the $1.50 increase in Class I differential constitutes a 7.8% increase in the Class I price

FIGURE 1: CURRENT CLASS I DIFFERENTIALS



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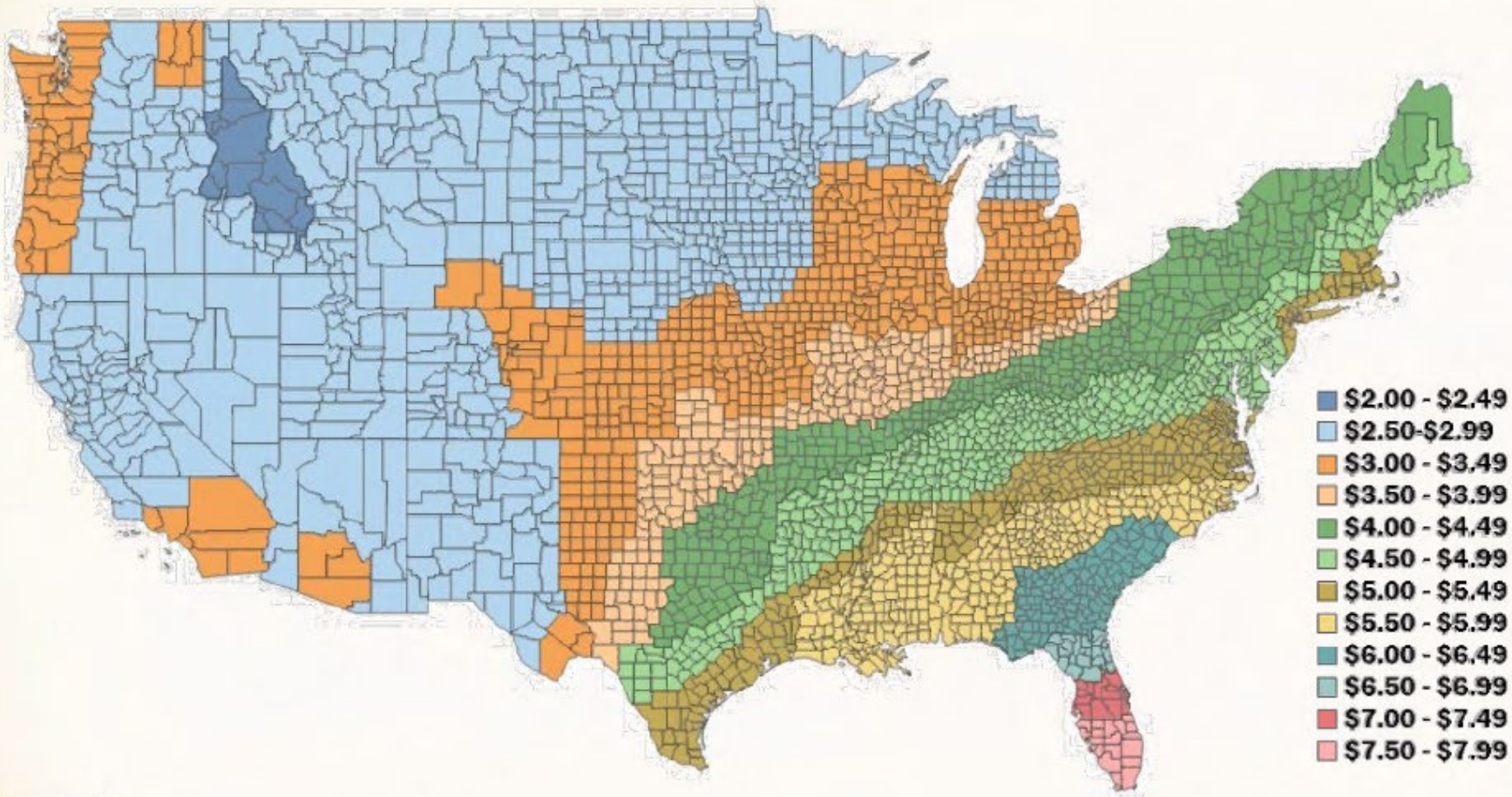
Source: USDA, AMS and Farm Bureau Compilations

