

# Impacts of the Margin Protection Program

Chuck Nicholson  
*Penn State University*



## Outline

- Q&A: What will influence MPP outcomes?
- Systems thinking analysis of the MPP
- Simulations model analysis:
  - Base, “Best” Case and a range of possible outcomes

## What Will Influence MPP Outcomes?

| Influence on MPP Outcomes | Comment |
|---------------------------|---------|
|                           |         |
|                           |         |
|                           |         |
|                           |         |

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|                           |  |
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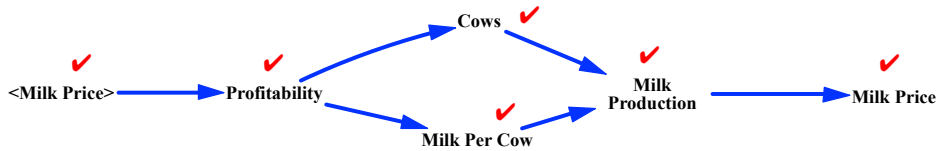
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| <b>Cows</b>                         | Profitability (culling rates)                                  |
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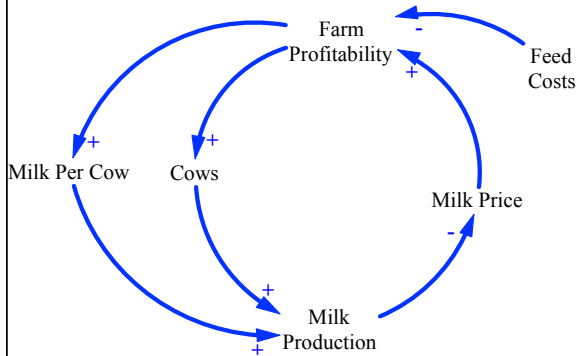
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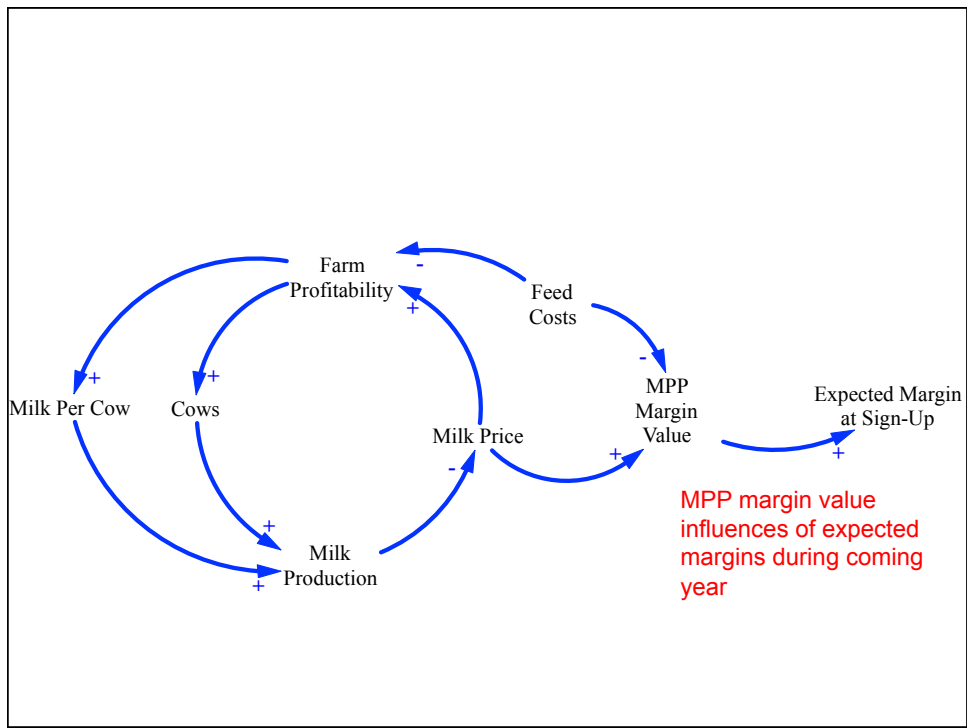
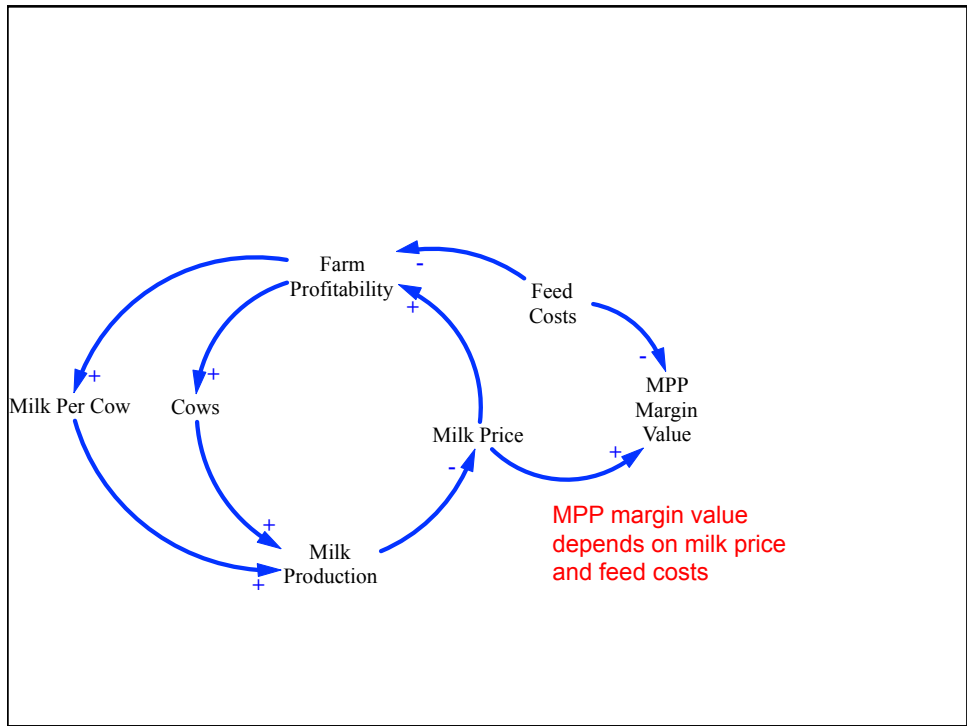


