Milk Price Volatility: What's Old is New

(but what's new is different)

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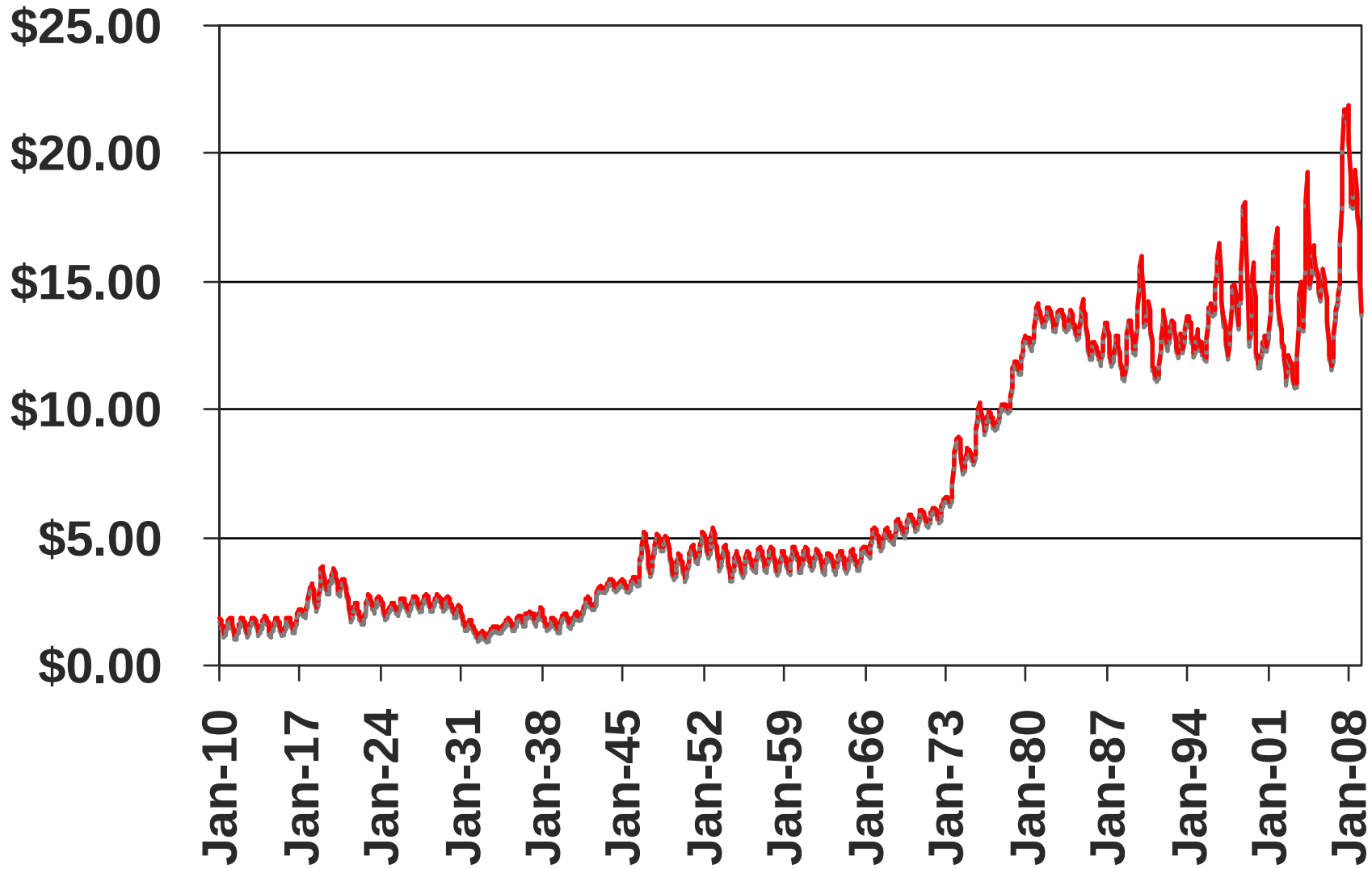
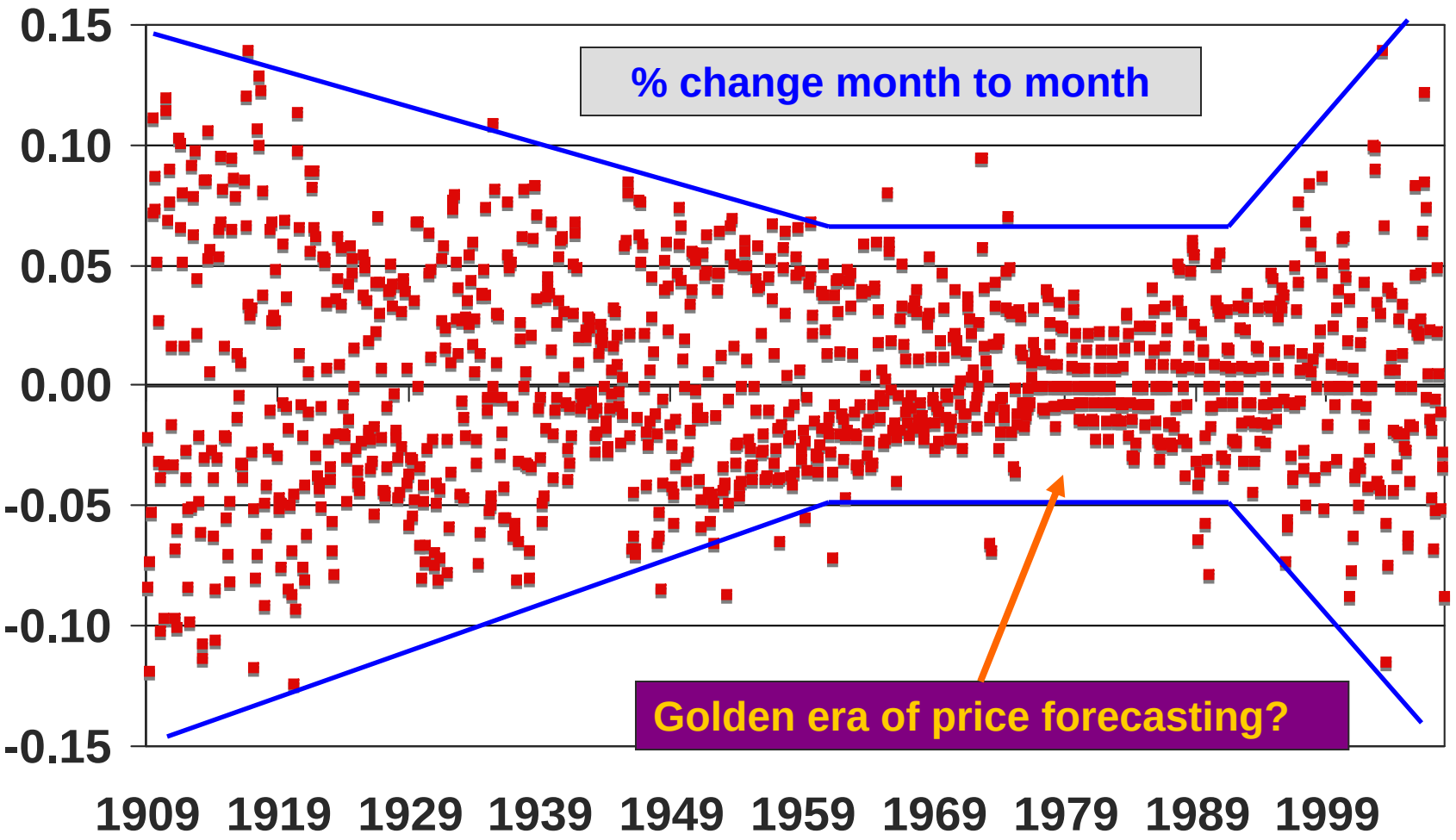
U.S. All Milk Price



What Are We Looking For?

- Anticipated Variation
  - Seasons
  - Cycles
  - Trends
- Unanticipated Variation
  - Shocks

Relative Variability Over Time

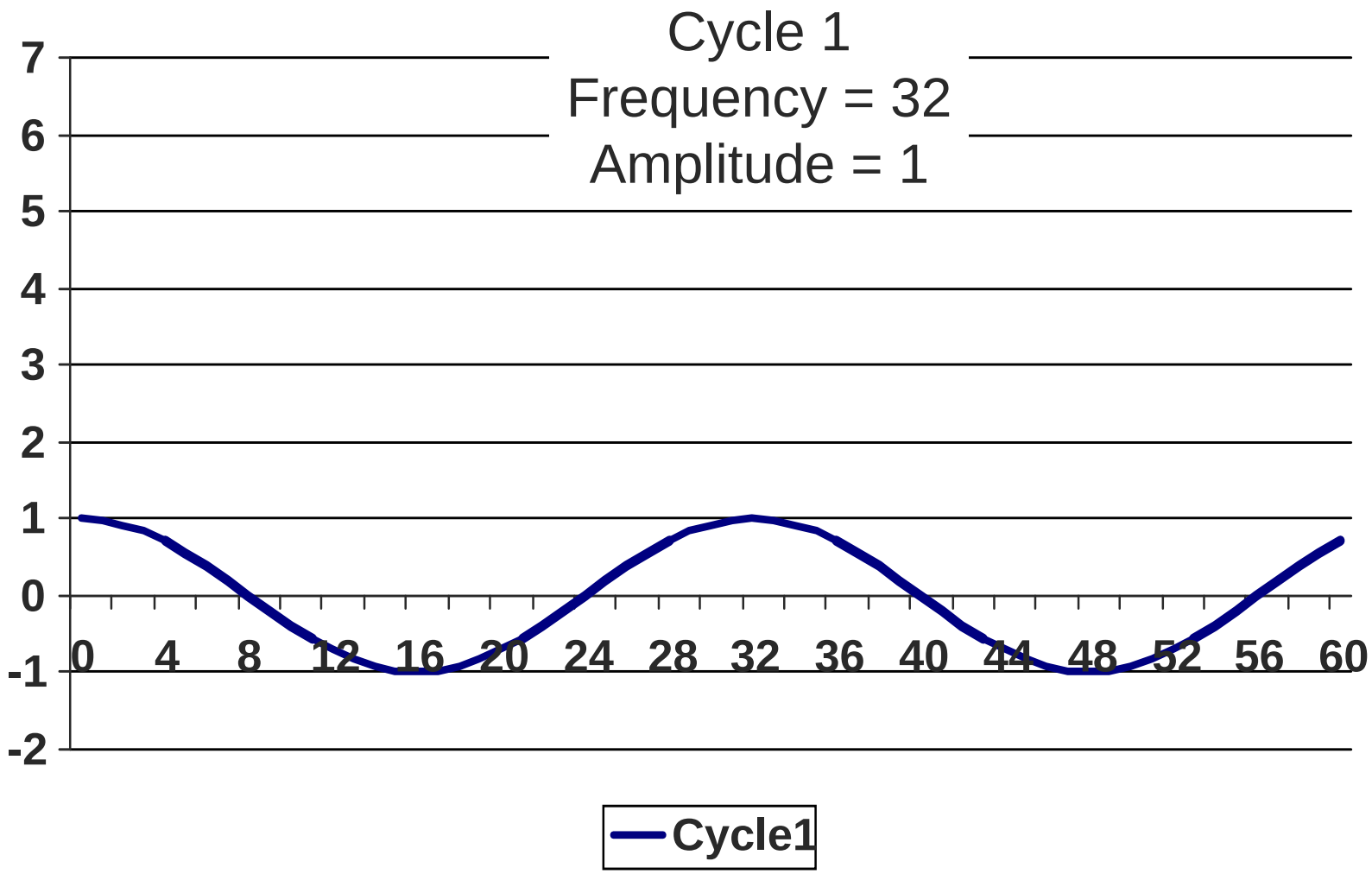


Current variability of similar magnitude to early 20th century – but less predictable?