FIGURE 2: NMPF PROPOSED CLASS I DIFFERENTIALS



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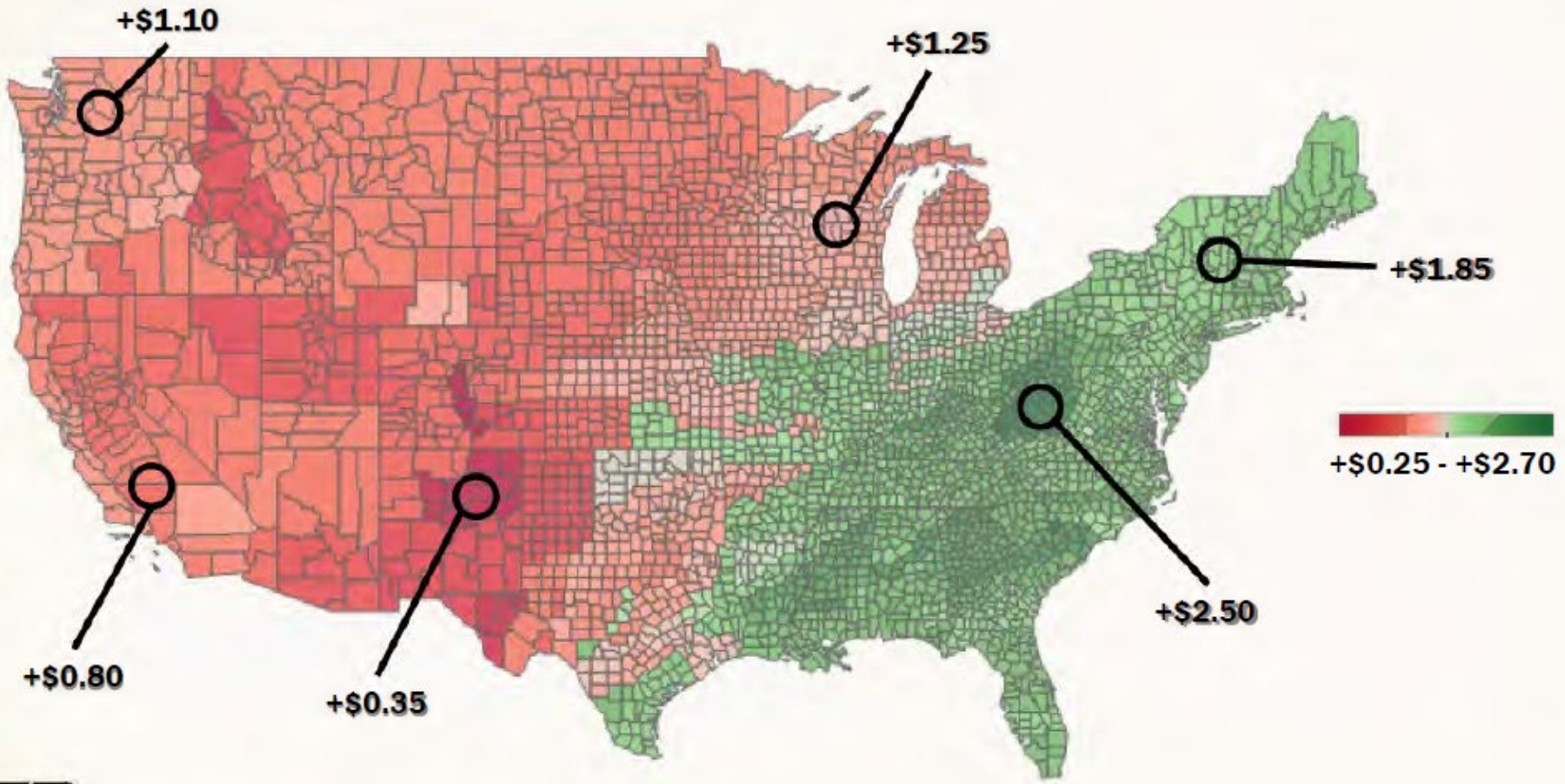
Source: National Milk Producers Federation