This is the "money makes milk" process  
(or "Less money makes less milk")

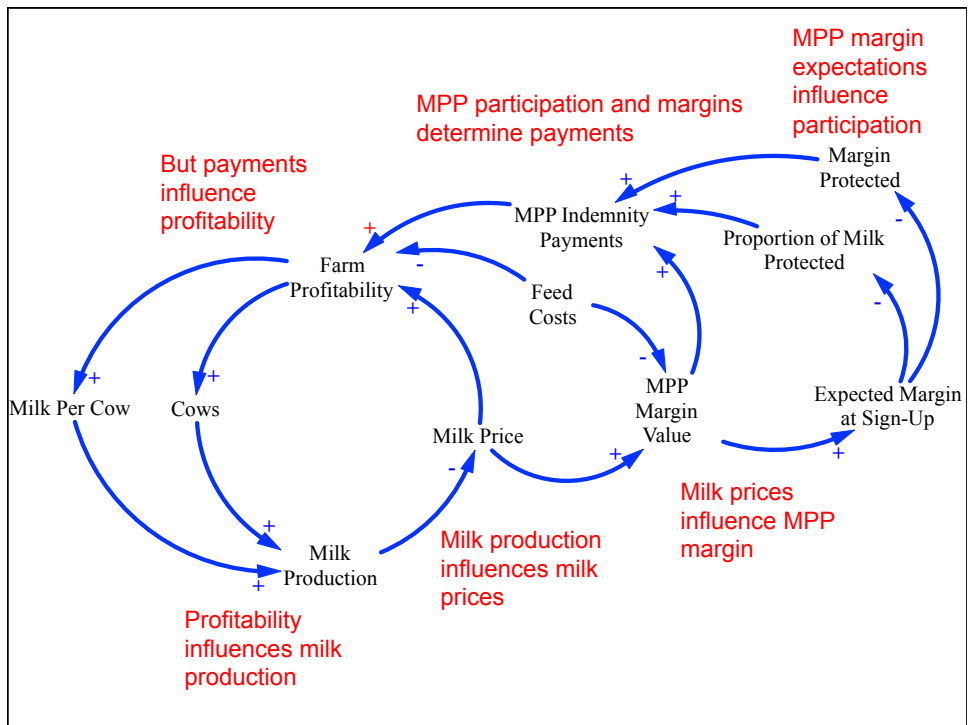
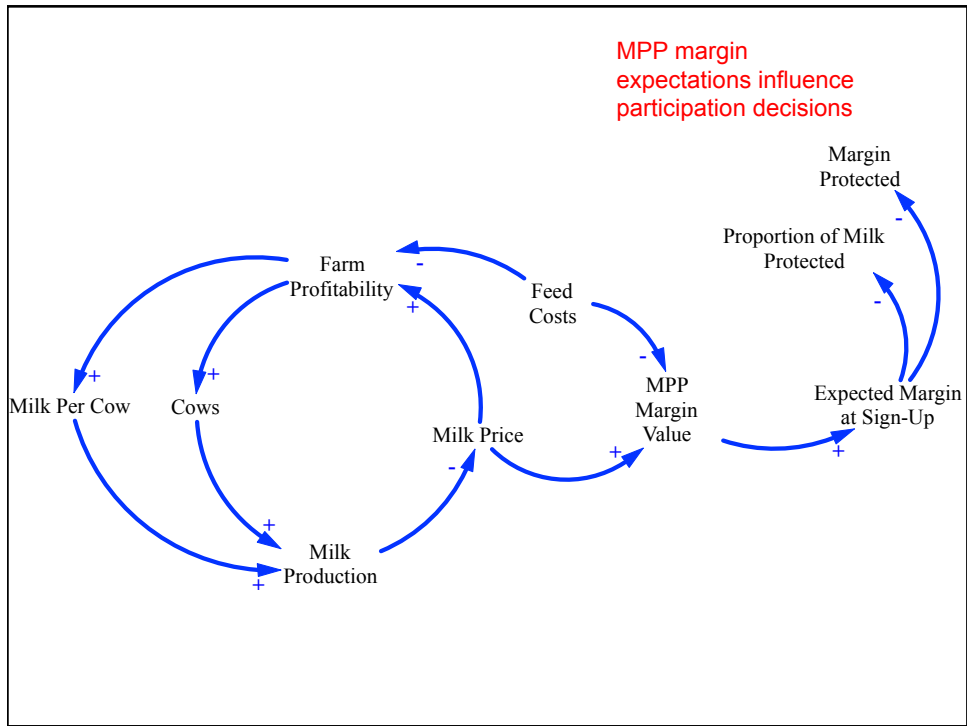


What happens with the MPP?