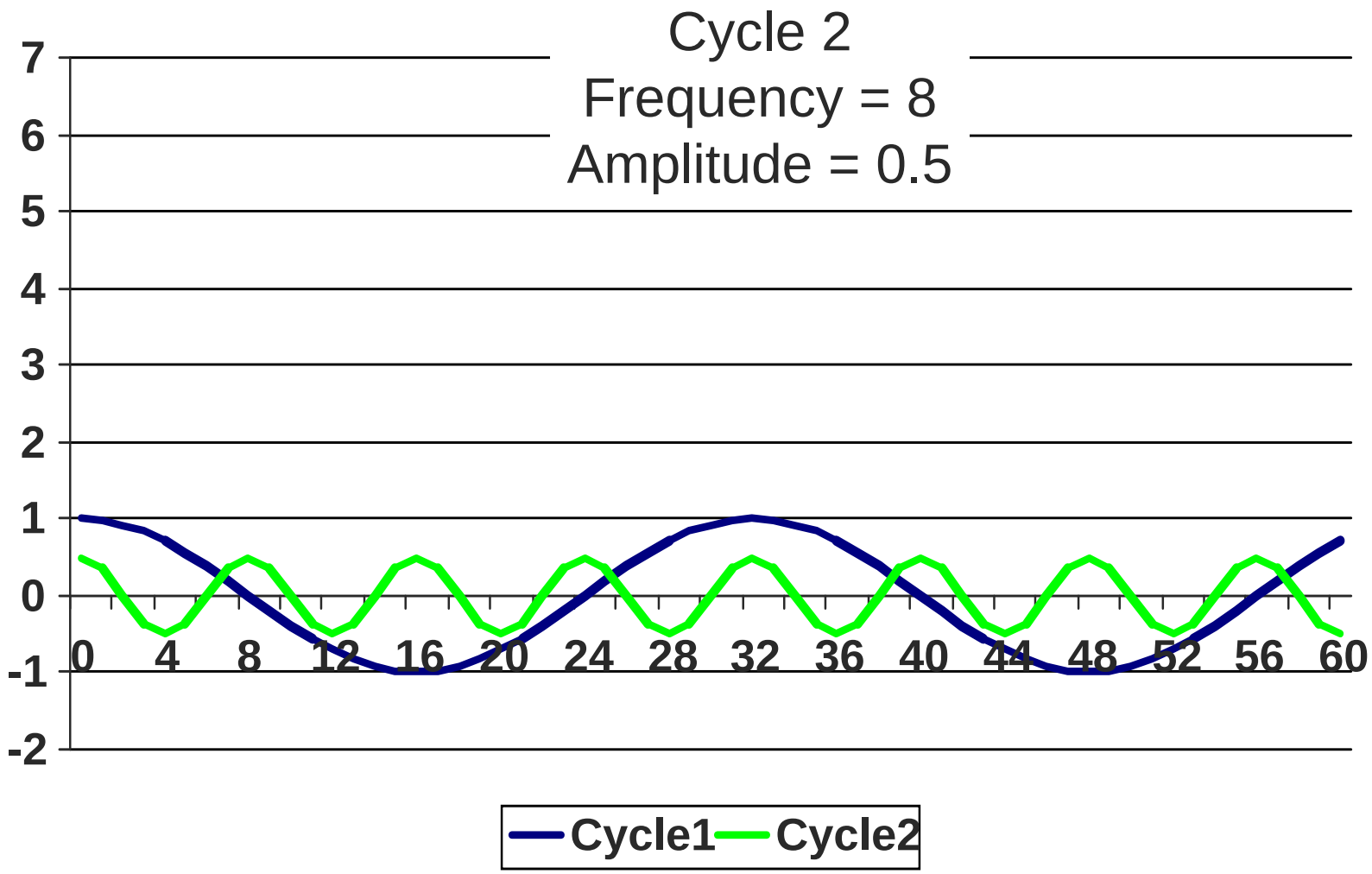
Is There Order Within the Chaos?

- The All Milk price series looks chaotic but is there order underlying the volatility?
- Let’s examine with “State-Space Methods” or “Spectral Decomposition”