FIGURE 3: DIFFERENCE BETWEEN CURRENT AND NMPF PROPOSED CLASS I Differentials



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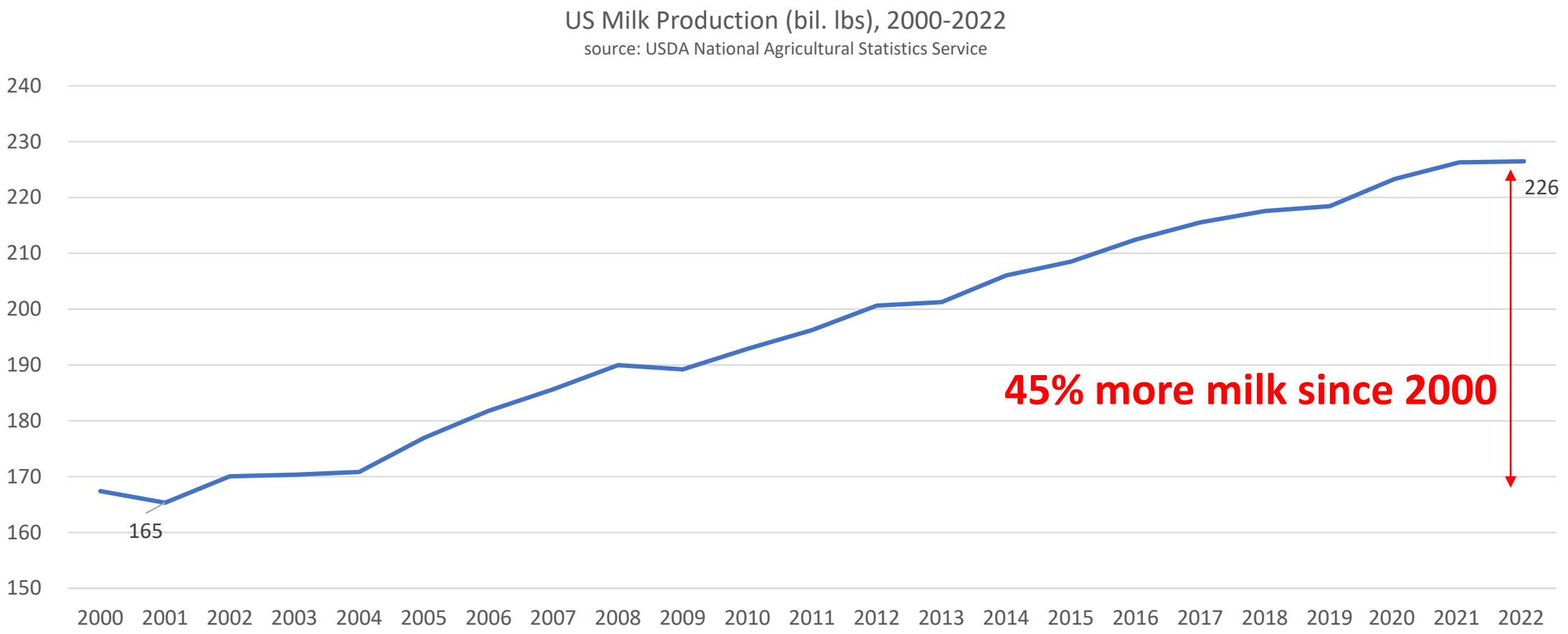
Source: National Milk Producers Federation, AFBF Compilations