Can create feedback diagram to show the linkages (over time)







## MPP Possibility #1

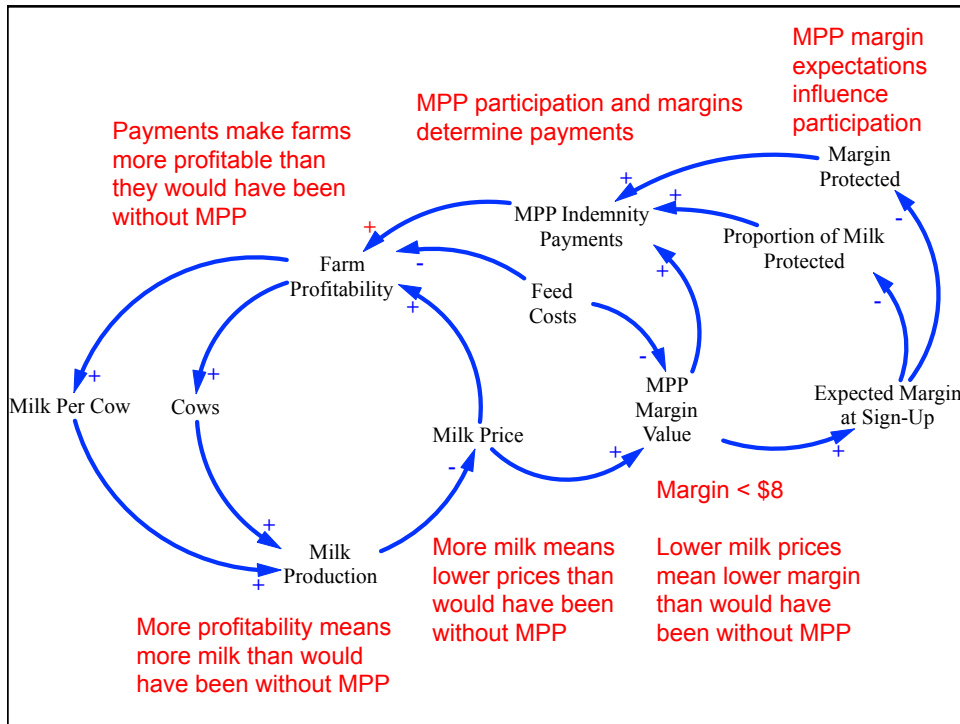
### One possible outcome:

- If the margin never gets below \$8, then the program will never operate
- No impacts of MPP
- Congress is brilliant (#1)
  - Program cost taxpayers nothing
  - “Supported” dairy farmers

## MPP Possibility #2

### Another possible outcome:

- Margins get below \$8 during 2014-2018
- Then, what happens?

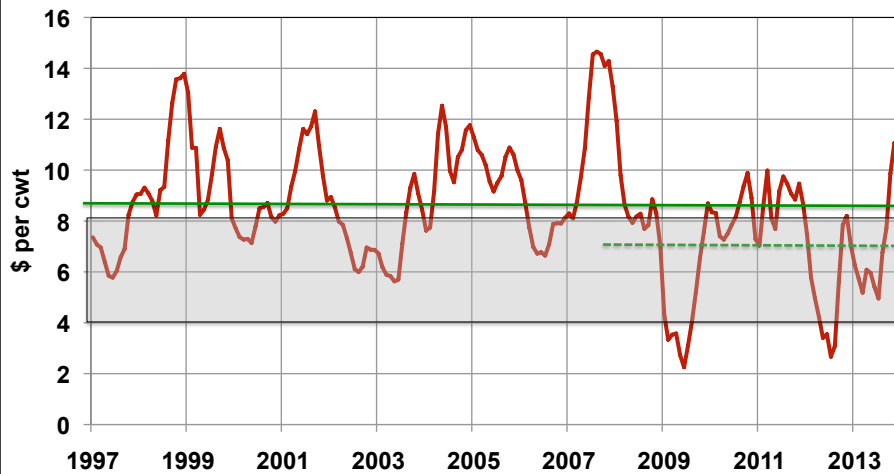


## MPP Possibility #2

### Another possible outcome:

- Margins get below \$8 during 2014-2018
- Program design leads to less adjustment of milk supplies in periods of low margins
- Low(er) prices and margins may persist due to less adjustment
- MPP could reduce average prices and margins during 2014-2018
- **How likely is a margin < \$8 in the future?**

## History of the MPP Margin, 1997-2013



Averaged \$8.50/cwt since 1997, but only \$7.11/cwt since 2008  
< \$8 the majority of months since 2008.

## Margin Will Be Influenced by the MPP

- The past *may not be a reliable guide* because the MPP did not exist
  - Did not influence what the margin was
- But we would expect that the MPP would affect margins if the program is active
- Need to account for this in a forward-looking analysis

## Simulation Model Analysis

- Uses our system dynamics model of the U.S. supply chain, which includes:
- All main dairy products categories
- All principal dairy policy instruments
- U.S. dairy product trade
- Dynamic response of milk supplies to profitability
  - 4 farm size categories, CA and Rest of U.S.

## Simulation Model Analysis

- Compares “Baseline” with previous policies to outcomes with MPP
- For various possible scenarios
  - Milk production
  - Feed prices
- MPP analysis assumes high level of participation in MPP due to subsidized premiums

## Simulation Model Analysis

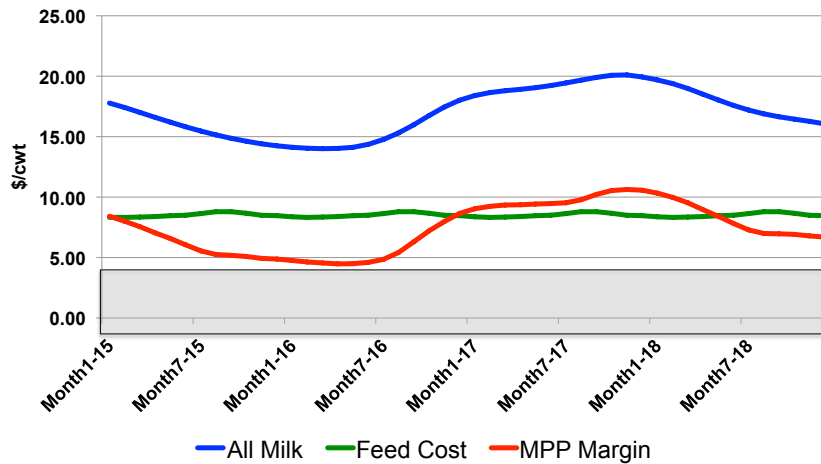
- Assumed that farmers will base decisions on expected margins for the next 12 months
- Decision at the beginning of each calendar year
- Program implemented in January 2015

