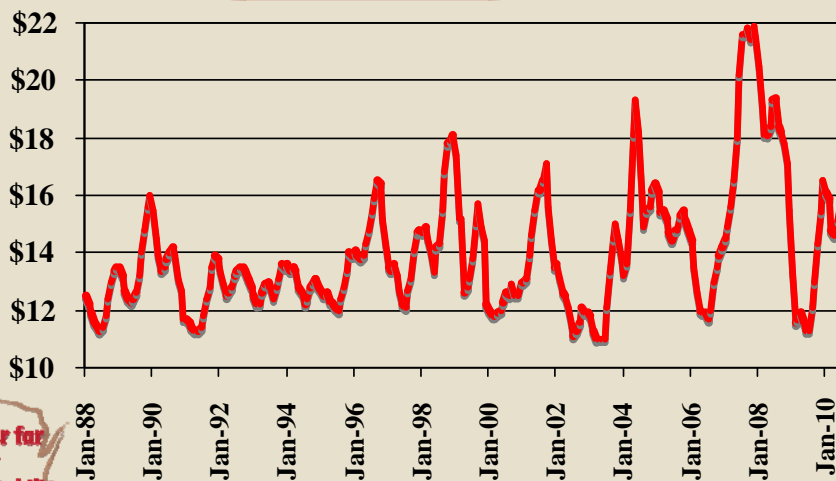


Addressing Price Volatility

Mark Stephenson, PhD
Director of Dairy Policy Analysis
University of Wisconsin–Madison



U.S. All-Milk Price

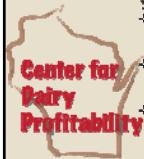
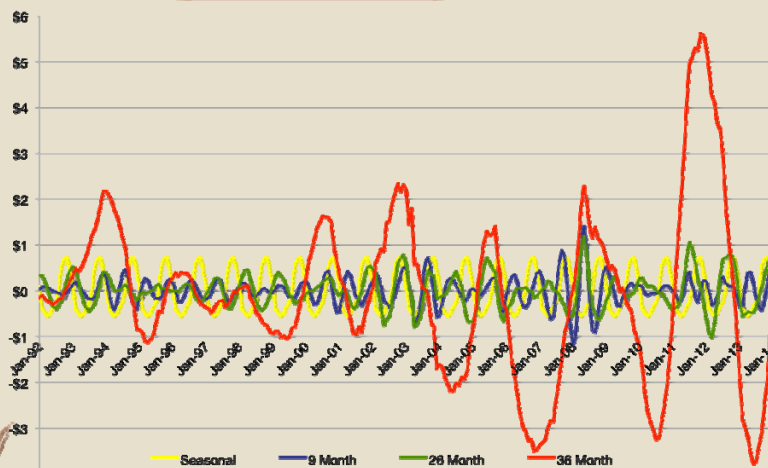


Just to Remind You:

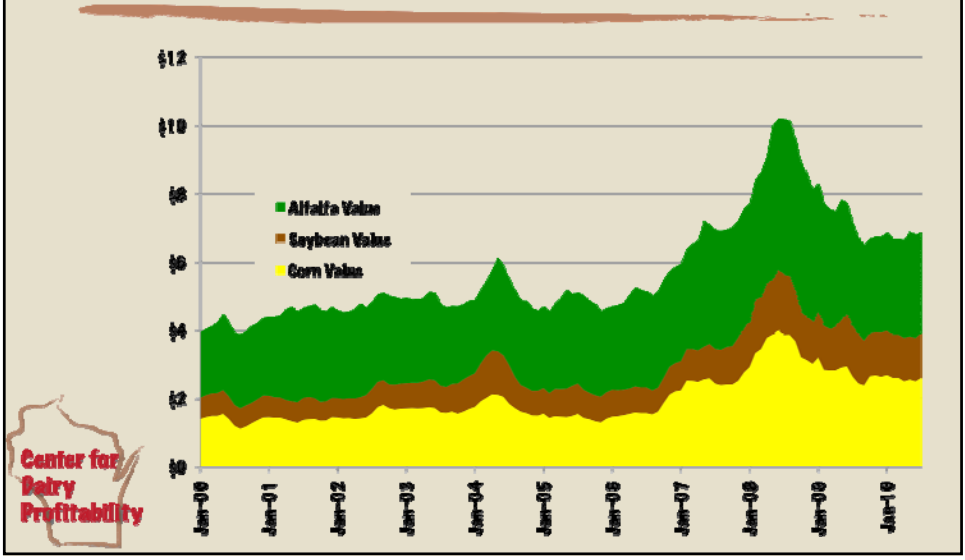
- There are two sources of milk price volatility:
 - Endemic
 - External Shocks
- Need to look at the ability of policy to handle both types



There is Order Within the Chaos



Supply Shock



Demand Shock



Policies to Address Volatility

- Producer groups have been looking at policies to manage volatility for several years now. Several programs have been suggested—a few have gained some traction.
 - The Costa-Sanders bill(s)
 - NMPF's Foundation for the Future
 - Marginal Milk Pricing
 - Others



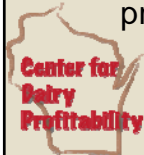
Foundation for the Future

- New Safety Net
 - Get rid of Milk Income Loss Contracts
 - Get rid of Dairy Product Price Support Program
 - Replace with Margin Protection Program
- Federal Milk Marketing Order Reform
- Dairy Market Stabilization Program
 - Rolling 3-month base
 - Use Margin triggers
 - No payment for a portion over base
 - Money from penalty milk used on demand programs



