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# Price Discovery and Price Transparency in the U.S. Cheese Industry

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*Selected Poster prepared for presentation at the  
2016 Agricultural & Applied Economics Association Annual Meeting, Boston, MA, July 31- Aug. 2*

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# Price Discovery and Price Transparency in the U.S. Cheese Industry

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## Motivation

The private Exchange spot cheese market

- National Cheese Exchange (NCE): 1974 - 1997
- Chicago Mercantile Exchange (CME): 1997 - present

Performs a primary price-discovery function in the U.S. cheese industry

The Exchange spot cheese prices affect cheese prices and milk prices

- Are used as reference prices in cheese contracts
- More than 90% of cheese produced in the country is sold under contracts
- Have been influencing prices paid for milk used in cheese manufacturing
- Class III milk price within the Federal Milk Marketing Orders (FMMOs)

## Research Objectives

1. To analyze the conduct and performance of the Exchange spot cheese market during three FMMOs milk pricing regimes (1980s – present)
  - To evaluate patterns of trading activities in cheddar cheese block and barrel markets (actual sales, unfilled bids and uncovered offers)
  - To evaluate the price behavior of cheddar block and cheddar barrel (wholesale level) and to compare to the behavior of Class III milk price
2. To analyze the performance of natural cheddar cheese segment
  - To focus on the behavior of Class III milk price, wholesale cheddar cheese price, retail natural cheddar cheese price and related margins

## Private Exchange Spot Cheese Market: NCE and CME

Two styles of cheddar cheese are traded

- Cheddar sold in 500 pound barrels (is used in further processing)
- Cheddar sold in 40 pound blocks (is used to make cut/wrapped cheeses)

A thin (low volume) market, is concentrated and transactions are infrequent

- Less than one percent of cheese produced in the country is traded
- 1997: Spot cheese market was moved from NCE to CME
- NCE: weekly trade and identities of traders are known
- CME: daily trade and trading is anonymous

Spot prices are affected by actual sales, unfilled bids and uncovered offers

Closing price rule: closing price at the end of the trading session is

- The last actual sale price or
- Last unfilled bid, if it is higher than the last actual sale price or
- Last uncovered offer, if it is lower than the last actual sale price

## Federal Milk Marketing Orders: Class III Milk Pricing

FMMOs determine the minimum prices for *Grade A* milk

- Regulated milk handlers have to pay based on the final use of milk
- Since 2000: there are four milk Classes (classified milk pricing principle)

Minnesota-Wisconsin price series (1960s – 1995): M-W price regime

- M-W price is based on unregulated Grade B milk price paid in WI and MN

Basic Formula Price (1995 – 1999): BFP regime

- BFP is based on M-W price and an adjustment (includes cheese price)
- NCE period: NCE spot price of cheddar block
- CME period: USDA survey-based wholesale price of cheddar block

Multiple Component Pricing (2000 – present): MCP regime

- A series of price formulas: cheese price is a key determinant
- USDA survey based wholesale prices of cheddar block and cheddar barrel