## Simulation Model Analysis

Assumed (simple) participation decision rules:

- If expected margin > \$8.00, protect 90% milk at \$4.00
- If expected margin <\$4.00, protect 90% milk at \$8.00
- If expected margin between \$4.00 and \$8.00, protect 75% milk at \$6.50 (a 'sweet spot' on the premium schedule)

## Simulated Baseline Values, 2015-2018



Feed cost is exogenous, assumed based on 2013-2014 futures prices

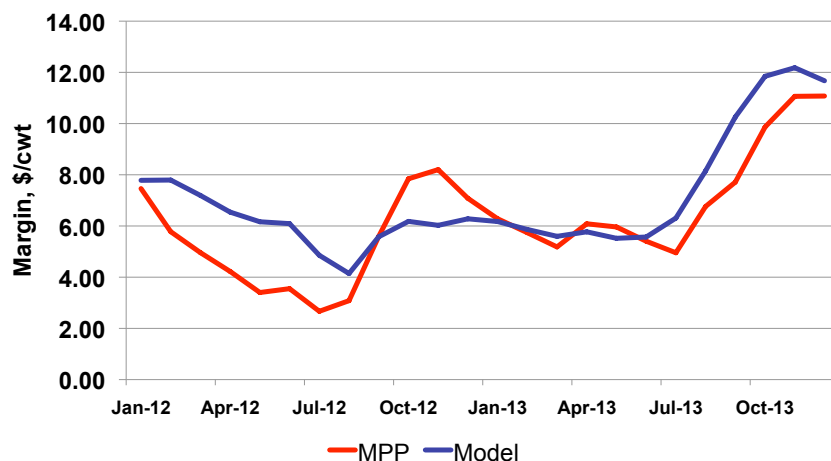
## The Baseline Indicates

- Low price period projected in 2016
- Low margin period projected in 2016
  - This puts us into possibility #2 from above
  - Margin < \$8/cwt
  - Program could become active (depending on producer decisions)

## Why Consider This Baseline?

- Dynamic model has been evaluated based on a common process for dynamic models
- The amplitude and magnitude of price movements are consistent with those observed during 2000-2014
  - Price cycles (Nicholson and Stephenson, 2014)
  - (If cycles are different going forward, then all bets are off)

## Model Versus Actual MPP Margin, 2012-2013



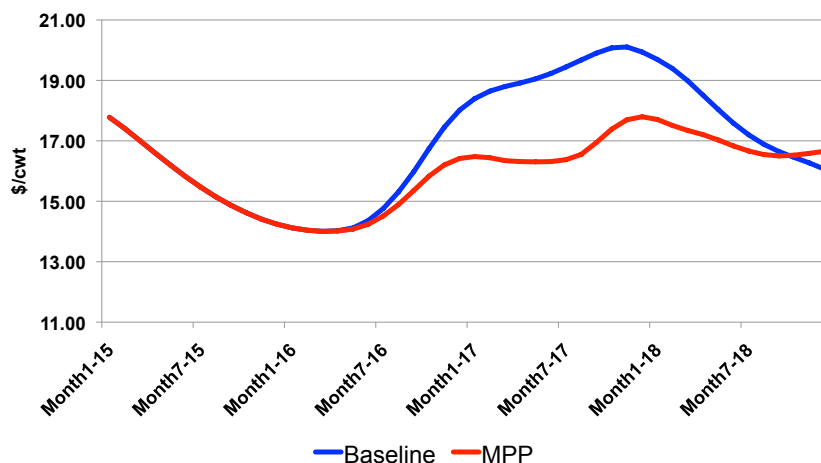
Model tended to over-predict margin, 26% MAPE during 2012-2013.



## Impacts of MPP Compared to Baseline

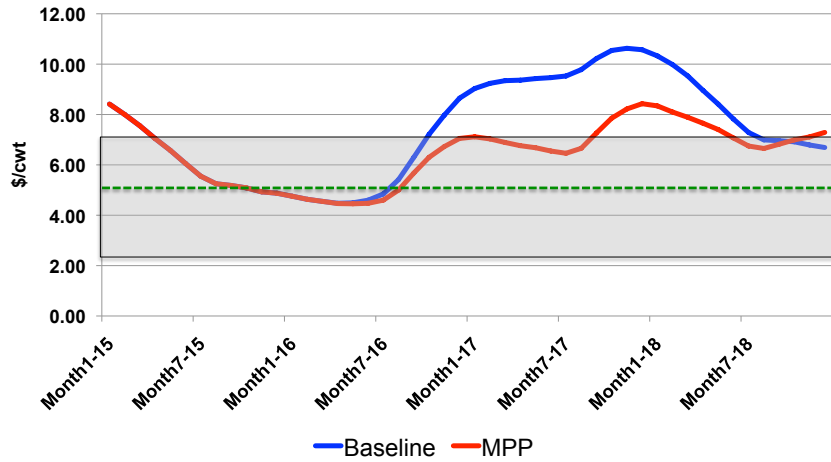
- Reduced margin by \$0.96/cwt
- Reduced average all milk price by \$0.96/cwt
- Reduced Net Farm Operating Income (NFOI) for all farms
  - Even including indemnity payments
- Much greater price stability
- Fewer months with NFOI < 0
- Government expenditures nearly \$4 billion