Marginal Milk Pricing

- Margin-based trigger at \$7 / cwt for 2 consecutive months
- Production base is any 3 consecutive months in the past year
- Require reduction of 1% for each \$1 below trigger
- Farms only paid difference between all milk price and class III price for penalty milk
- Money from penalty milk used on demand enhancing programs



Costa-Sanders Bills

- Production base is same quarter from previous year
- Milk / Feed price ratio is trigger
- Various levels of allowed growth from base depending on trigger value
- Can exceed growth limit by paying a Market Access Fee also based on Milk /Feed trigger
- Collected Market Access Fees paid back to producers who didn't exceed allowable growth limits



Key Plan Differences

	FFTF	MMP	C/S
Safety Net	Replace MILC & DPPSP with margin insurance	Keep MILC & DPPSP	Keep MILC & DPPSP
Price Discovery	Reform FMMO programs	No Change to FMMO	No Change to FMMO
Supply Mangt.	No payment on % of milk when trigger is met	Reduced payment on % of milk	Allowable growth % with MAF
Use of Funds	Purchase / give away, etc.	Purchase / give away, etc.	Redistributed to Producers



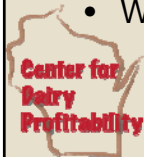
Model Basics

- “System Dynamics” modeling approach
 - Stock-Flow-Feedback structure
 - System of differential equations
 - Model decision point behaviors
- Monthly model, time horizon 2009-2018
 - Implement programs in 2012
- National-level (aggregated US) model
 - No regional impacts directly assessed



Dairy Products in Model

- Fluid milk (I)
- Yogurt (II)
- Frozen desserts (II)
- Cottage cheese (II)
- American cheese (III)
- Other cheese (III)
- Fluid whey
- Separated whey
- Whey cream
- Dry whey (III)
- WPC34/35
- WPC80+
- Other Whey (lactose)
- Butter (IV)
- NDM (IV)
- Condensed skim
- Other ECD
- Casein/MPC (limited)



Policy Structure

- Federal Milk Marketing Orders
 - FMMO pricing formulas
 - 10% of cheese milk assumed not pooled
- Dairy Price Support Program included
 - Purchase prices less additional costs
 - Government inventories and buybacks possible
- MILC program with production caps
- Trade policy for “tradable” products
 - TRQ and export subsidies structure included



Trade Structure

- Tradable Products (categories)
 - Cheeses, whey products, NDM, Butter, “Other ECD”, Yogurt, Ice Cream
 - Basically, all except fluid and cottage cheese
- Bi-directional flows allowed
 - This is the reality, based on data definitions
 - Allows one to look at “net exports” (imports)
 - Use annual data as base (2009, previous)
- Ad valorem and unit tariffs, TRQ and over-quota in separate categories



Trade Structure

- Trade responds to relative changes in US and world prices
 - Increased US price decreases exports, increases imports
- Not a complete modeling of other countries
 - Modeled as “Rest of World”
 - ROW has milk supply and reacts to prices
 - ROW has dairy product demand and also reacts to prices



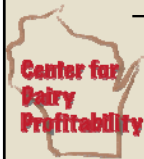
Components Balance

- Model explicitly balances components
 - For a given average raw milk composition, can determine product compositions and yields
 - Allocation of skim and cream is central
- Assume fixed proportions
 - Constant composition of milk and products
 - Use of intermediate inputs
 - Some substitution
 - For example, if MPC will be substituted into cheese vats in place of NFDM if prices are right.



Enterprise Accounting

- Margins are assumed for an “enterprise”
 - Fluid milk margins separate from ice cream margins, even if many companies make both
- Most important in cheese: margins for cheese separate from whey products
 - Could be combined or weighted
- FMMO obligations also calculated this way
 - Based on component usage (butterfat, skim)



Milk Allocation & Premiums

- Butter and NDM are assumed to be residual users of cream and skim milk
 - All other users get what they need to meet current demands
 - All remaining must be processed into butter and NDM
- Over-order premiums depend on balance of raw milk supply and demand
 - Decrease if milk supplies loosen up
 - Increase if milk supplies are tight

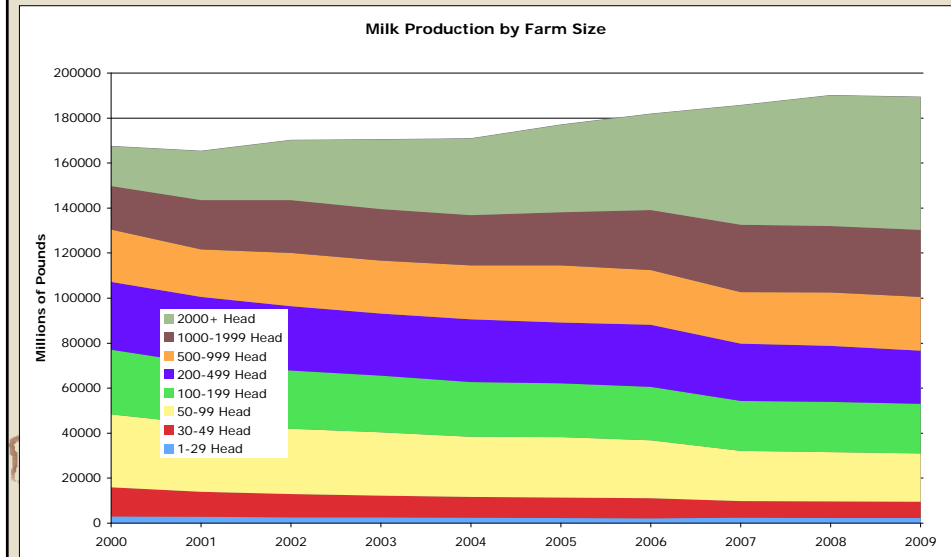


Farm Accounting

- 4 farm size categories
- Farm numbers
- Exits & expansions
- Capital & debt tracking
- Cows and milk per cow
- Variable costs
- Net Farm Operating Income