Questions addressed

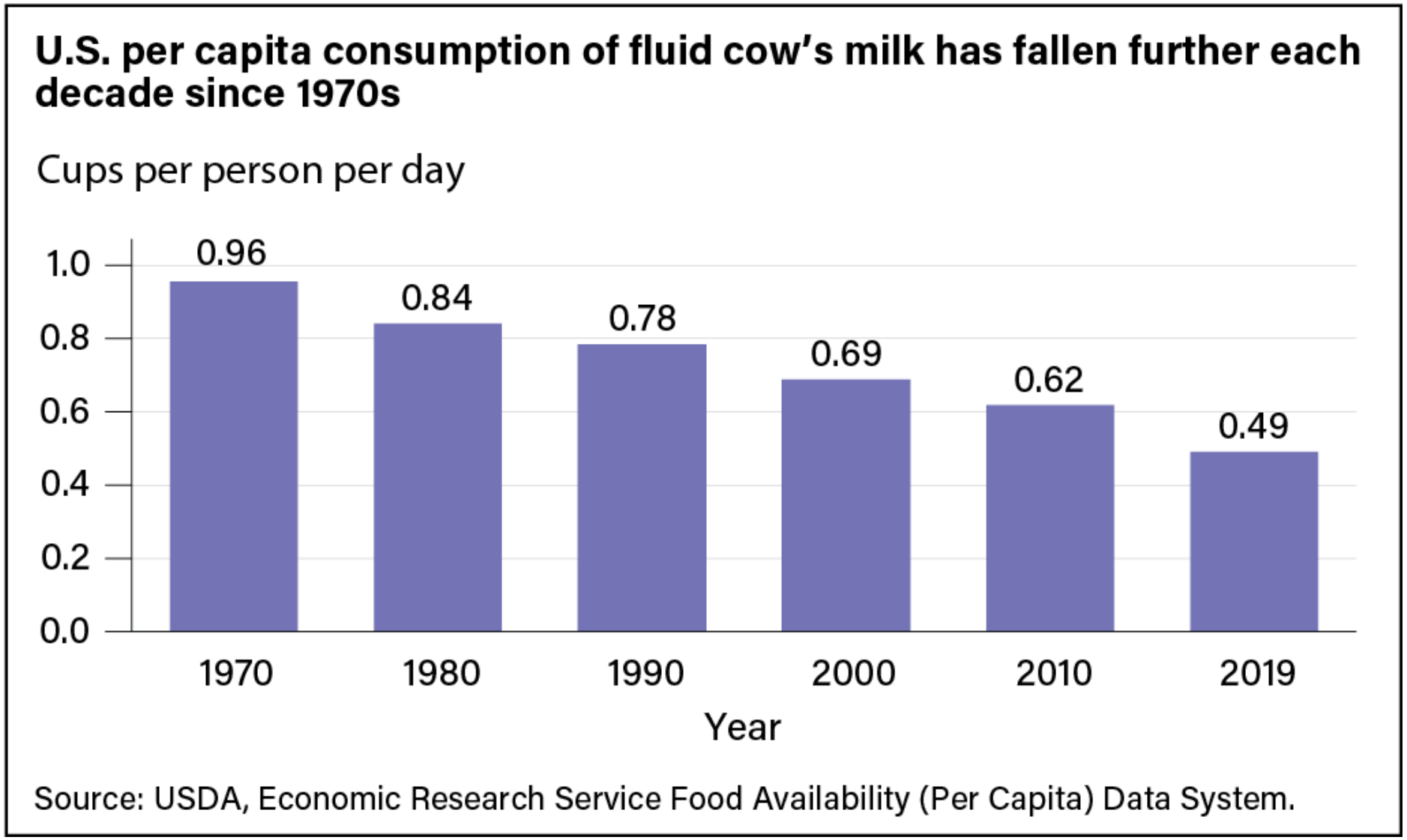
- Do changes in dairy markets since 2000 justify increases in Class I differentials?
- How would higher Class I differentials affect milk consumption, Class I utilization, and economic welfare of milk consumers?
- How would higher Class I differentials affect manufacturing markets and average farm price for milk?