## Simulated All-milk Price, 2015-2018



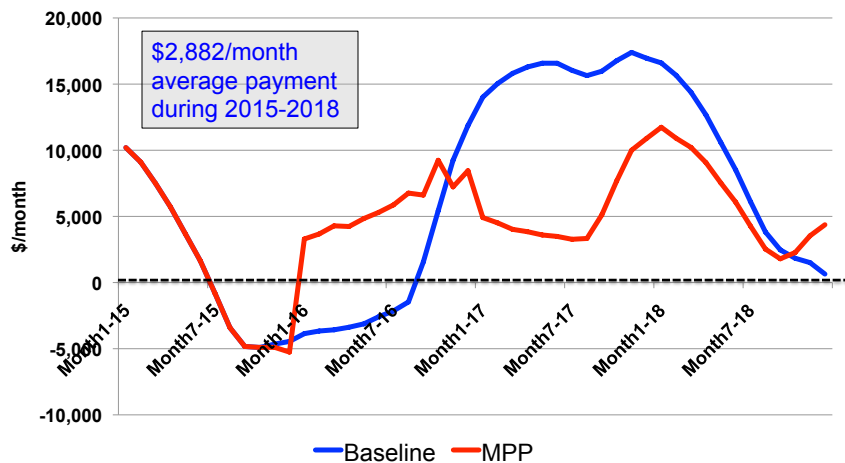
**Average milk price decreases \$0.96/cwt, greater price stability**

## Simulated MPP Margin, 2015-2018



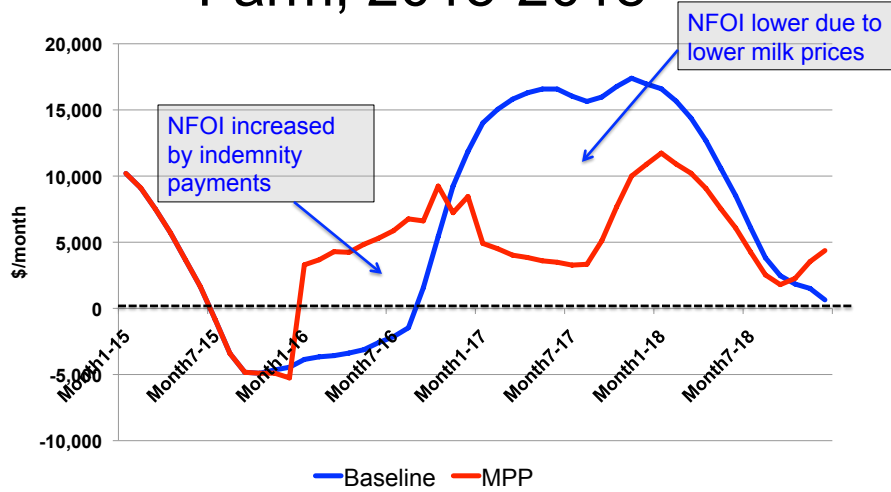
Average MPP decreases \$0.96/cwt, margin < \$8 most of time

## Simulated NFOI, Medium-size Farm (230 Cows), 2015-2018



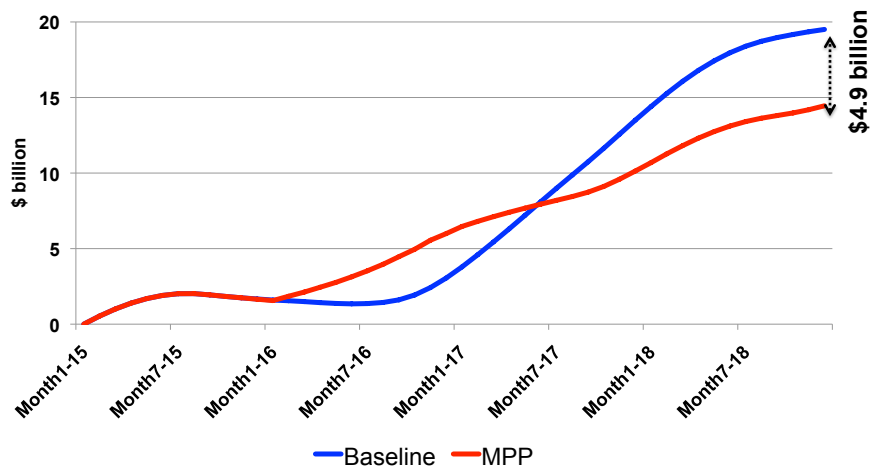
MPP reduces average NFOI for medium-size farm by about \$21,000/year, minimizes months with NFOI < 0

## Simulated NFOI, Medium-size Farm, 2015-2018



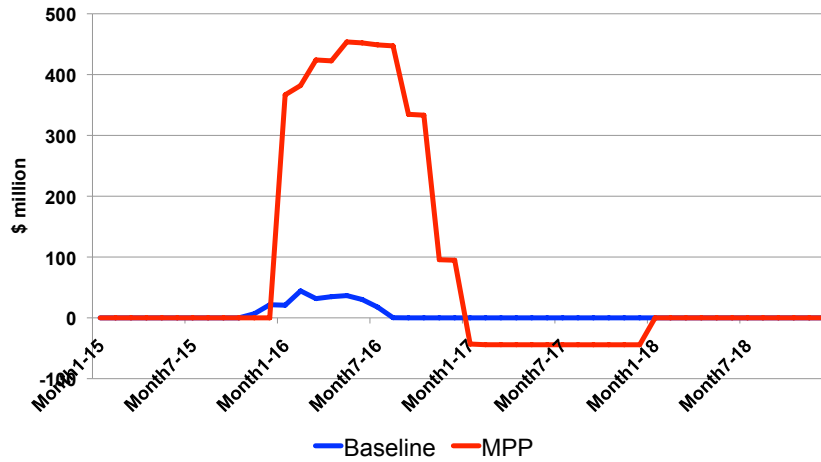
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## Simulated Cumulative NFOI, All Farms, 2015-2018