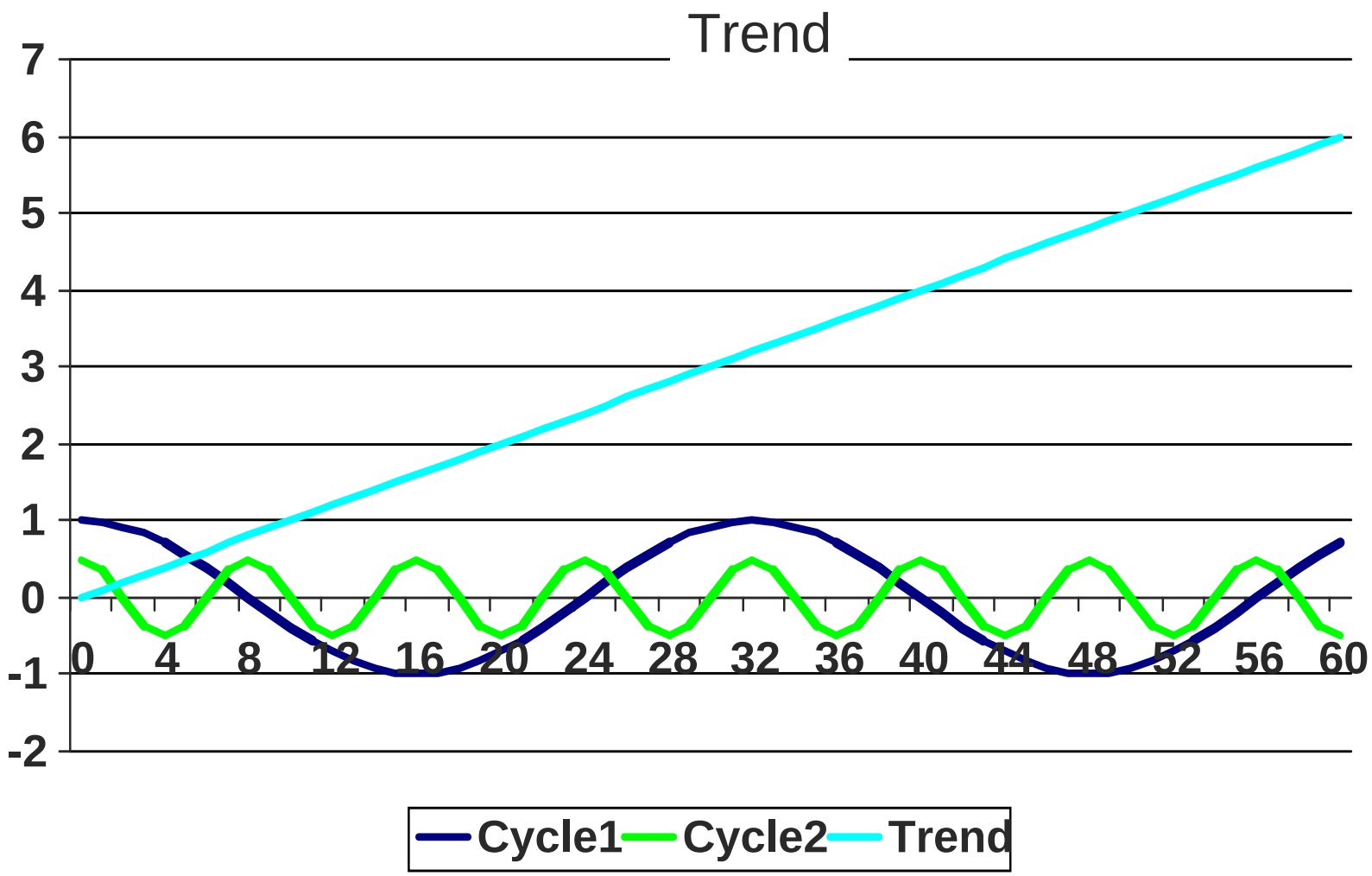
Spectral Composition Example



Spectral Composition Example



Spectral Composition Example



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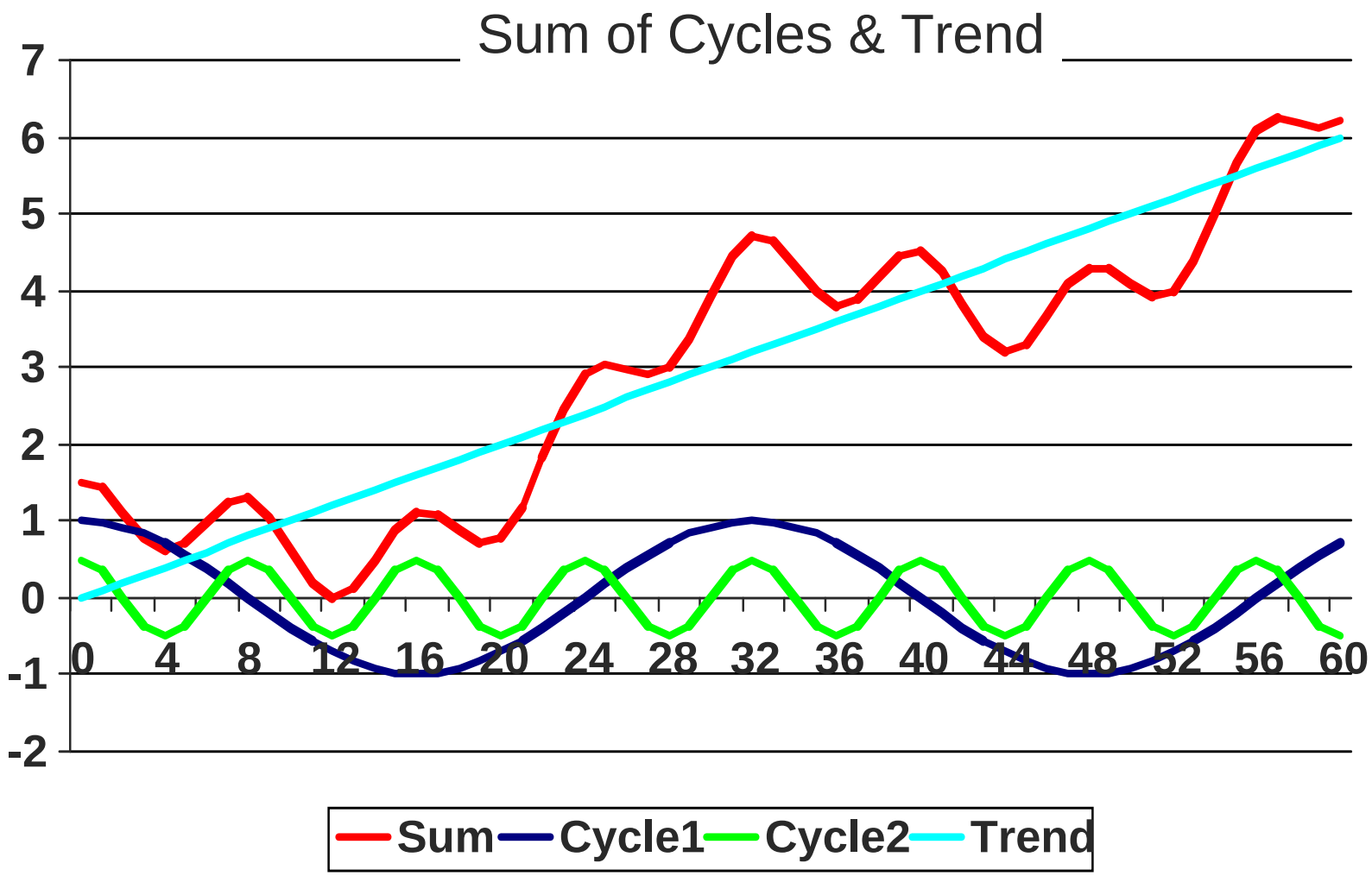
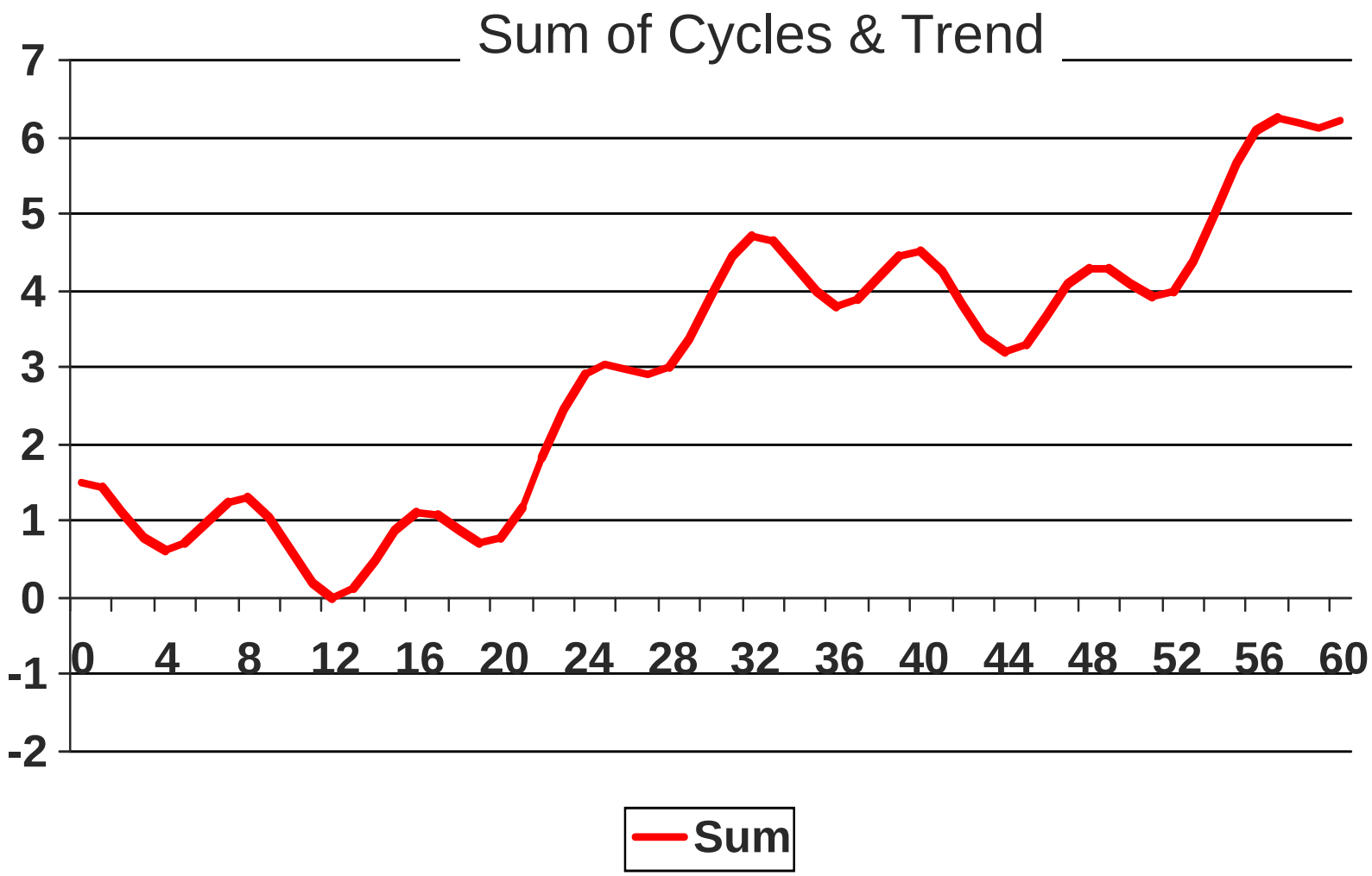
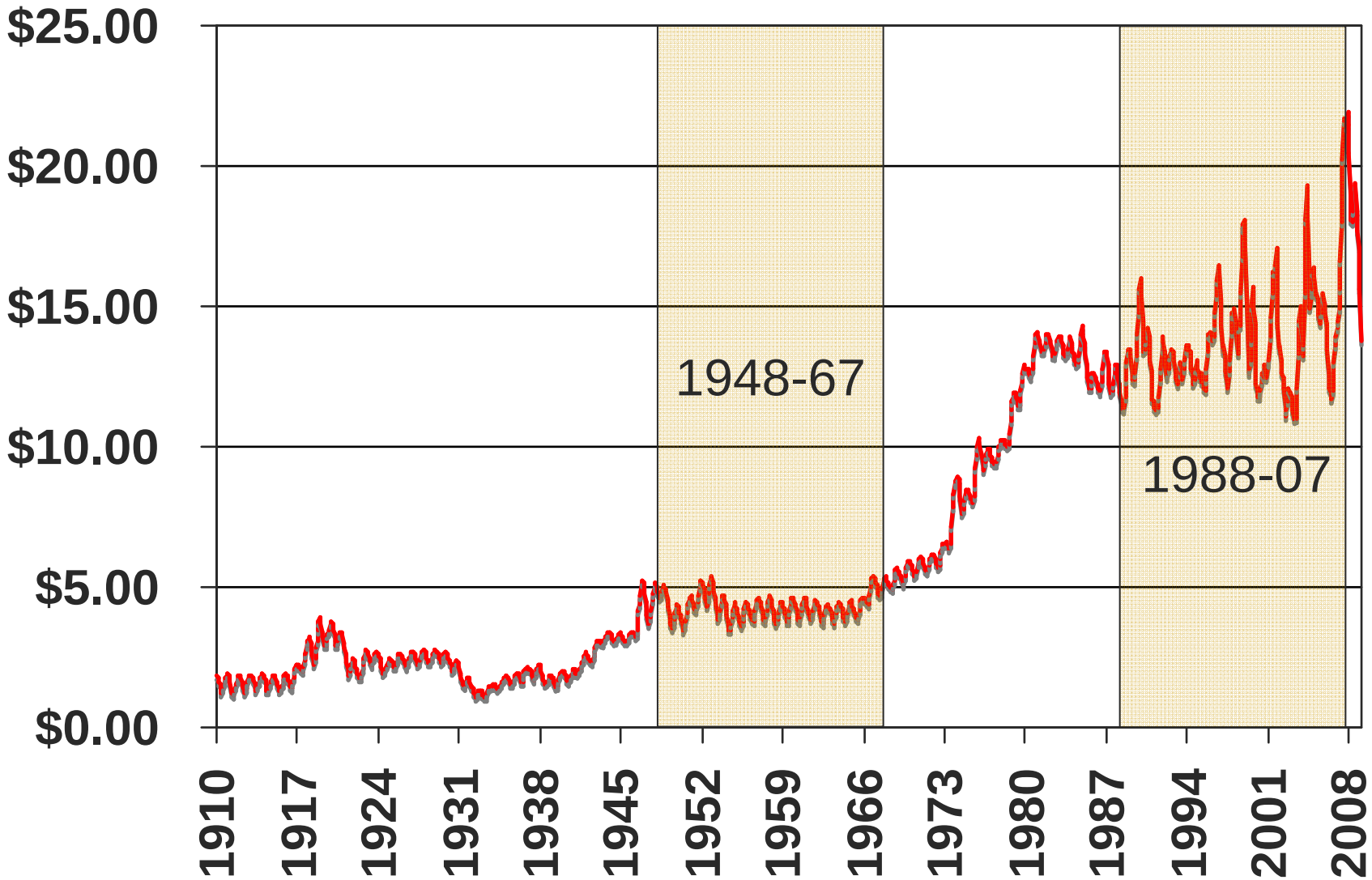