Do changes in dairy markets since 2000 justify increases in Class I differentials?

Milk production growing at avg annual rate of 1.8% since 2000



Fluid Milk Consumption is Falling



10% Reduction in Producer Milk in Class I since 2001

Class I Milk (million pounds)			
Marketing Order Region	2001	2022	% Change
Appalachian	4,352	3,818	-12.27
Central	4,881	4,363	-10.61
Florida	2,492	2,061	-17.30
Mideast	6,633	6,211	-6.36
Northeast	10,642	7,963	-25.17
Pacific Northwest	2,098	1,622	-22.69
Southeast	4,805	2,833	-41.04
Southwest	4,029	3,864	-4.10
Upper Midwest	4,092	2,192	-46.43
All Markets Combined	45,887	40,986	-10.68

30% Reduction in Share of Producer Milk in Class I since 2001

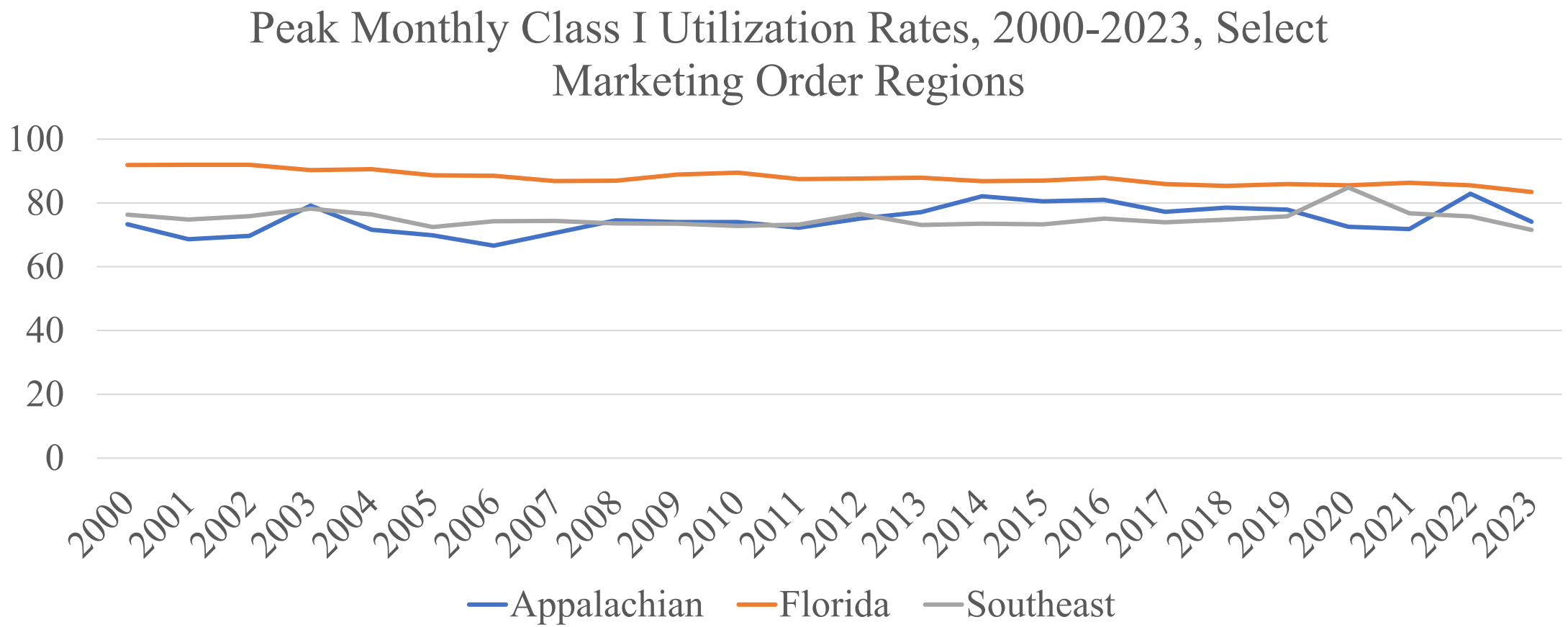
Class I Utilization (%)			
Marketing Order Region	2001	2022	% Change
Appalachian	65.22	70.43	7.99
Central	27.37	27.90	1.94
Florida	89.90	83.01	-7.66
Mideast	38.50	36.98	-3.95
Northeast	43.34	29.62	-31.66
Pacific Northwest	29.60	21.40	-27.70
Southeast	61.85	72.40	17.06
Southwest	46.83	28.17	-39.85
Upper Midwest	17.47	6.88	-60.62
All Markets Combined	38.17	27.03	-29.19