NASS Farm Size Categories



2009 Herd Size Profile

Herd Size	Number of Herds	Average herd size	Milk per Cow	Total Milk Production	Percent of Total Milk
1-99 COWS	49,200	37	17,129	31,048	16.40%
100-499 COWS	12,450	183	20,076	45,626	24.10%
500-1999 COWS	2,610	910	22,570	53,578	28.30%
2000 > COWS	740	3705	21,543	59,068	31.20%

Producer Decisions

- Production decisions are made based on Net Farm Operating Income
- Economies of scale are achieved at larger herd sizes
- Milk per cow can be increased in short-run
- Total cows can be increased in long-run
- Culling rates can be changed immediately
- Ramp up the use of sexed semen over a 5 year period



Example of Market Effects

Whey protein product promotion and farm milk prices

Promotional
Activities

Demand for High
Protein Whey
Products

Promotion increases the
demand for whey products



Example of Market Effects



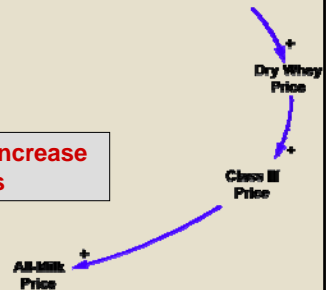
Demand for whey solids tightens whey product markets



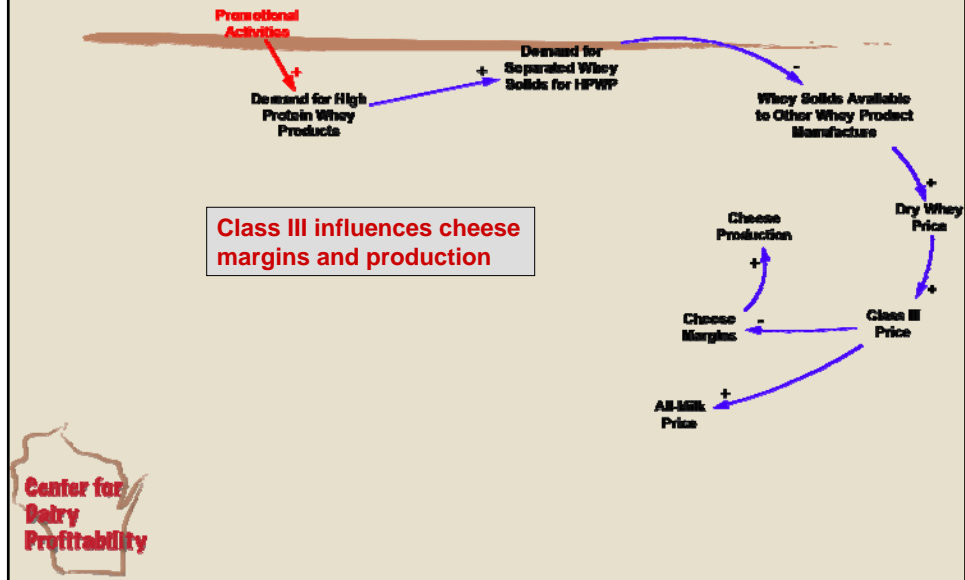
Example of Market Effects



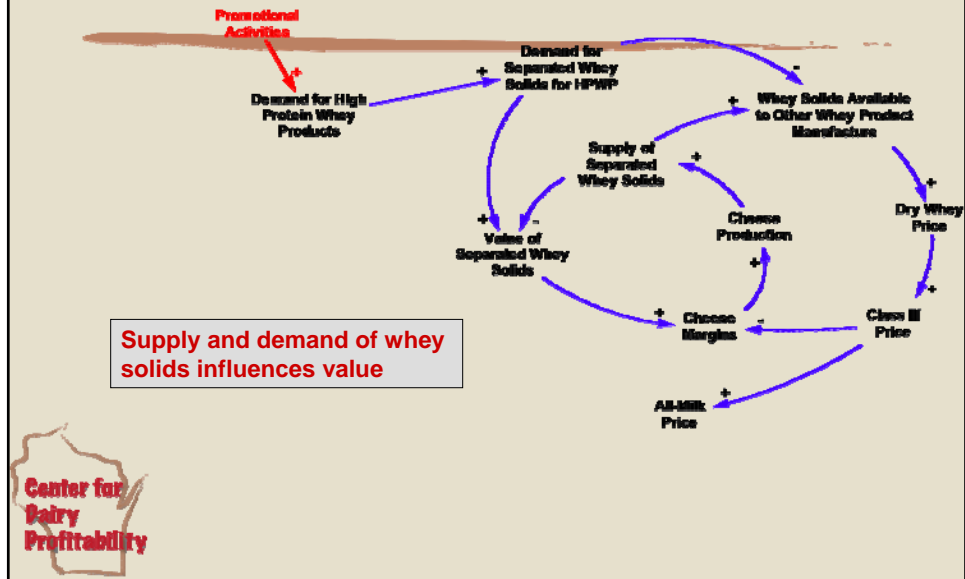
Stronger dry whey prices increase Class III and All-Milk prices