## Data and Methodology

USDA Agricultural Marketing Service: Dairy Market Statistics Annual Summaries

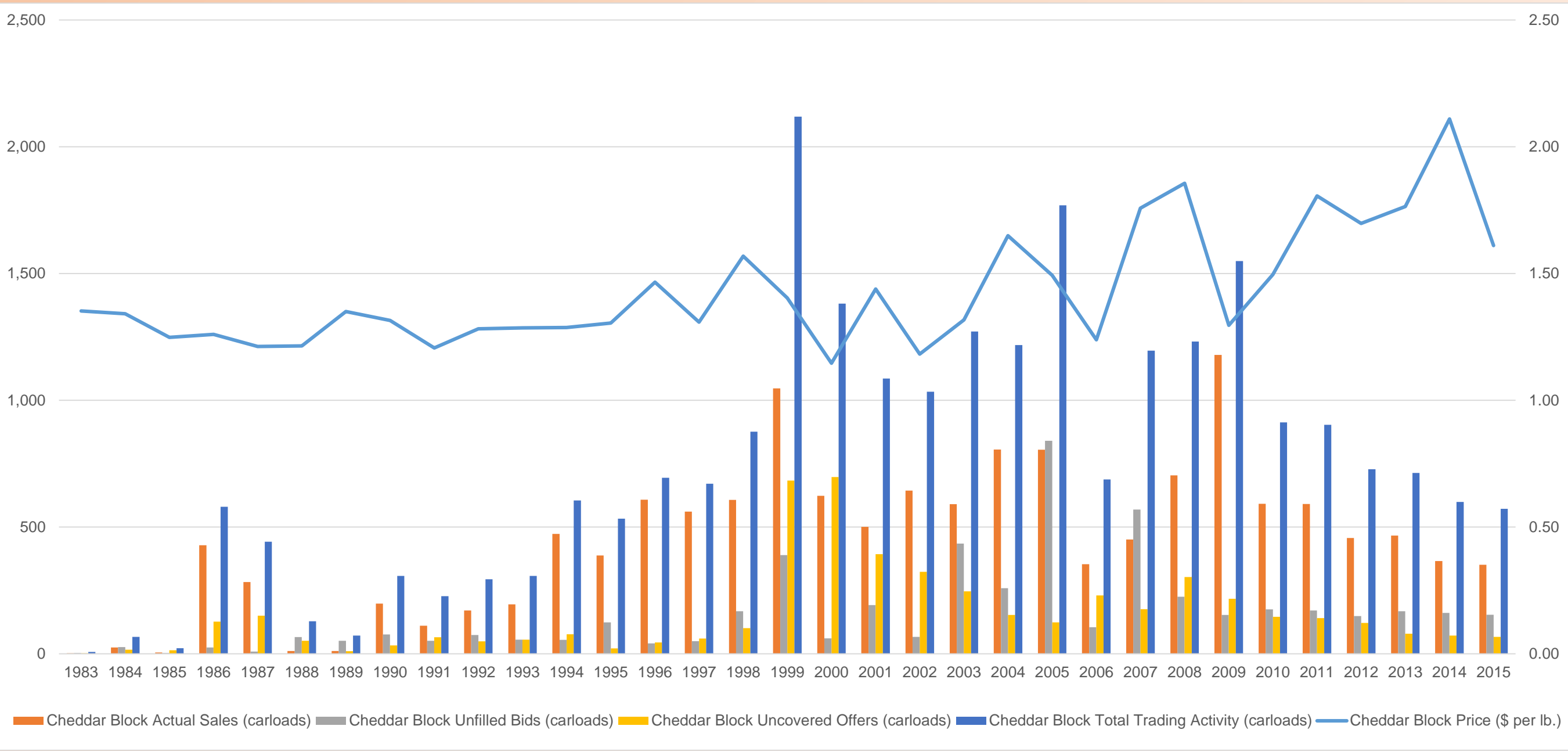
- Exchange spot prices for cheddar barrel and block (\$/pound)
- Exchange actual sales, unfilled bids and uncovered offers (carloads)
- Class III milk price (\$/cwt), Milk Marketing Order Statistics Database

US Bureau of Labor Statistics: Retail cheddar cheese (natural) price (\$/pound)

Methodology: An analysis of the level and volatility of the analyzed variables

- During three FMMOs milk pricing regimes: M-W price, BFP and MCP
- The averages and coefficients of variation (CV) are calculated

## The Exchange Spot Cheese Market Trading Activities Cheddar Cheese Sold in 40 pound Blocks: Closing Prices, Actual Sales, Unfilled Bids and Uncovered Offers (1983-2015)



FMMOs regime	Closing price	Actual sales	Unfilled bids	Uncovered offers	Overall trading activity
	Average \$/pound	Total carloads per year			
Minnesota-Wisconsin price series regime					
Average	1.2796	159	41	54	255
[Min.; Max.]	[1.2065; 1.3525]	[2; 473]	[3; 76]	[2; 150]	[7; 605]
Basic Formula Price regime					
Average	1.4103	642	154	182	979
[Min.; Max.]	[1.3044; 1.5687]	[388; 1,047]	[41; 389]	[21; 683]	[533; 2,119]
Multiple Component Pricing regime					
Average	1.5537	592	243	218	1,053
[Min.; Max.]	[1.1465; 2.1094]	[351; 1,179]	[61; 840]	[67; 697]	[572; 1,769]