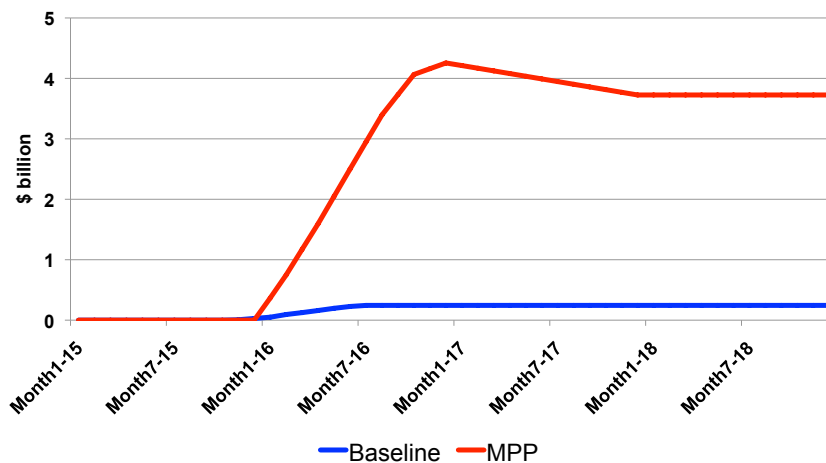
**MPP reduces cumulative NFOI for all U.S. dairy farms by about \$4.9 billion**

## Simulated Indemnity Payments Net of Premiums, 2015-2018



**MPP indemnity payments occur in 2016, large compared to MILC payments**

## Simulated Cumulative Gov't Expenditures, 2015-2018

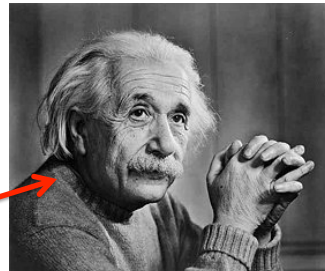


**MPP indemnity payments net of premiums total \$3.8 billion (MILC \$300 million)**

## Irony?

- Government spends \$4 billion to lower farm incomes by \$5 billion
- The good news:
- Consumers in the U.S. and countries to which we export would benefit a great deal
- Much more stable prices

## Why Congress Is Brilliant



## Why Congress Is Brilliant

- Without the 90% adjustment to the feed cost for the margin...
- Cost of the program under our price projections would have been..
- **\$30 billion** over four years

## But Nothing is Certain

- Alternative assumptions would change the impacts of MPP

## MPP Impacts: an “Empirical Question”

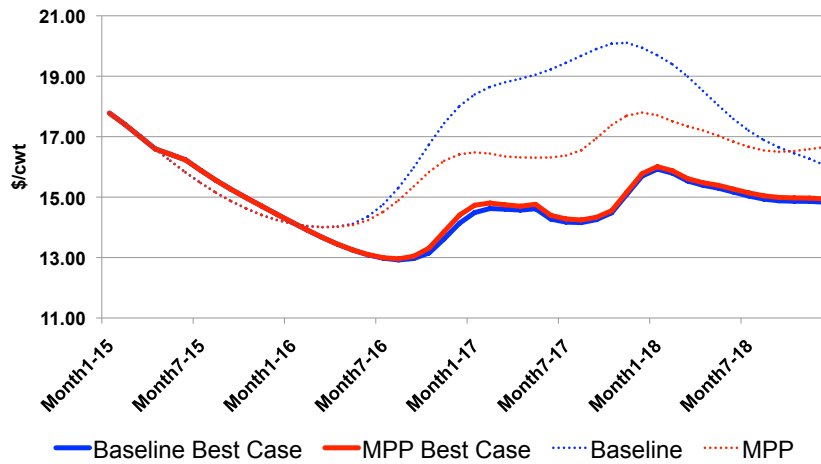
The impacts depend on:

- Assumptions about milk prices and feed costs
- Assumptions about participation decisions
- The relationships between margins, participation decisions, indemnity payments, and milk production

## Consider a “Best Case” Scenario

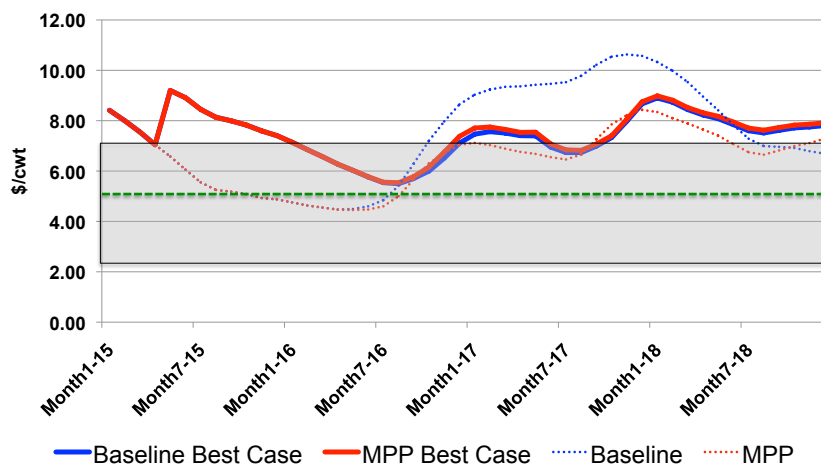
- Higher milk prices
  - 24-month reduction in MPC used to simulate this
  - Beginning May 2015
- Lower feed costs
  - 25% reduction in our feed cost projection
  - Beginning May 2015
- Compare a new Baseline to MPP