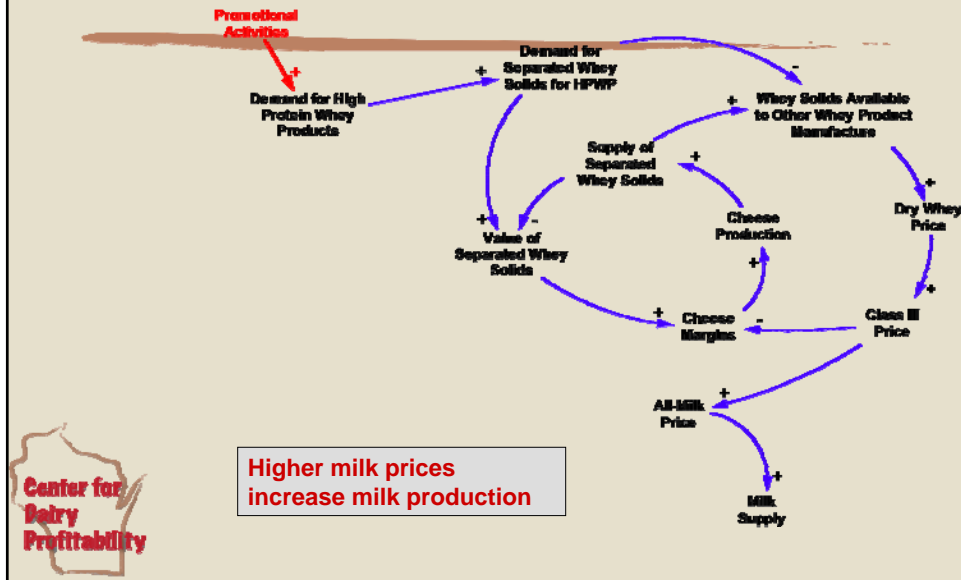
Example of Market Effects



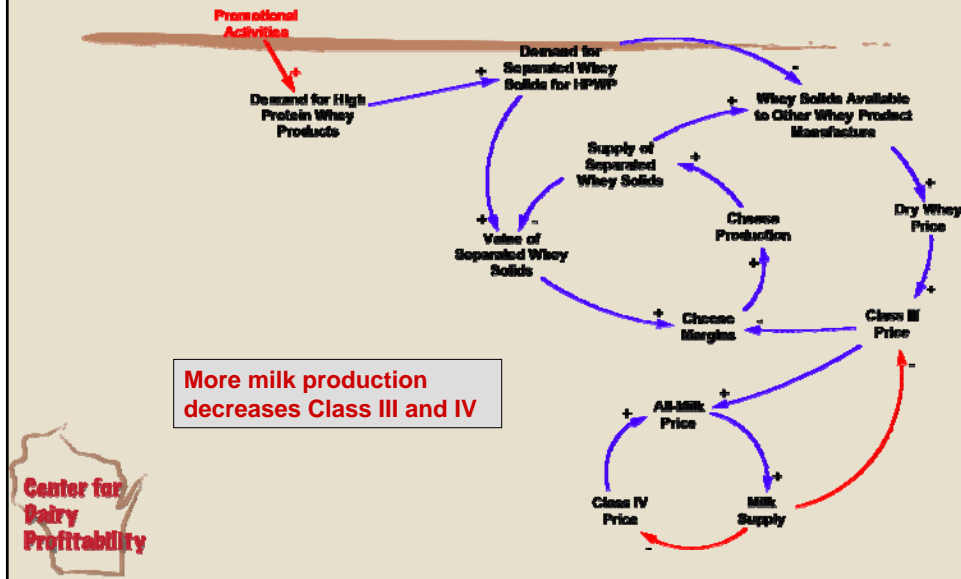
Example of Market Effects



Example of Market Effects



Example of Market Effects



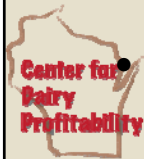
Key Questions

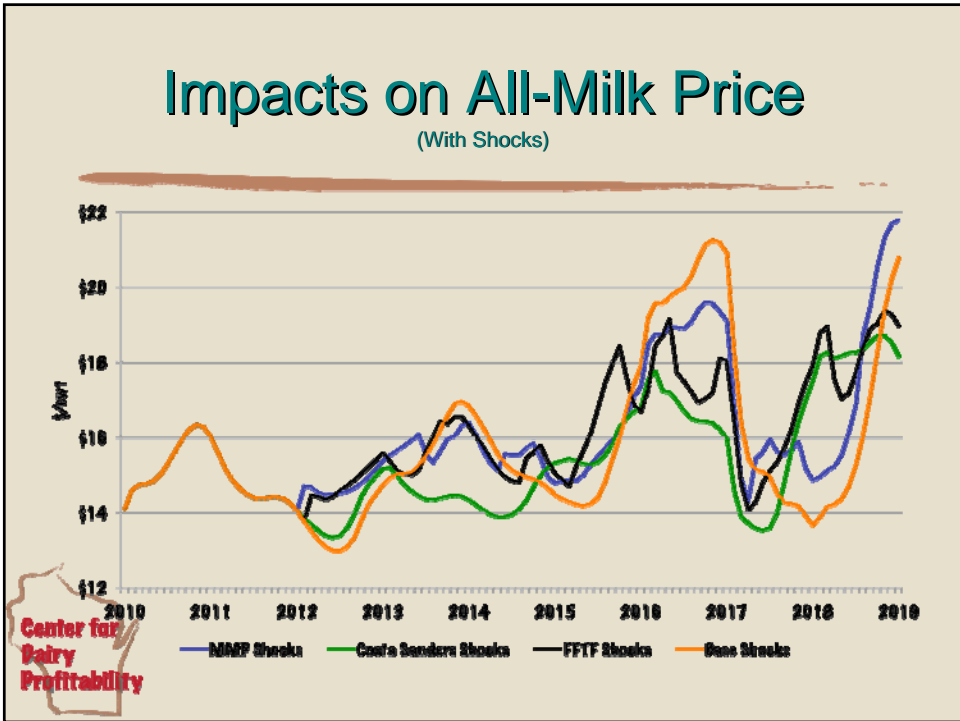
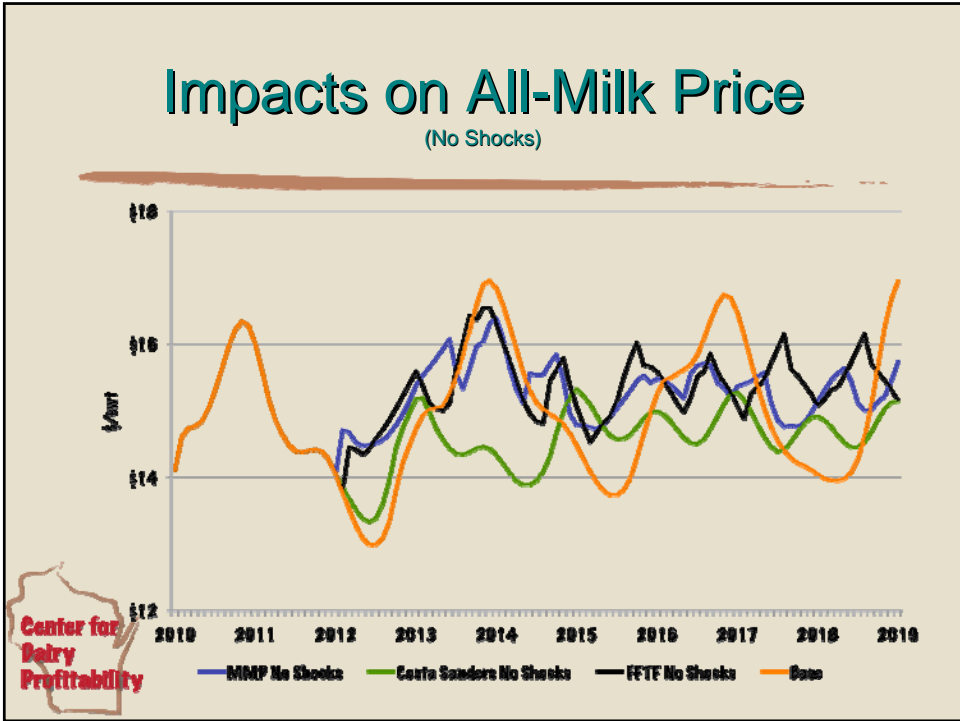
- Would the 3 programs reduce the variability the U.S. average All-Milk price?
 - Compared to a situation with only current dairy programs
- What would some other key impacts be of the 3 programs?