## Discussion: Exchange Spot Cheese Market

Exchange spot cheese market remains a low volume market

- Less than 3% of yearly cheddar cheese production is traded

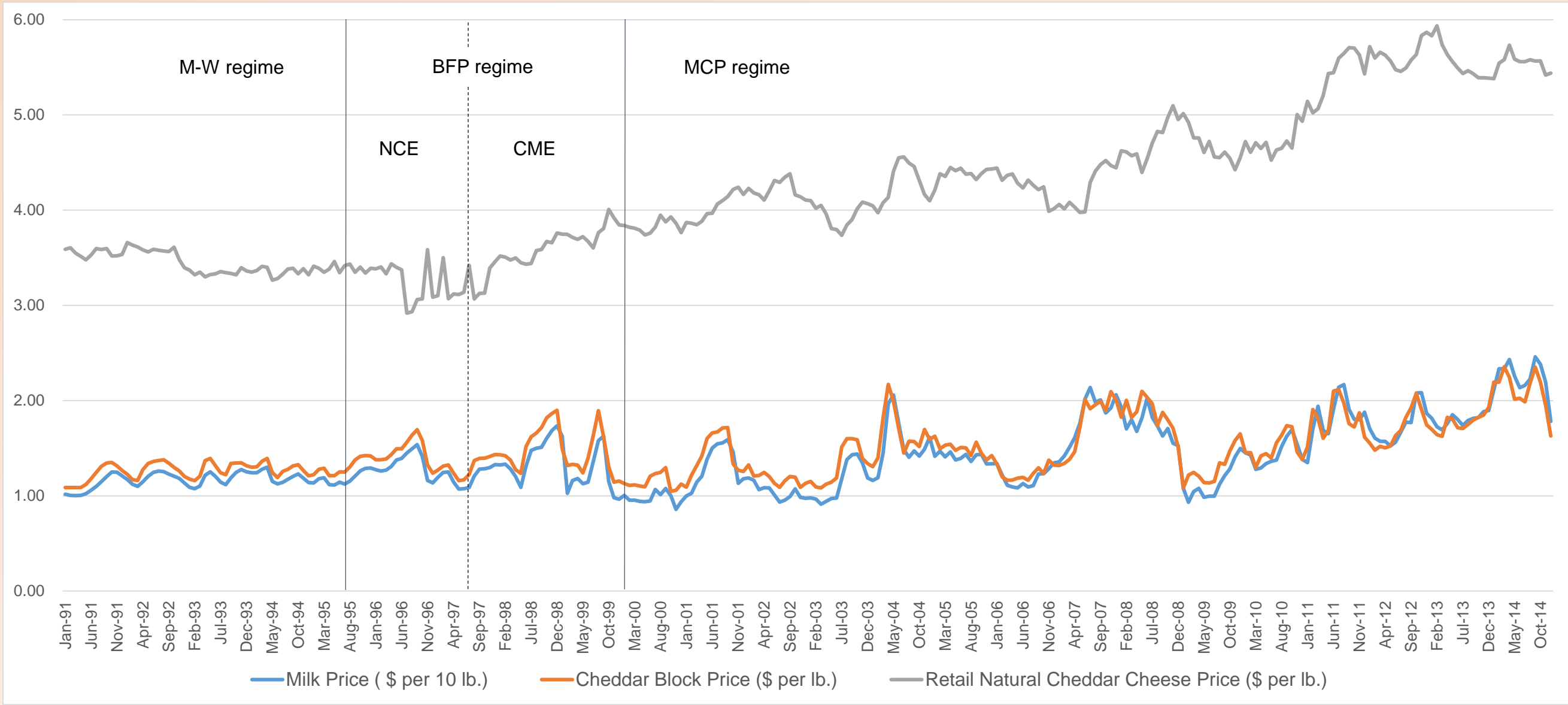
Exchange spot cheese market reacted to changes in FMMOs milk pricing

- The pattern of trading activities changed (more active trading)
- When cheese prices started being used in milk pricing
  - BFP regime (June 1995) and MCP regime (January 2000)