Changes in Class I Utilization Rates

- In 6 of 9 FMMO regions shown here, Class I utilization rates have fallen since 2001
  - I take this as evidence that in these regions, there is more than adequate supply of milk for fluid uses

- In 3 of 9 FMMO regions shown here, Class I utilization rates have risen since 2001 (Appalachian, Central, and Southeast)
  - Suggests potential that market conditions have changed so that supply is inadequate for fluid uses
  - I look at additional data to evaluate

Peak Monthly Class I Utilization Rates are Not Trending Higher



High Class I Utilization Has Not Resulted in Higher Retail Milk Prices

	2019	2020	2021	2022	2023
	(US$/gallon)				
30-City Average	3.25	3.47	3.62	4.21	4.29
75th Percentile	3.75	3.85	4.02	4.61	4.59
Atlanta, GA (Southeast)	3.56	3.37	3.45	4.07	4.42
Louisville, KY (Appalachian)	2.07	2.38	2.70	2.53	2.81
Miami, FL (Florida)	3.91	3.83	3.60	4.34	4.21

Higher Class I Differentials are Not Justified on the Basis of Inadequate Supply of Milk for Fluid Uses

- Growing milk production nationally and in most regions
- Declining milk consumption, Class I milk, and Class I utilization
- Rising Class I utilization rates in Appalachian, Central, and Southeast Orders
  - Utilization rates have not risen since 2000
  - Higher utilization rates have not caused high retail milk prices

Demand for Fluid Milk and the Effect of Higher Class I Prices on Milk Consumption

- Higher Class I prices cause higher retail prices of fluid milk products

- Consumers respond to higher prices by reducing consumption, an effect quantified by the own-price elasticity of demand for milk

Elasticity of demand = (% change in quantity consumed)/(% change in price)

- Proposal 19 would contribute to declining milk consumption. Magnitude of this effect depends on the elasticity of milk demand.

So what is the elasticity of demand for milk?

- Specifically, to evaluate the effects of Proposal 19, we need to know how consumers will respond to higher retail milk prices.

- Large body of work estimating demand for fluid milk in the U.S. dating back ~60 years
  - Typically find demand is inelastic: (elasticity less than 1.0 in absolute value)
  - Consumers reduce consumption less than proportionally in response to higher prices

- Implies FMMOs increase farm revenue of milk
  - When demand is inelastic, an increase in the price causes an increase in revenue

We need an elasticity of demand that captures behavior of consumers in current/future markets

- Studies using data from the middle or late 20th century likely do not capture relevant behavior and market conditions

- Consumers drinking less milk

- Growth of nondairy substitutes
  - Mintel Group: Nondairy milk accounted for 17% of all milk sales in 2022, up 67% since 2017
  - Son and Lusk (Nielsen data): Nondairy share of milk expenditure 12.5% in 2022

The effect of substitutes on demand elasticity

- A main driver of consumer response to higher prices is the substitution effect
  - When there are close substitutes for a good, consumers respond to higher prices of that good by switching to the close substitute
  - Thus, the presence of more substitutes in the market lead to greater consumer response to prices: aka more elastic demand

- Growing competition within the dairy aisle and across the beverage category means that demand for milk is likely more elastic today than it was even 10 years ago
  - Demand studies using data that do not capture these market realities are not relevant for analyzing Proposal 19 which would be implemented in current markets

What do recent milk demand studies find?