 - Average All-Milk price for farmers
 - Government expenditures
 - Total product sales



What We Found

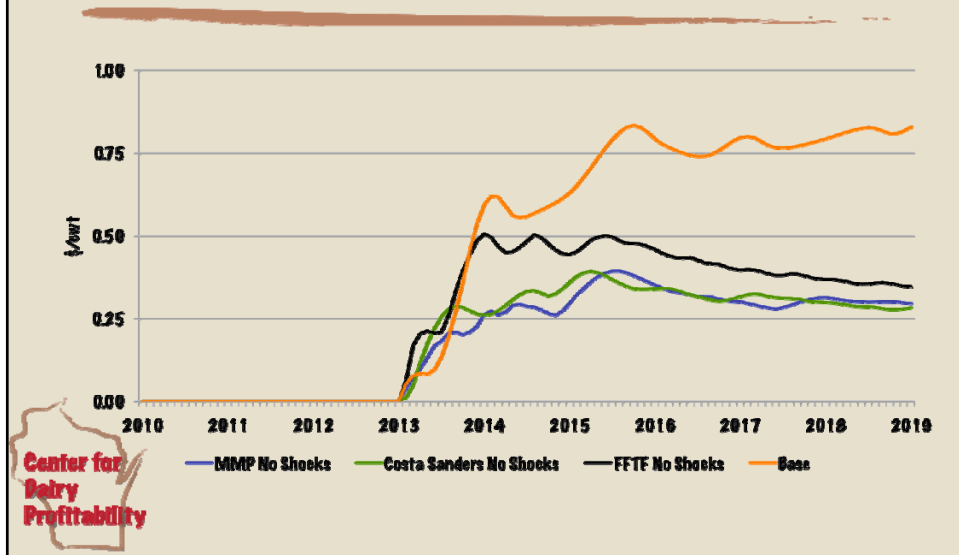
- All 3 programs could reduce variability in the All-Milk price
- All 3 programs would reduce government expenditures (taxpayer \$)
- Programs have different impacts on the average All-Milk price received by farmers
- Programs have different impacts on Class III (cheese milk) price
- Programs have different impacts on total product sales