## Simulated All-milk Price, *Best Case*, 2015-2018



**MPP has limited impacts on milk prices (+\$0.07/cwt on average 2015-2018)**

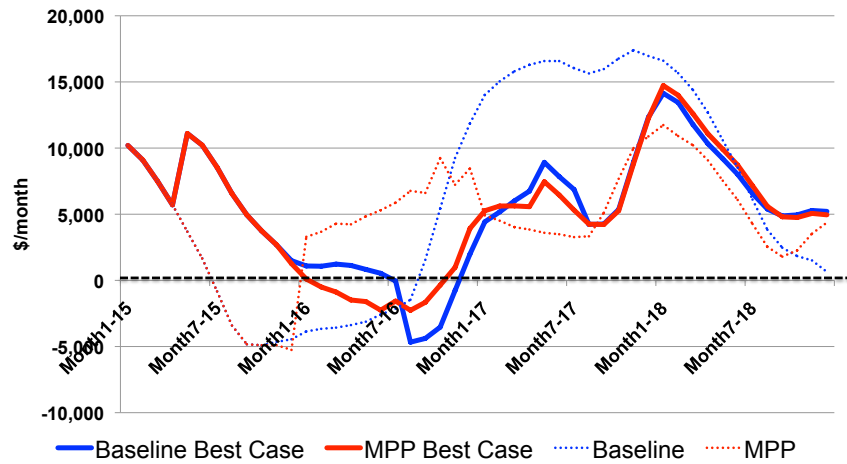
## Simulated MPP Margin, *Best Case*, 2015-2018



**Lowest margin higher, limited time with < \$6.50/cwt**



## Simulated NFOI, Medium-size Farm, *Best Case*, 2015-2018



**MPP lowers average NFOI for medium-size farm by about \$800/year**

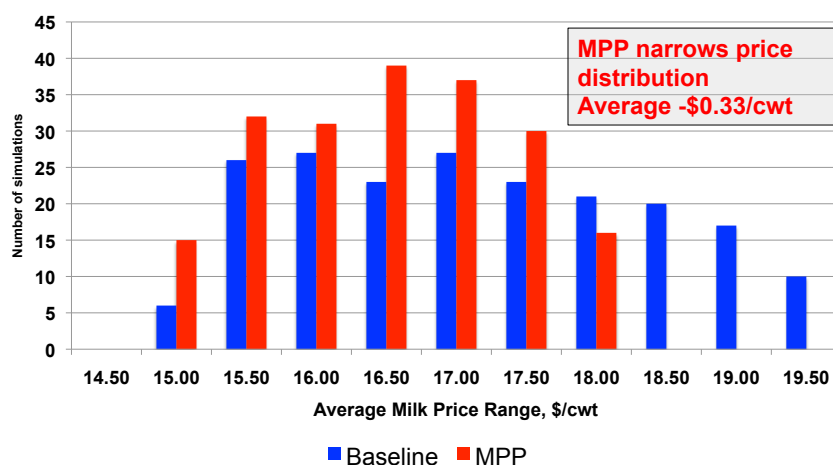
## Other *Best Case* Results

- Cumulative NFOI for all farms decreases \$140 million during 2015-2018
  - Compared to nearly \$5 billion in previous
- Cumulative government expenditures are -\$357 million
  - Government earns money from the program

## Stochastic Analysis

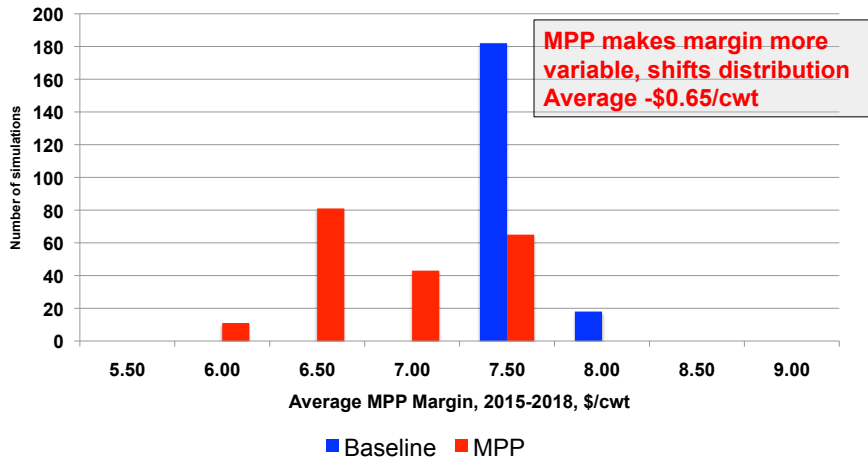
- Clearly, milk prices and feed costs matter for the impact of the program
  - More magnitude than direction
- Assessed N=200 scenarios with various combinations of higher milk prices and higher or lower feed costs
  - Look at distribution of outcomes