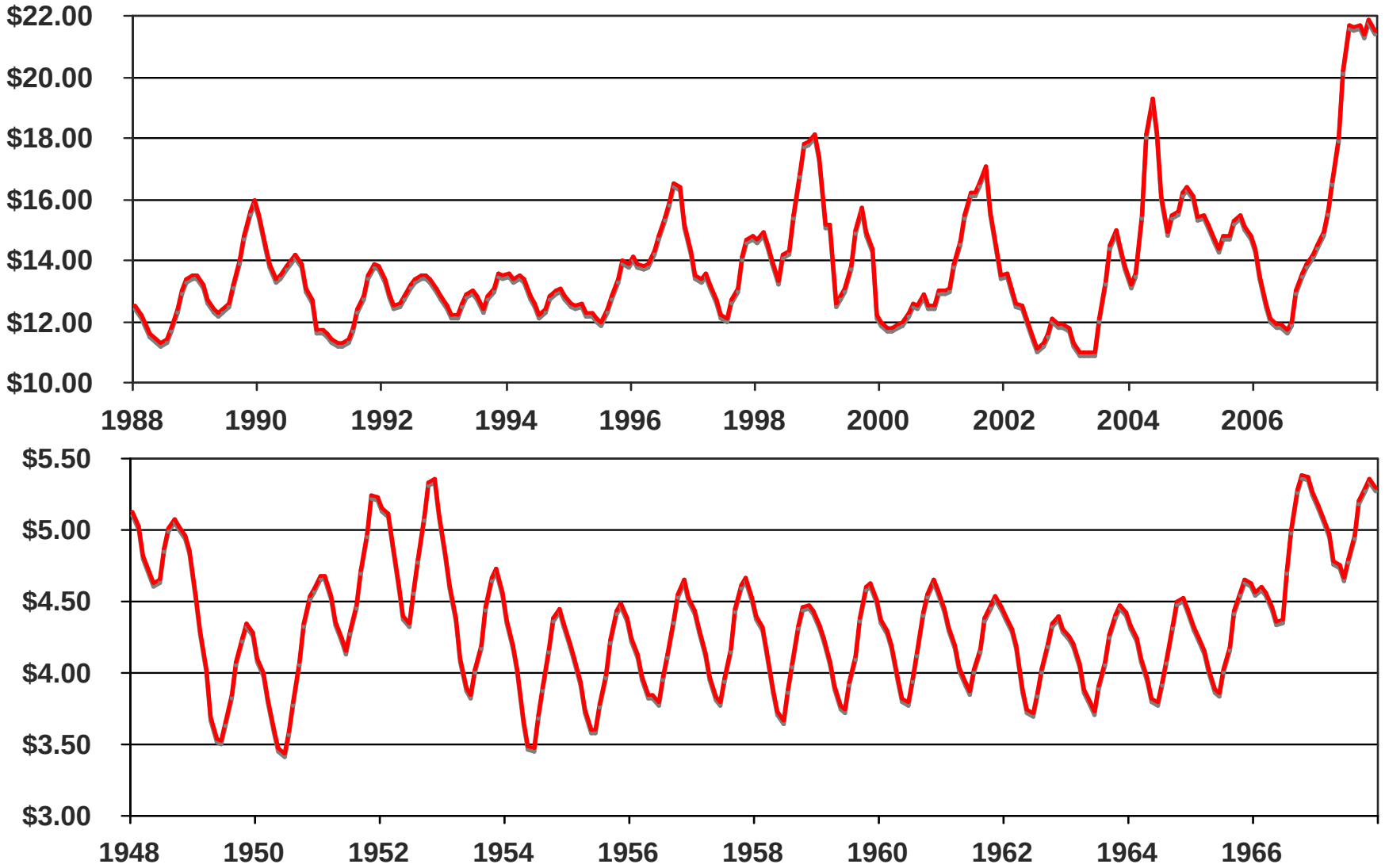
Spectral Composition Example



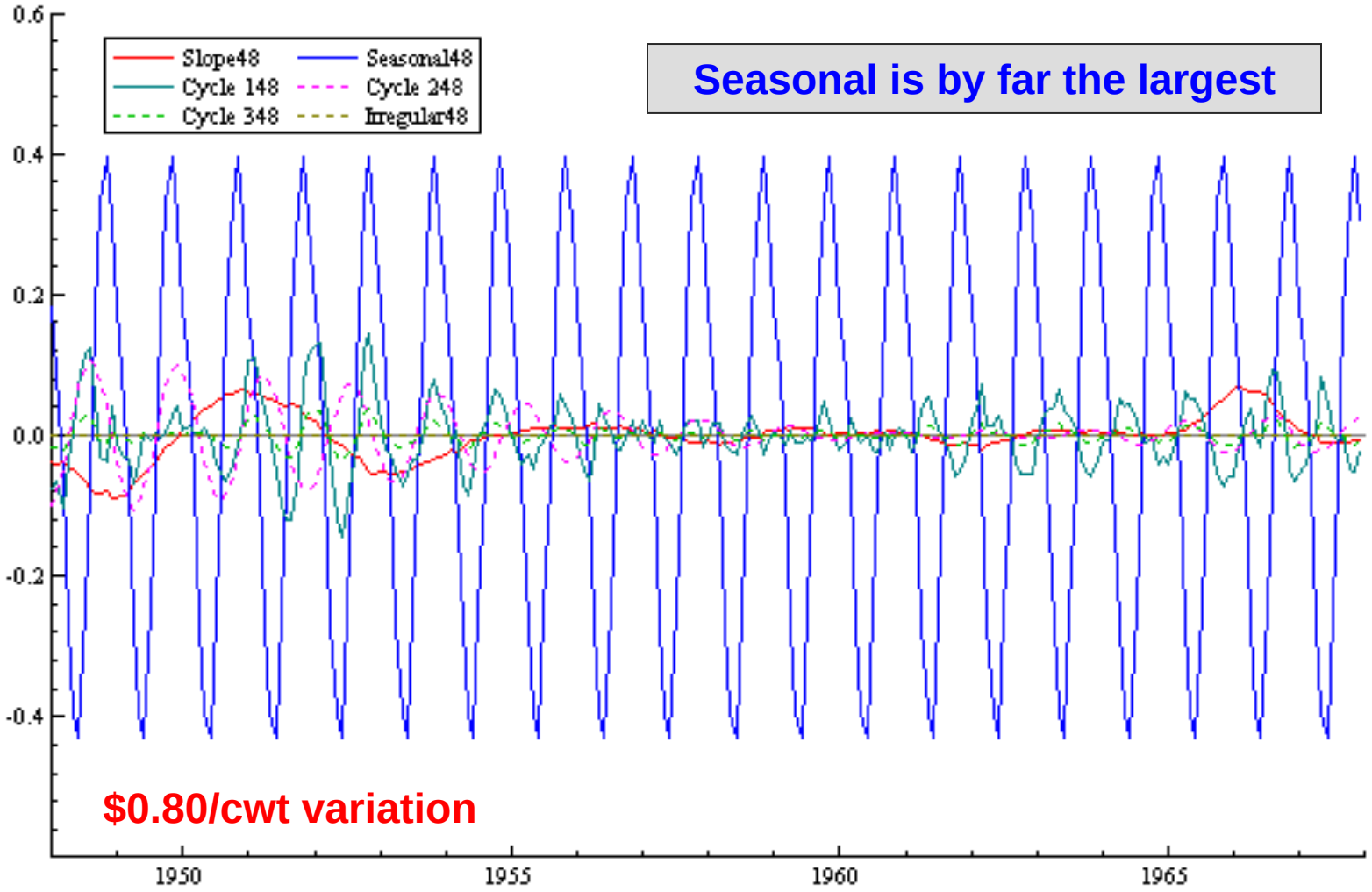
Look At Two Time Periods



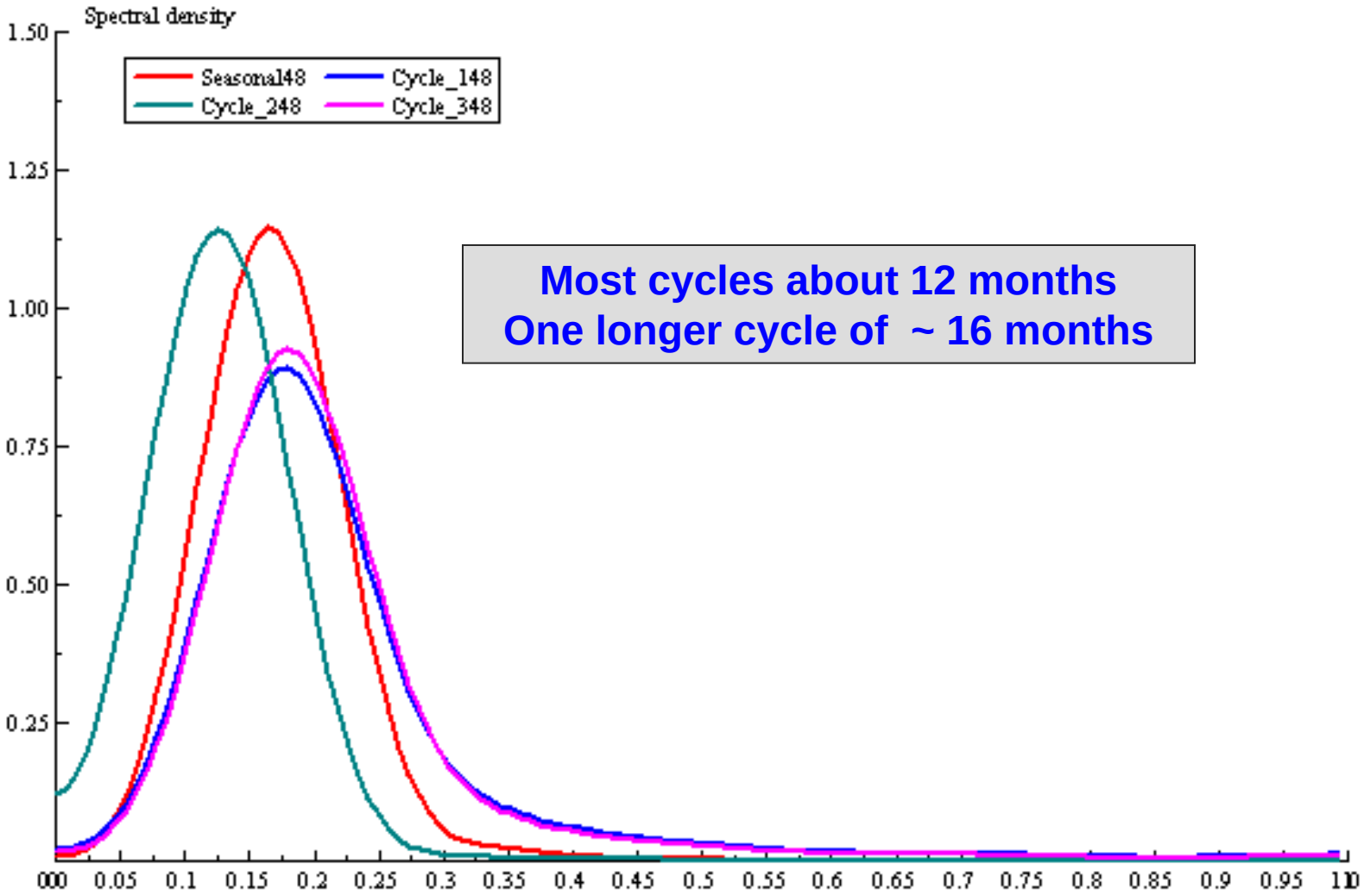
A Closer View of the Two Series



Components 1948 to 1967

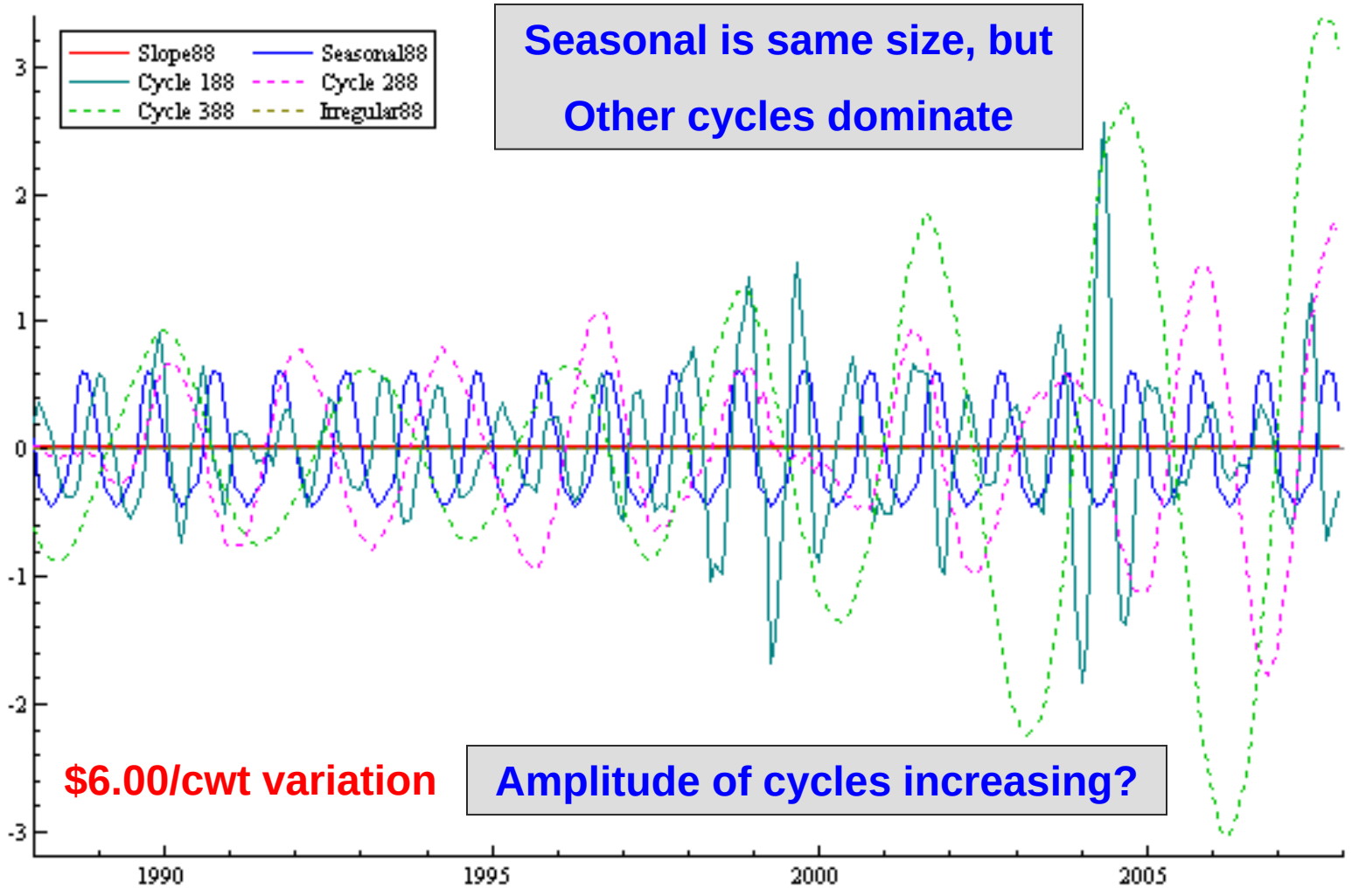