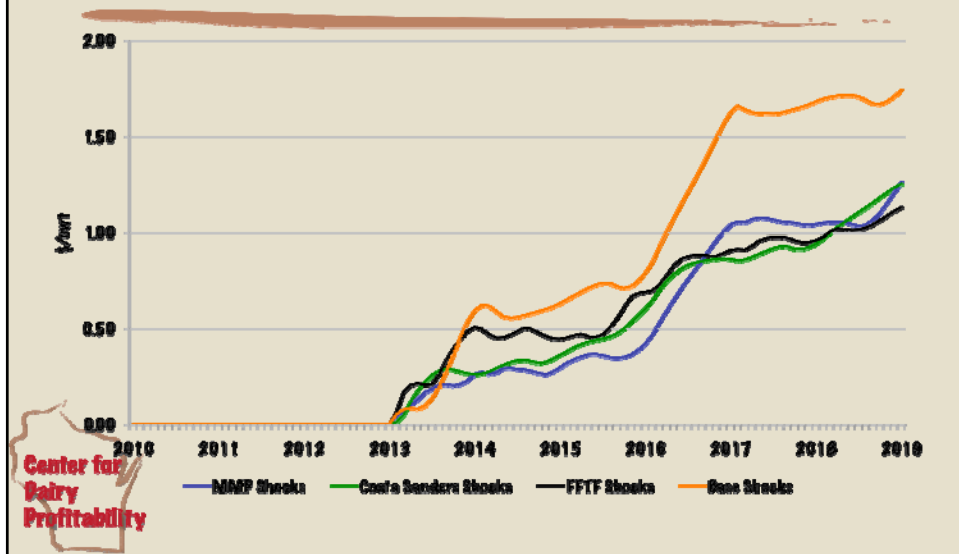
Cumulative Average Deviation

(No Shocks)



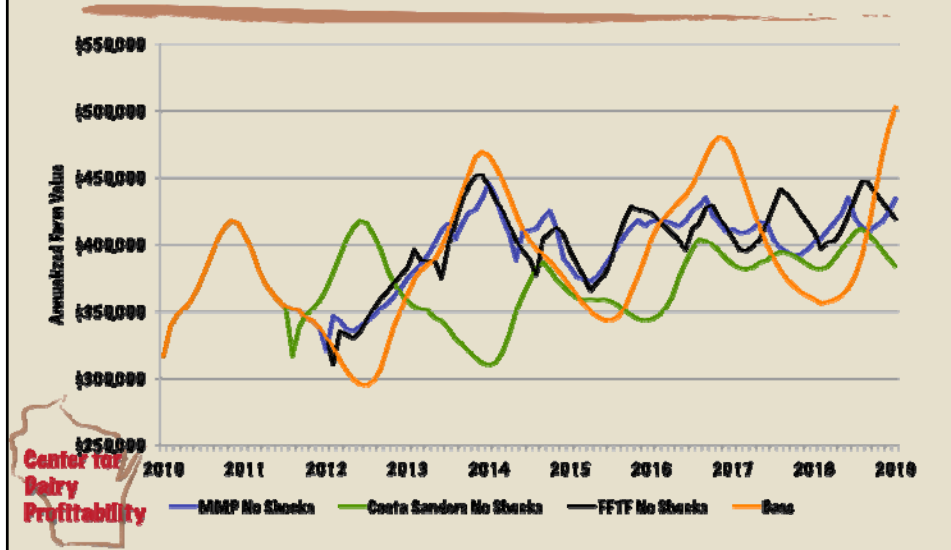
Cumulative Average Deviation

(With Shocks)

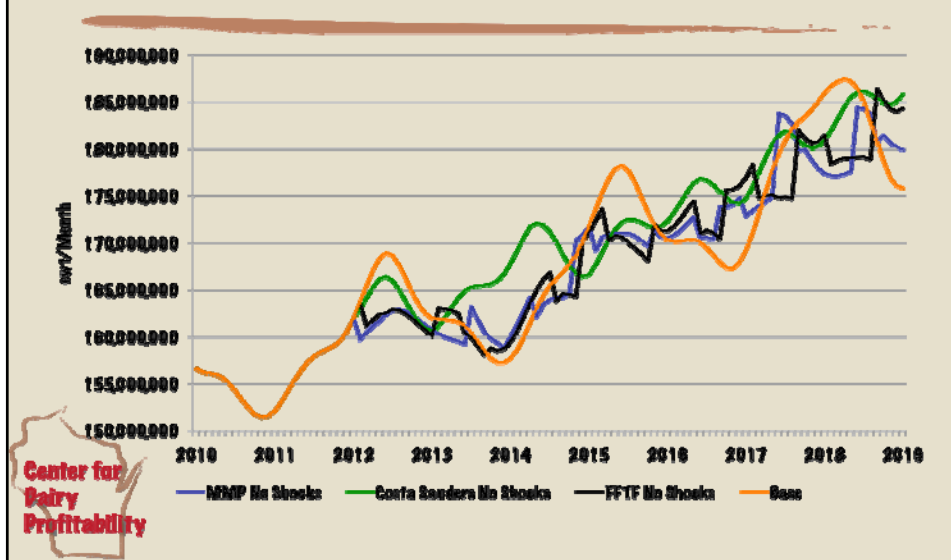


Milk Income less Feed Costs

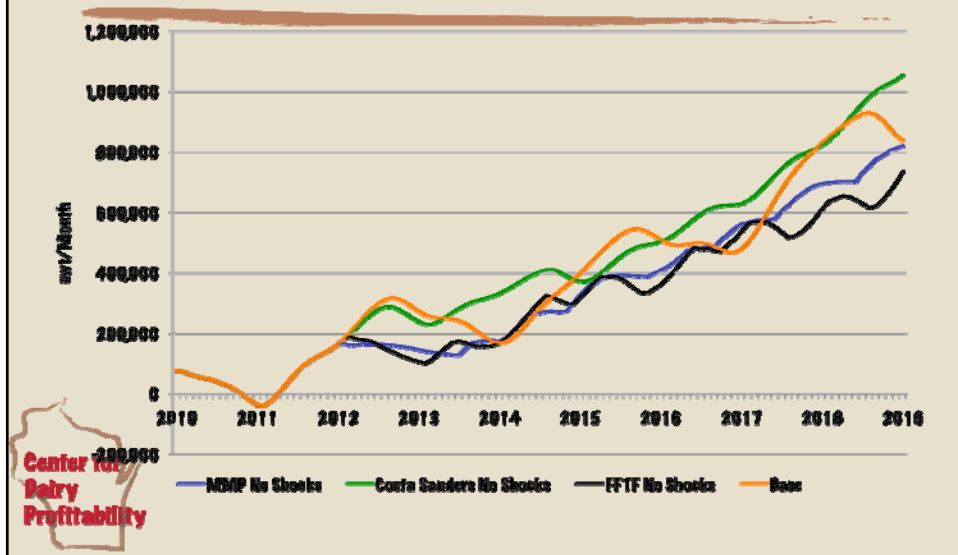
(No Shocks—Medium Sized Farm)