Closing prices are affected by actual sales, unfilled bids and uncovered offers

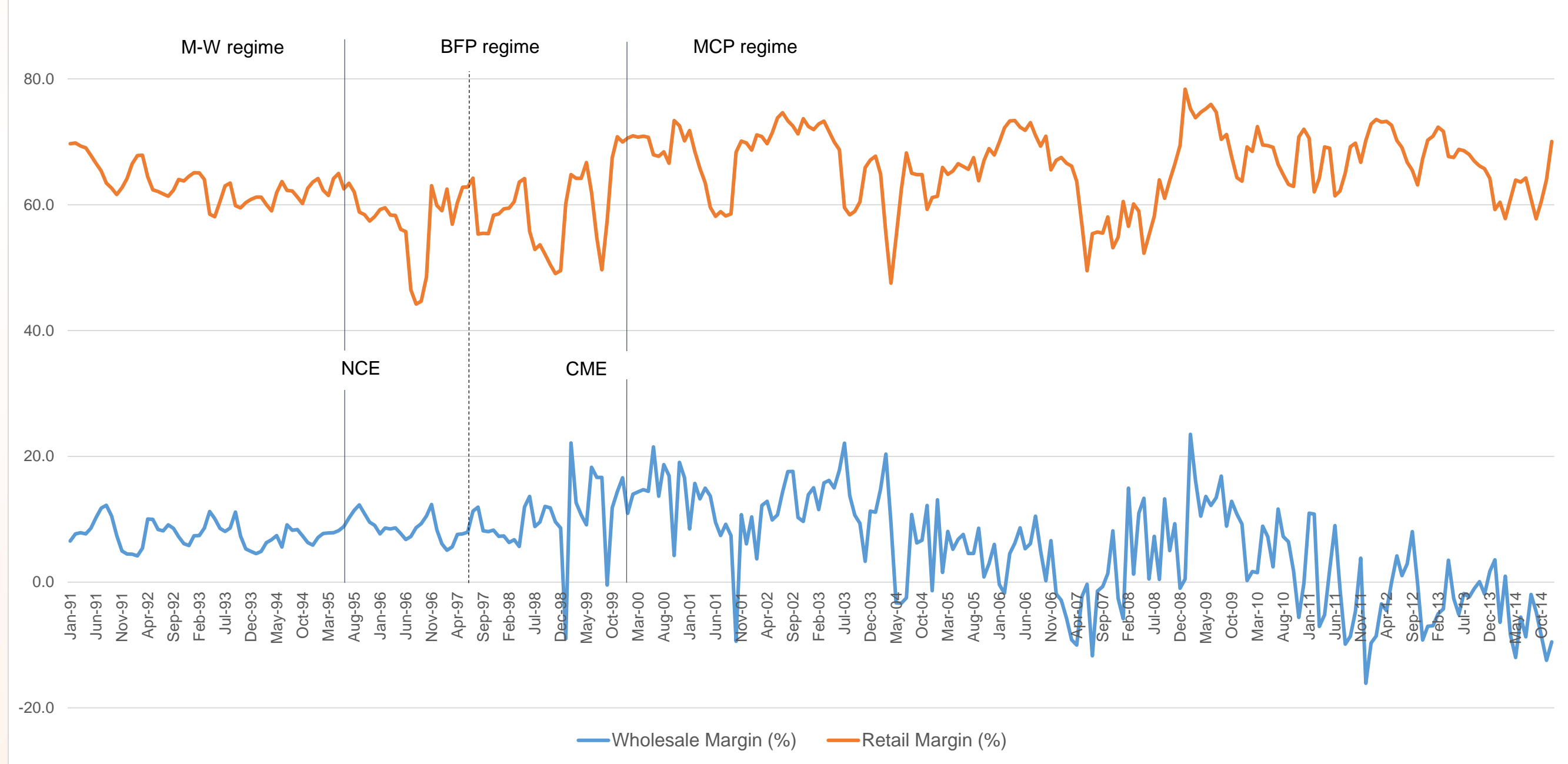
- The frequency of unfilled bids and uncovered offers has increased over time
- Since January 2000 the average yearly share of actual sales in total trading activity is 56% and the share of unfilled bids and uncovered offers is 44%

## Natural Cheddar Cheese Segment: Class III Milk Price, Cheddar Block Price and Retail Natural Cheddar Cheese Price (1991-2014)



	Class III milk price (\$ per cwt)	Exchange cheddar block price (\$ per lb.)	Retail natural cheddar cheese price (\$ per lb.)	Wholesale margin (%)	Retail margin (%)
<b>Minnesota-Wisconsin price series regime</b>					
Average	11.7	1.26	3.45	7.6	63.3
CV	0.07	0.07	0.03	0.26	0.05
<b>Basic Formula Price regime</b>					
Average	12.9	1.43	3.44	9.5	58.4
CV	0.14	0.13	0.08	0.47	0.10
<b>Multiple Component Pricing regime</b>					
Average	14.9	1.55	4.63	4.8	66.5
CV	0.26	0.21	0.13	1.73	0.09

## Wholesale Margin and Retail Margin (1991-2014)



## Discussion: Natural Cheddar Cheese Segment

Exchange spot cheddar cheese price and Class III milk price

- Increases in the average prices are small in magnitude
- Increases in the variance of cheese and milk prices are dramatic

Wholesale cheddar block margin at the first-handler level

- The average wholesale margin decreases from 7.6% in M-W price regime to 4.8% in MCP regime
- The wholesale margin volatility increases dramatically, almost 7 times

Retail natural cheddar cheese margin

- The average retail margin remains at approximately the same level 63.3% in M-W price regime and 66.5% in MCP regime
- The retail margin volatility increases almost 2 times