Spectra 1948 to 1967

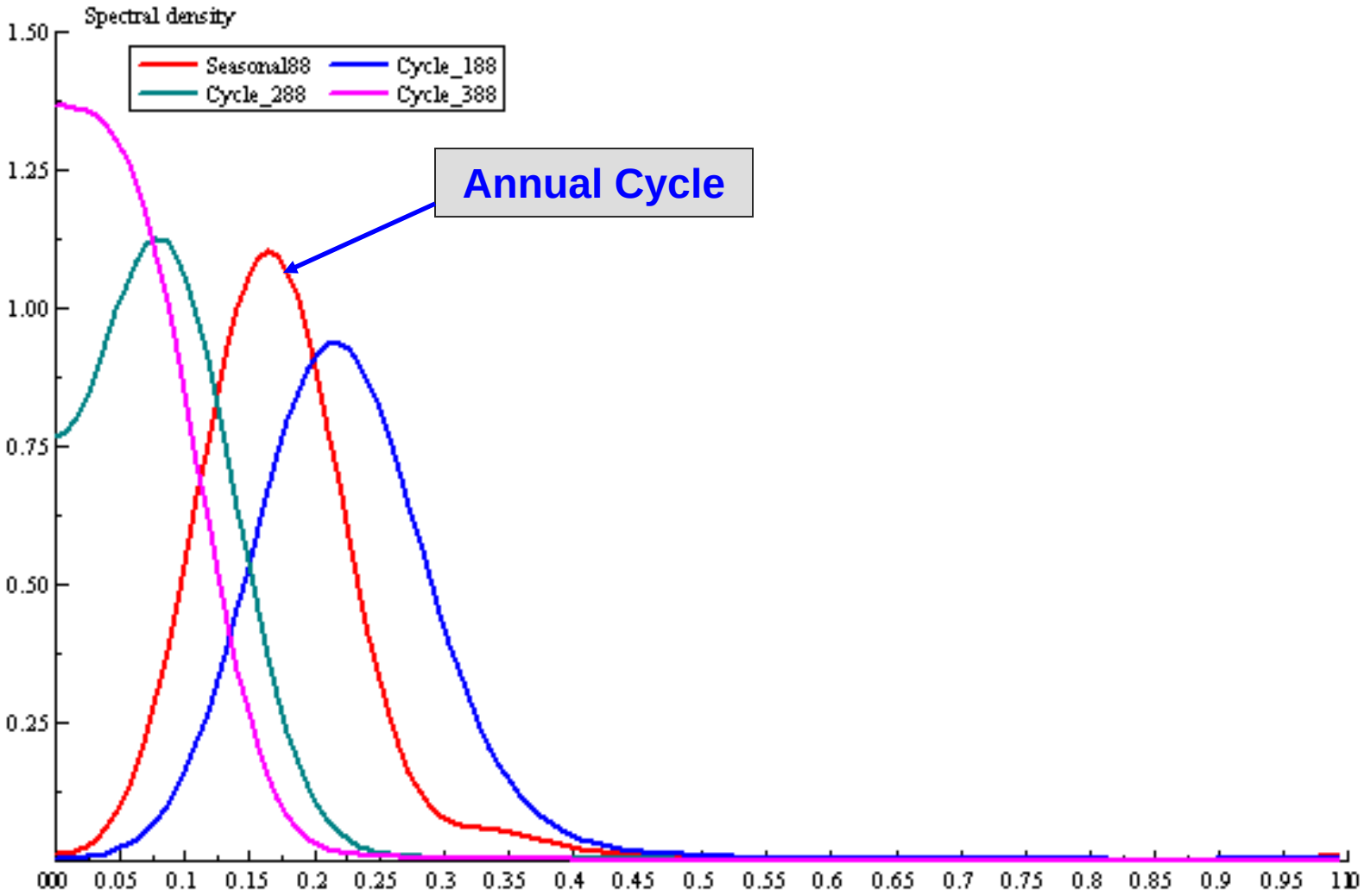


Most cycles about 12 months
One longer cycle of ~ 16 months

Components 1988 to 2007



Spectra 1988 to 2007



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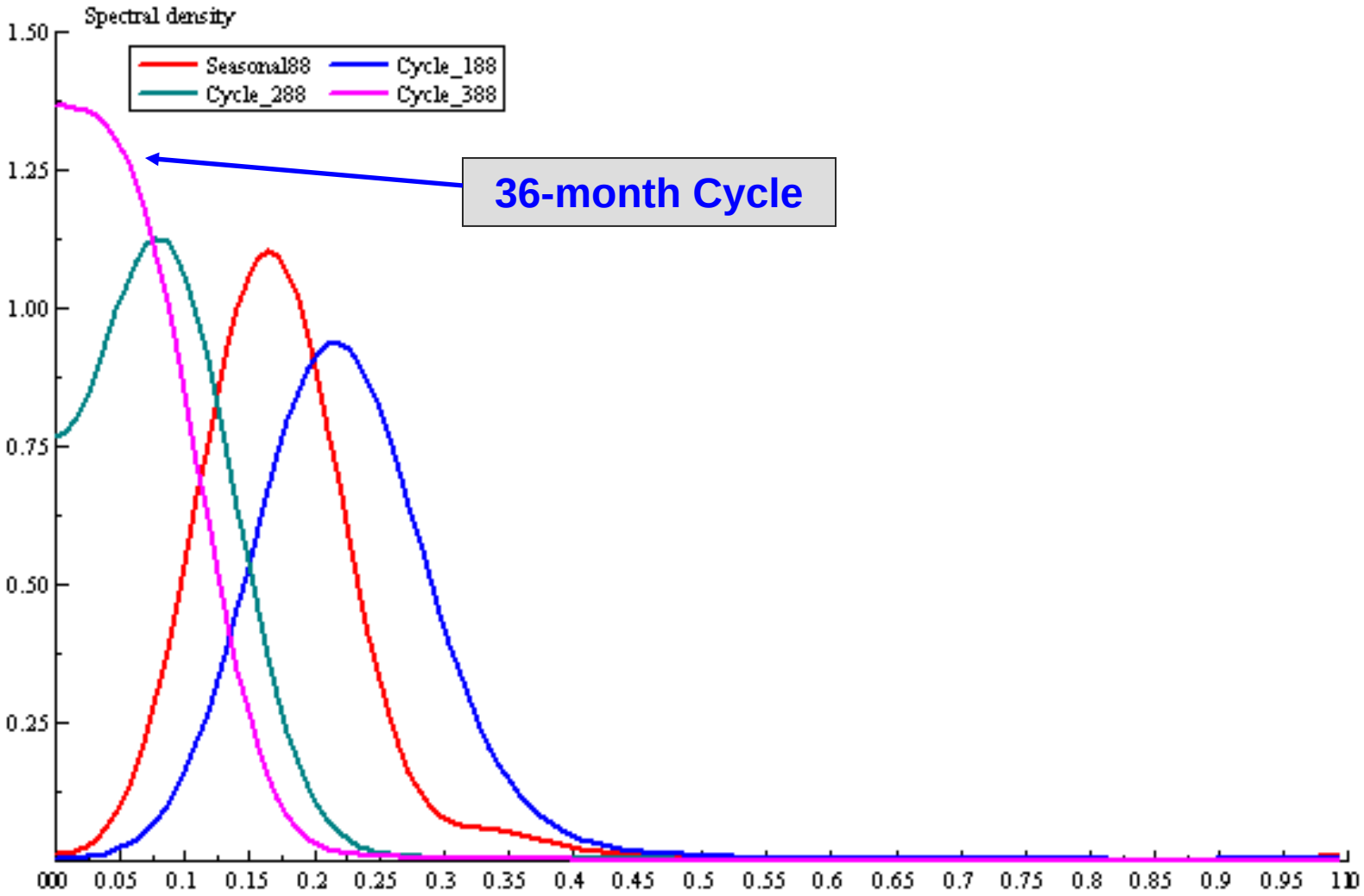