## Distribution of Average All-Milk Prices During 2015-2018



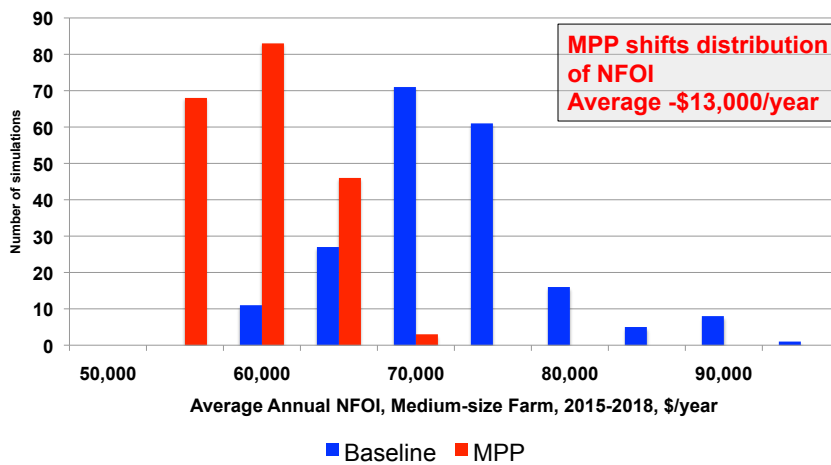
Based on N=200 simulations

## Distribution of Average MPP Margin, 2015-2018



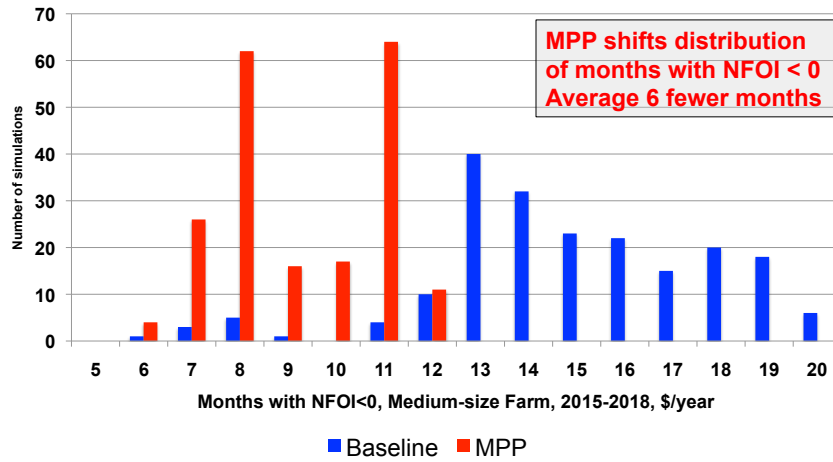
Based on N=200 simulations

## Distribution of Average Annual NFOI, Medium-size Farm



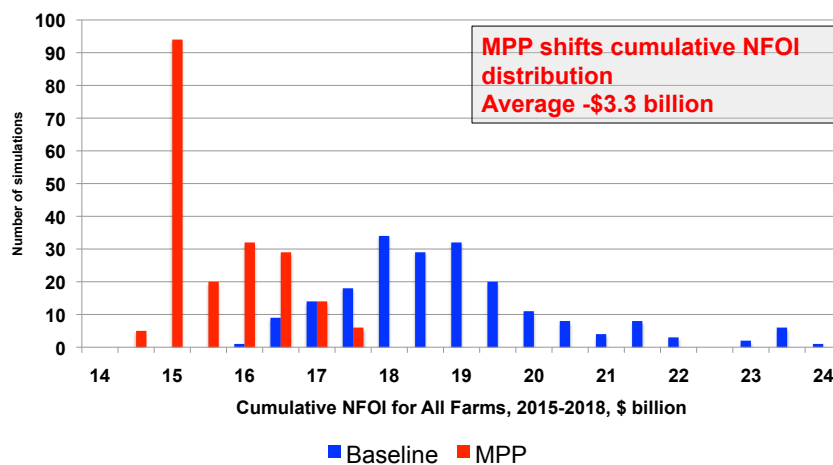
Based on N=200 simulations

## Distribution of Months with NFOI<0, Medium-size Farm



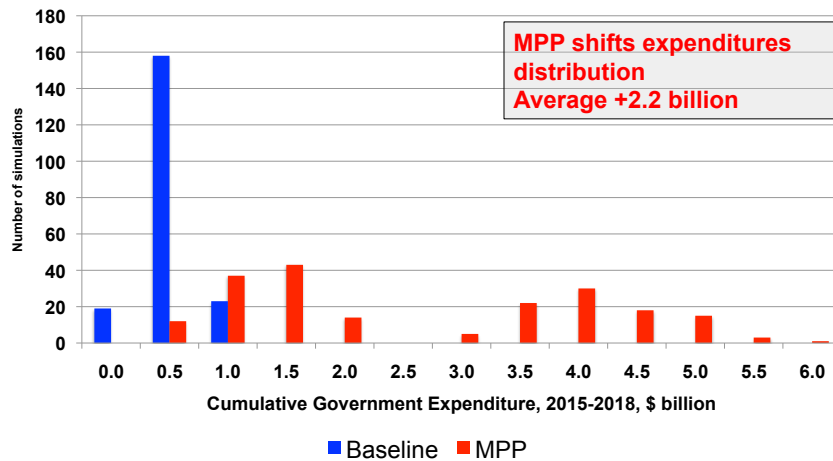
Based on N=200 simulations

## Distribution of Cumulative NFOI, All Farms, 2015-2018



Based on N=200 simulations

## Distribution of Cumulative Gov't Expenditure, 2015-2018



Based on N=200 simulations

## Conclusions

During 2015 to 2018, MPP *is likely to*:

- Reduce milk prices and margins compared to current programs
- Reduce average NFOI incomes compared to current programs
  - Offsetting effect of more milk production on milk prices, despite payments
- Make prices less variable compared to current programs
- Be more costly than current programs

## Conclusions

The magnitude of these effects is uncertain, and will depend on many factors, including:

- General trajectory of milk and feed prices
  - Influenced by many factors
- Degree of participation by dairy producers
  - Likely more varied than assumed in our analysis

## The “Nicholson Paradox”

- “Every action to improve the situation will end up making it worse”
  - Attributed to Novakovic and Stephenson