- Capps Jr. (2023): milk demand elasticity = -1.26
- Ghazaryan, et al. (2023): milk demand elasticity = (-1.3, -1.7)
- Son and Lusk (2023): milk demand elasticity = -0.946

Implications of More Elastic Demand for Milk

- Compared to previous literature (Kaiser's median: -0.196), recent work suggests demand in current market is more elastic

- Proposal 19 would reduce milk consumption by than more than what is suggested by previous estimates.
  - Proposal 19 would make a bigger contribution to declining milk consumption
  - Proposal 19 has bigger implications for manufacturing class milk

Effect of Proposal 19 on Fluid Milk Consumption

- Prop. 19 raises Class I prices by 8.7% ($1.50/$19.20)

- That translates to a 4.3% increase in retail milk prices
  - Applying Kaiser's price transmission elasticity of 0.55

- That translates to a 5.4% reduction in consumption of fluid products
  - Applying Capps, Jr.'s demand elasticity of -1.26

Proposal 19 Harms Fluid Consumers

- By causing higher retail prices, Proposal 19 makes milk consumers worse off. As a measure of that cost, I use the change in consumer surplus (approximately equal to the change in consumer expenditure)

- Using Capps, Jr.'s Circana data ($4.95/gallon, 56.9 mil. gal./week), harm to consumers is $11.8 million per week.
- Assuming Capps, Jr.'s data applies to untracked retail (12%), harm to consumers is $14 million per week.
- Assuming Capps, Jr.'s data applies to food service (24%), harm to consumers is $18.4 million per week.

Diversion of Class I Milk to Manufacturing

- By reducing milk used in Class I, Proposal 19 diverts milk to manufacturing uses
- Increased supply of milk to manufacturing uses results in increased production of manufactured dairy products, reduced prices of those dairy commodities, and lower prices of milk components
- I quantify these effects

A 5.4% reduction in Class I milk

- In 2022, producer milk used in Class I was 41 bil. lbs. So 5.4% reduction in Class I milk is 2.2 bil. lbs.

- Where will that milk get absorbed? I assume all of that milk is used in butter/powder production (Class IV)
  - 201 mil. lbs. NFDM (+7.6% annually)
  - 62.9 mil. lbs. butter (+3.1% annually)

- Effect of increased production on commodity prices depends on demand elasticities. In the absence of relevant demand elasticities, I report effects for a wide range of elasticity values.

Effects of a 7.6%-increase in NFDM and 3.1%-increase in Butter Production under Alternative Demand Elasticity Scenarios

	Elasticity Scenarios		
	More Inelastic	Mid-range	More Elastic
Elasticity of demand for US NFMD	-4.0	-8	-10.0
Elasticity of demand for US Butter	-0.25	-0.6	-1.0
Change in NFDM price	-1.9%	-0.95%	-0.76%
Change in Butter price	-12.23%	-5.09%	-3.06%
Change in FMMO skim price	-$0.20/lb	-$0.10/lb	-$0.08/lb
Change in FMMO butterfat price	-$0.385/lb	-$0.1589/lb	-$0.0954/lb
Net change in All Milk Price	-$0.28/cwt	$0.03/cwt	$0.12/cwt

Effects of Proposal 19 on the Dairy Sector

- Increased Class I Revenue + Decreased Manufacturing Milk Revenue
  - Uncertainty about the sign of the net effect

- “Modest” effect on All Milk Price masks big changes within the sector
  - Harm to fluid milk consumers
  - Disruption to manufacturing milk market