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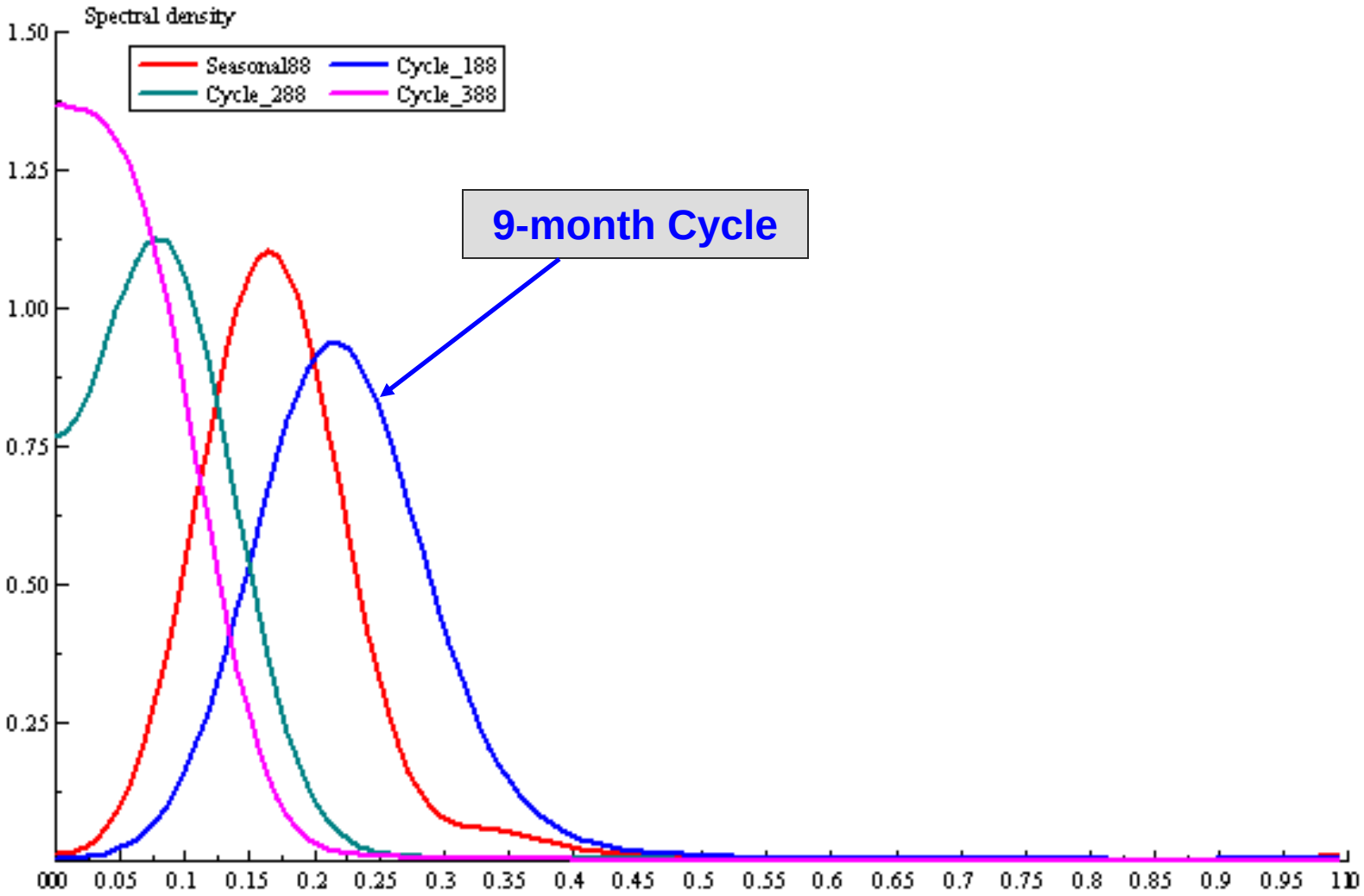
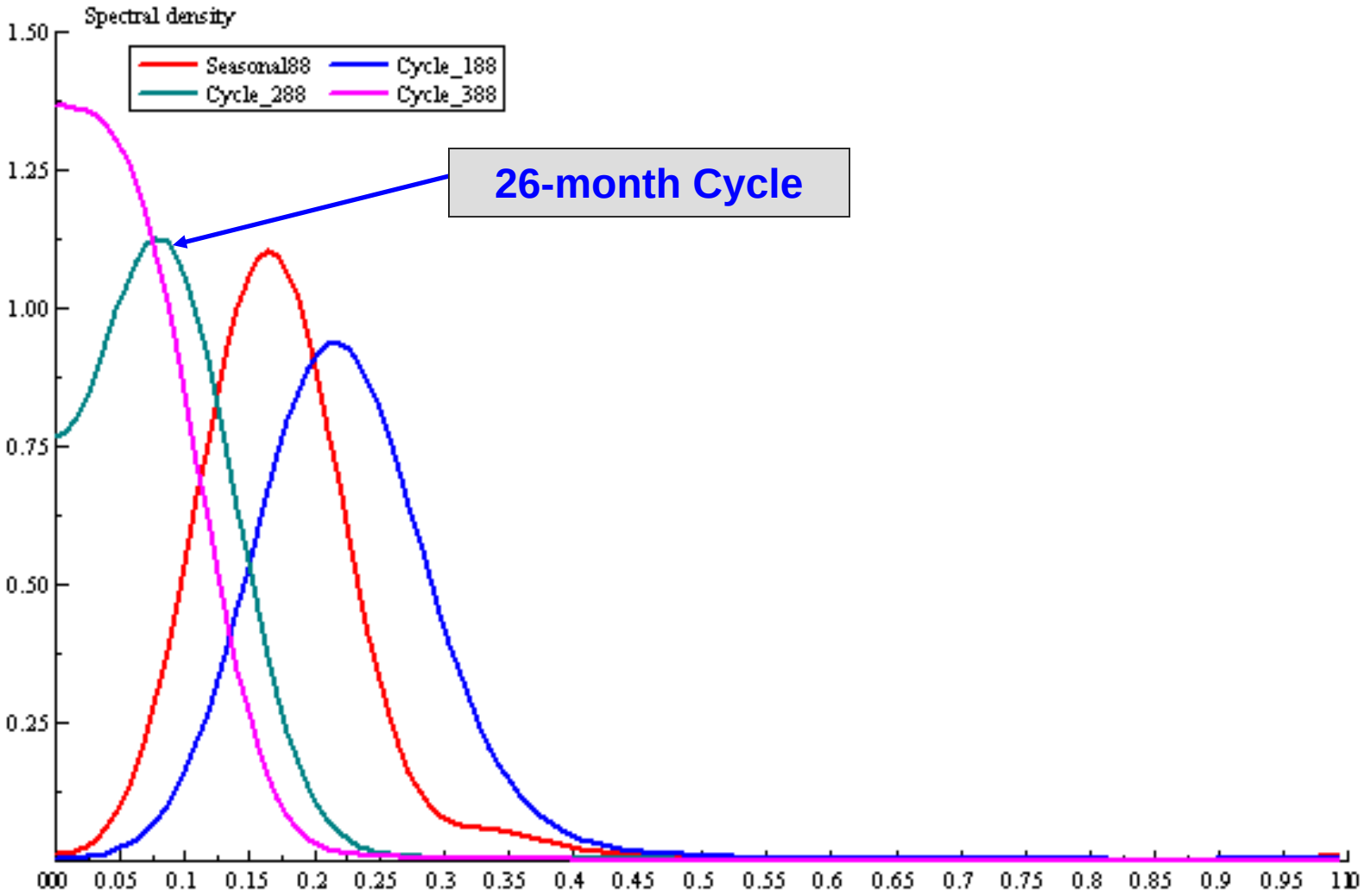
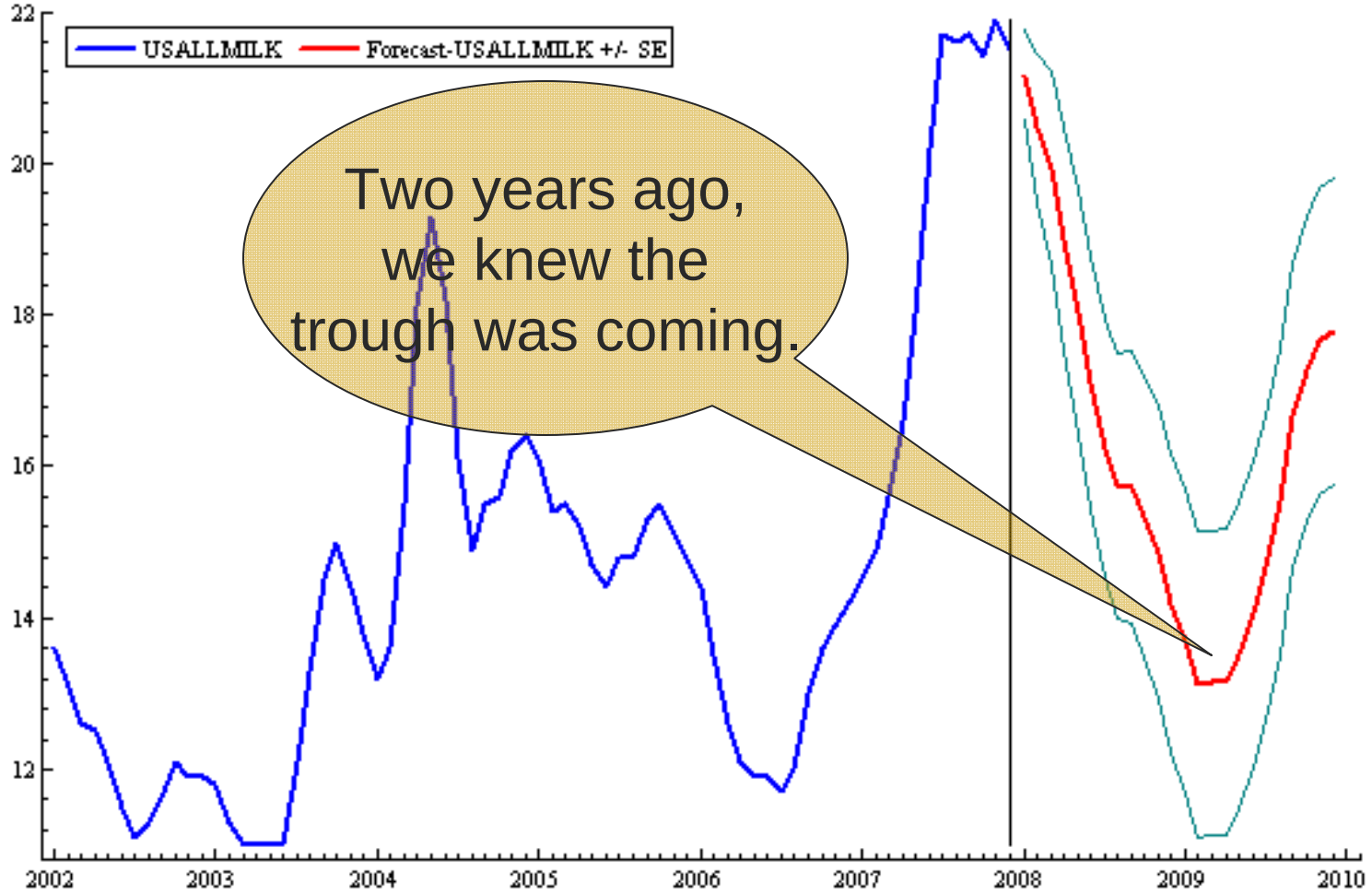