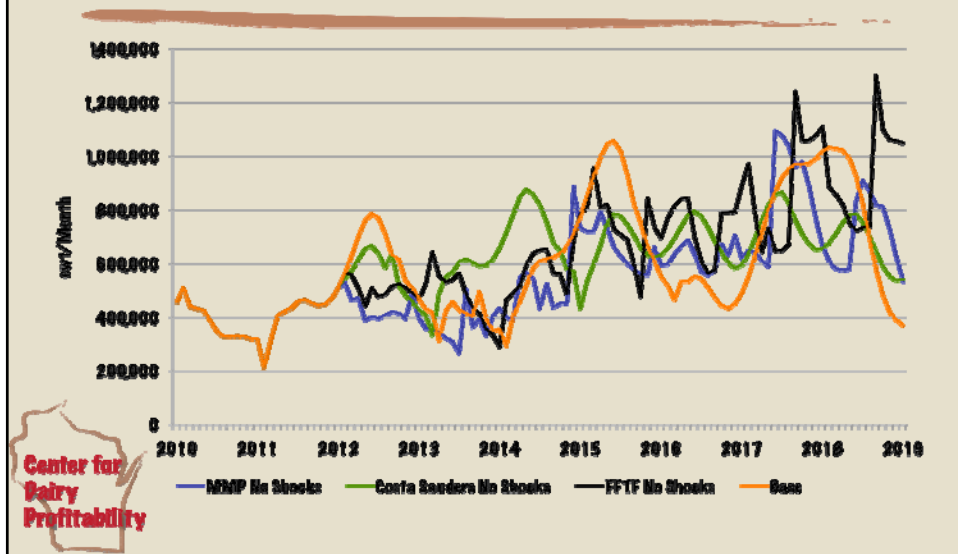
U.S. Milk Marketings



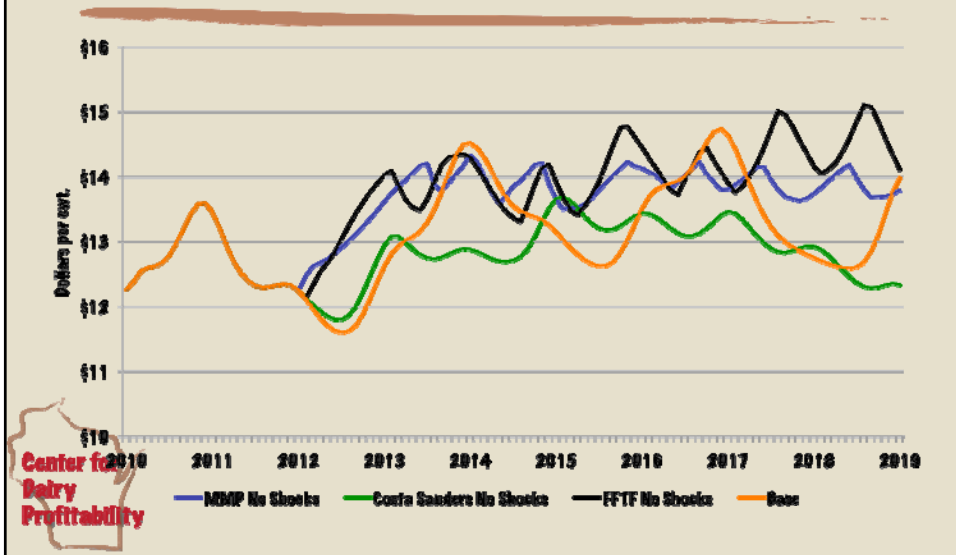
Net Cheese Exports



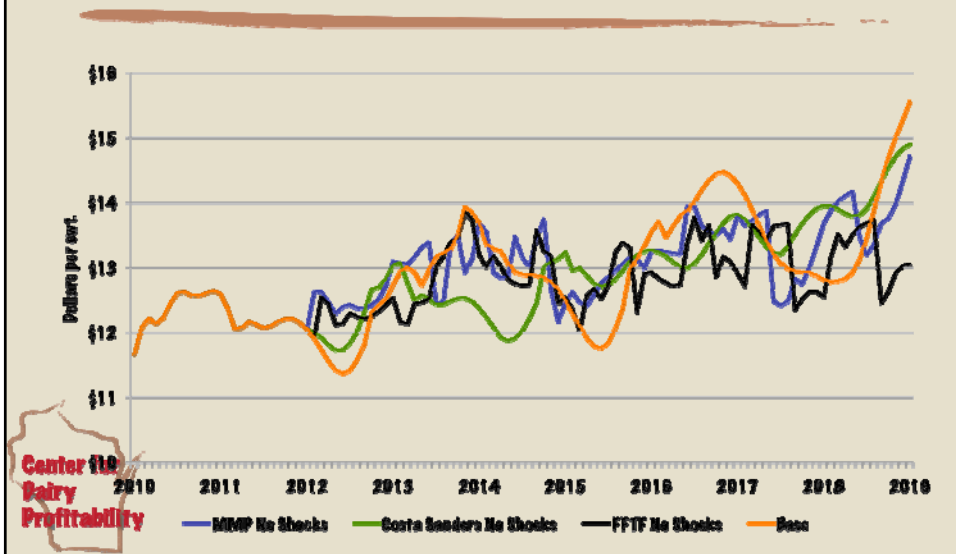
Net NFDM Exports



FMMO Class III Price

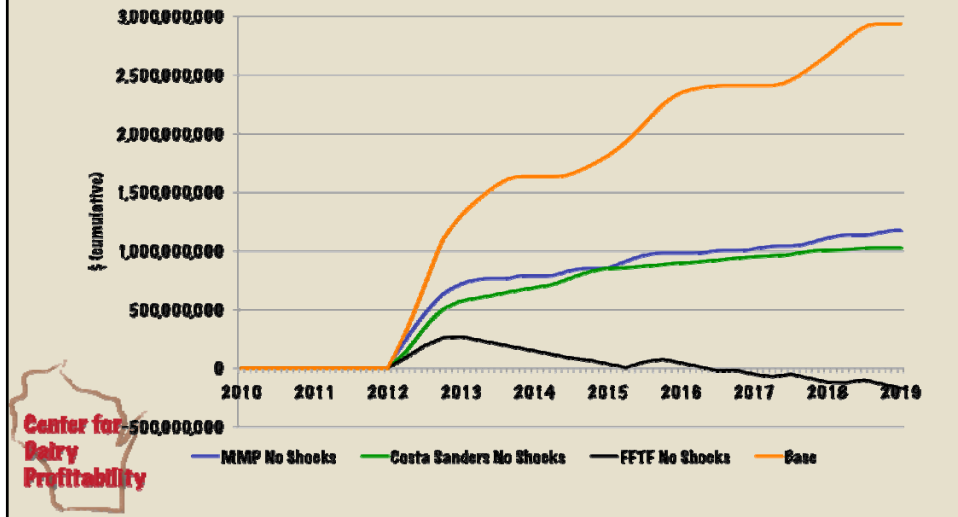


FMMO Class IV Price



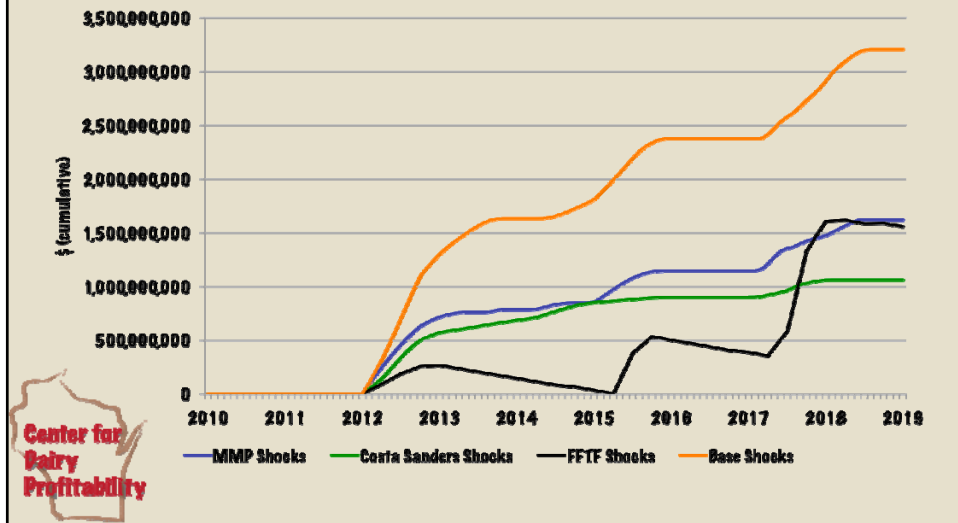
Cumulative Government Expenditures

(No Shocks)



Cumulative Government Expenditures

(With Shocks)



To Summarize...

- All of these programs will reduce, but not eliminate, milk price volatility
- All 3 programs would reduce government expenditures (taxpayer \$)
- Programs have different impacts on the average All-Milk price received by farmers
- Programs have different impacts on Class III (cheese milk) and Class IV (Butter/Powder) prices
- Programs have different impacts on total product sales



To Summarize...

- Costa-Sanders:
 - Produces more milk and yields a slightly lower milk price
 - Class III & IV prices are nearly equal
 - More cheese is made and exported
- FFTF & MMP:
 - Produces slightly less milk and yields a slightly higher milk price (this comes from product purchases)
 - Butter and NFDM production is highly variable
 - Class III price is somewhat higher and Class IV price is lower



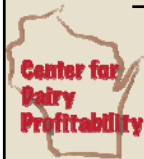
Assumptions Matter

- There is nothing inherently “good” or “bad” about any of the programs.
- We can get different outcomes if parameters are varied
 - Eg., more restrictive allowed growth in CS
 - Eg., spend money in different ways under FFTF and MMP (faster, different products)



Assumptions Matter

- How will producers react?
 - We assumed that 35% of milk penalty in FFTF & MMP will still be marketed
- How much subsidy will government provide for margin insurance and how will producers react?
 - We assumed that 60% of producers will “buy up” to a \$6 margin protection for 14¢ on 45% of their milk



Any Questions?

Much more detail in paper
<http://dairy.wisc.edu>