Spectra 1988 to 2007



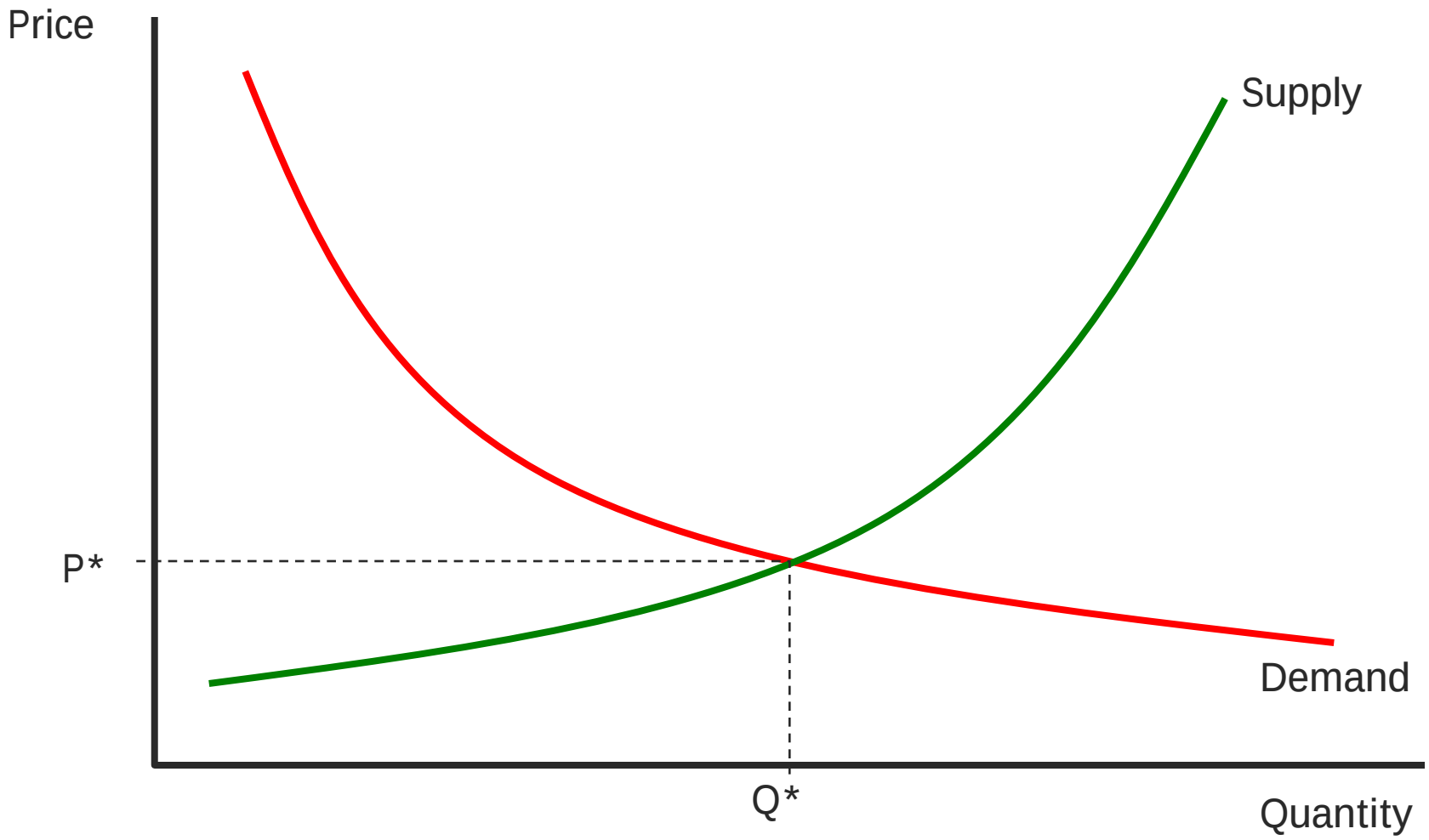
Forecasting with Spectral Decomposition



Shocks

- A sudden surprise event that temporarily increases or decreases the **supply** or **demand** for goods or services

Supply Shocks



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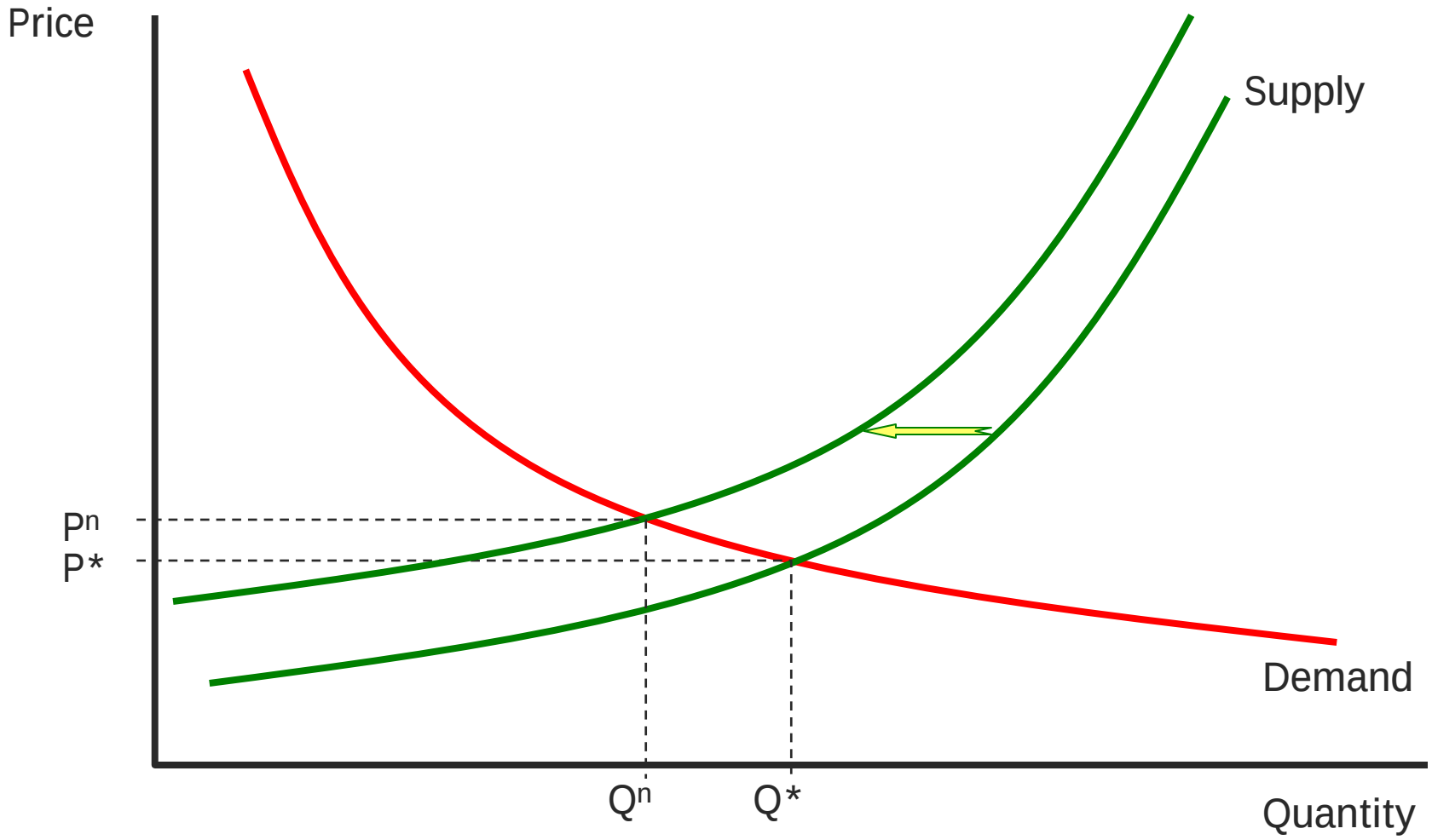
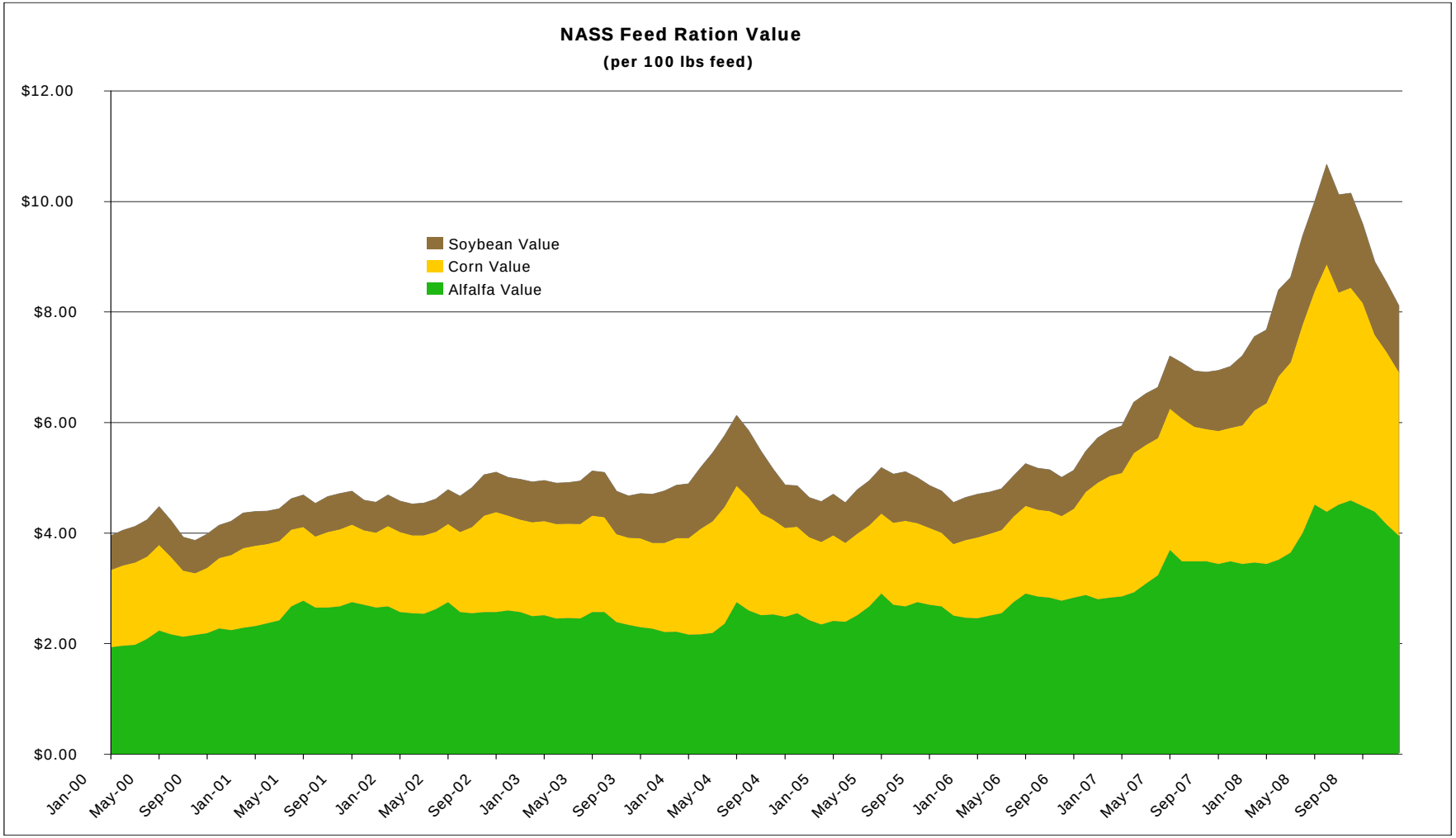
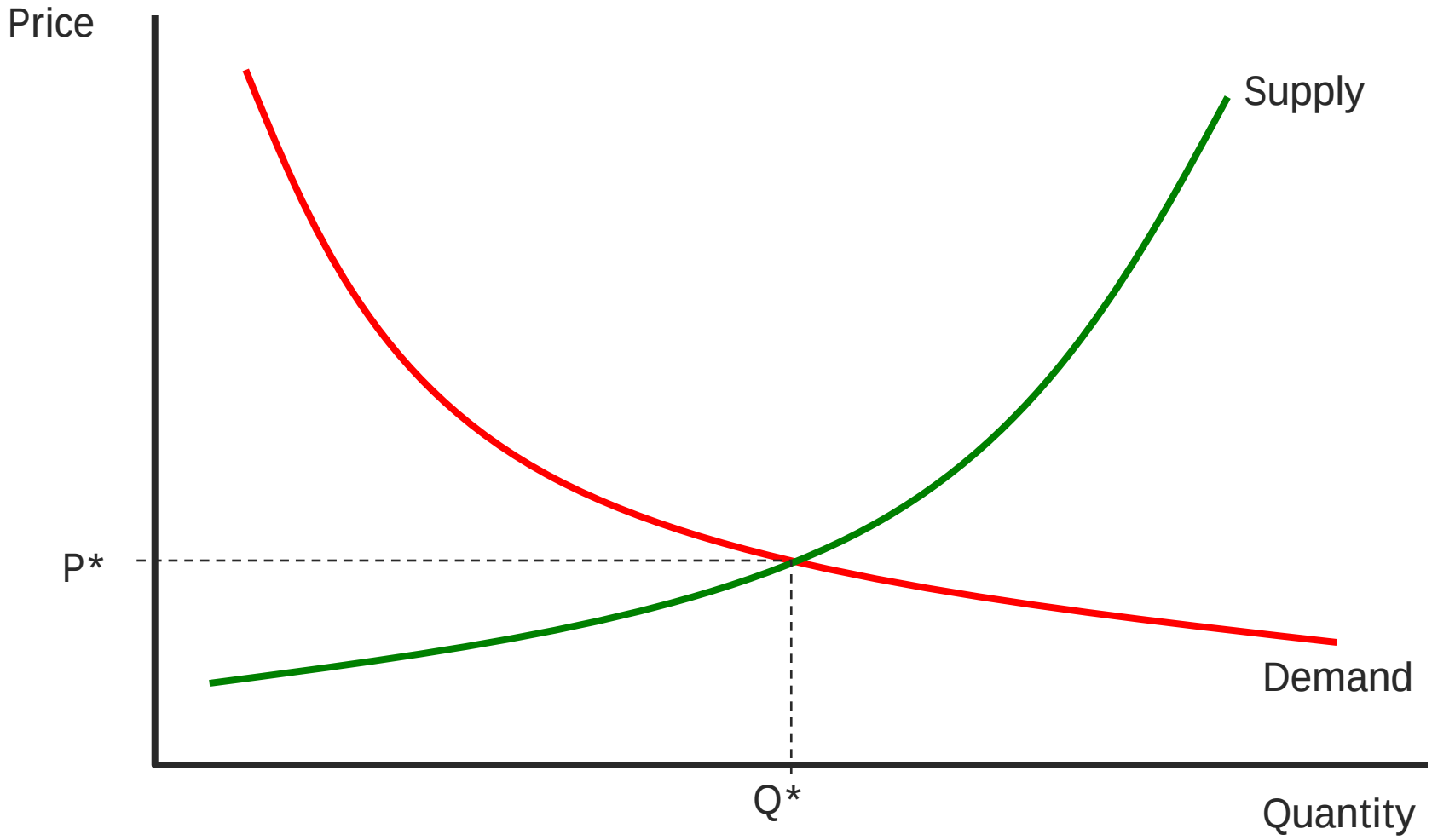


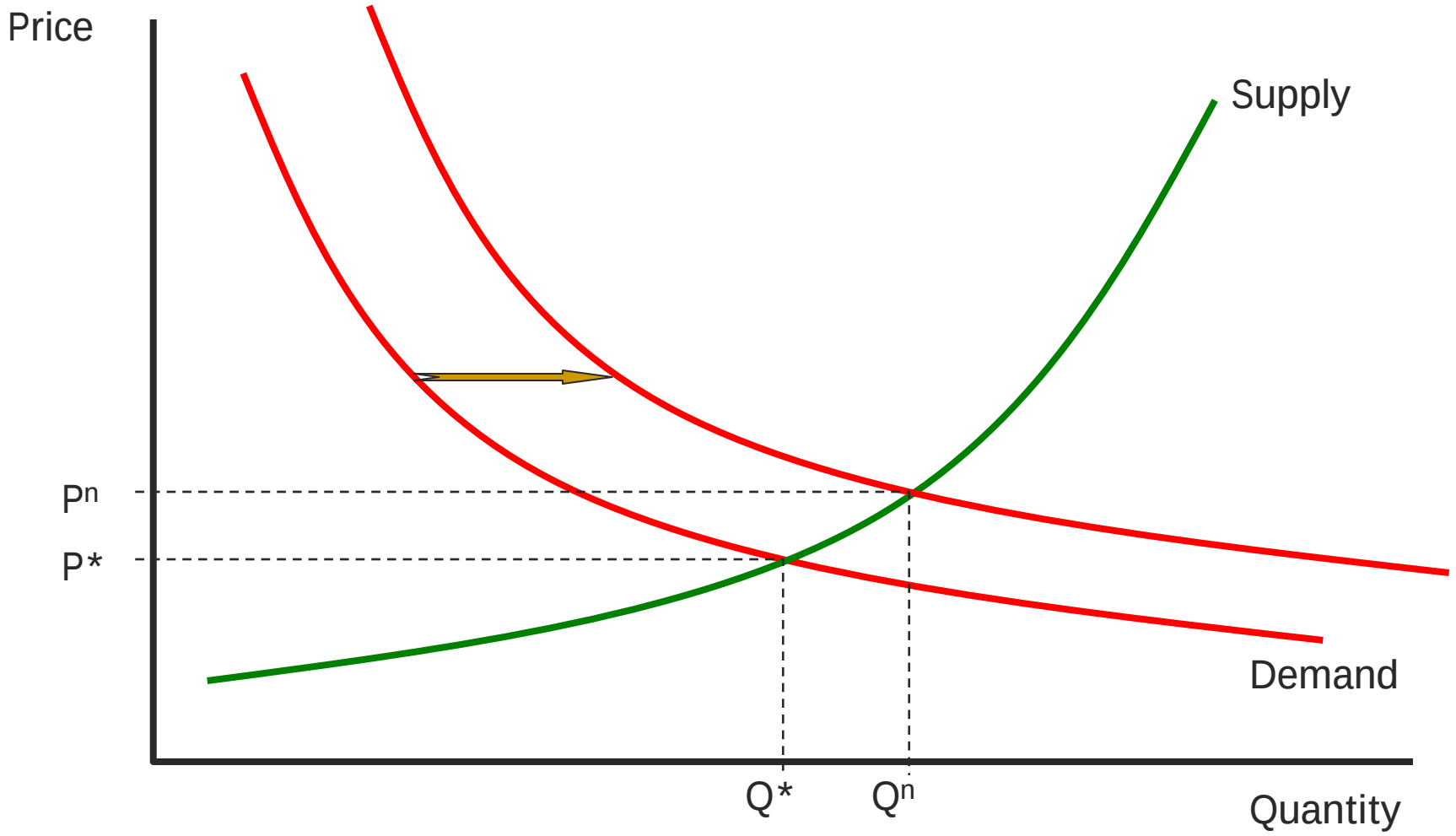
Feed Costs Have Been Way Up



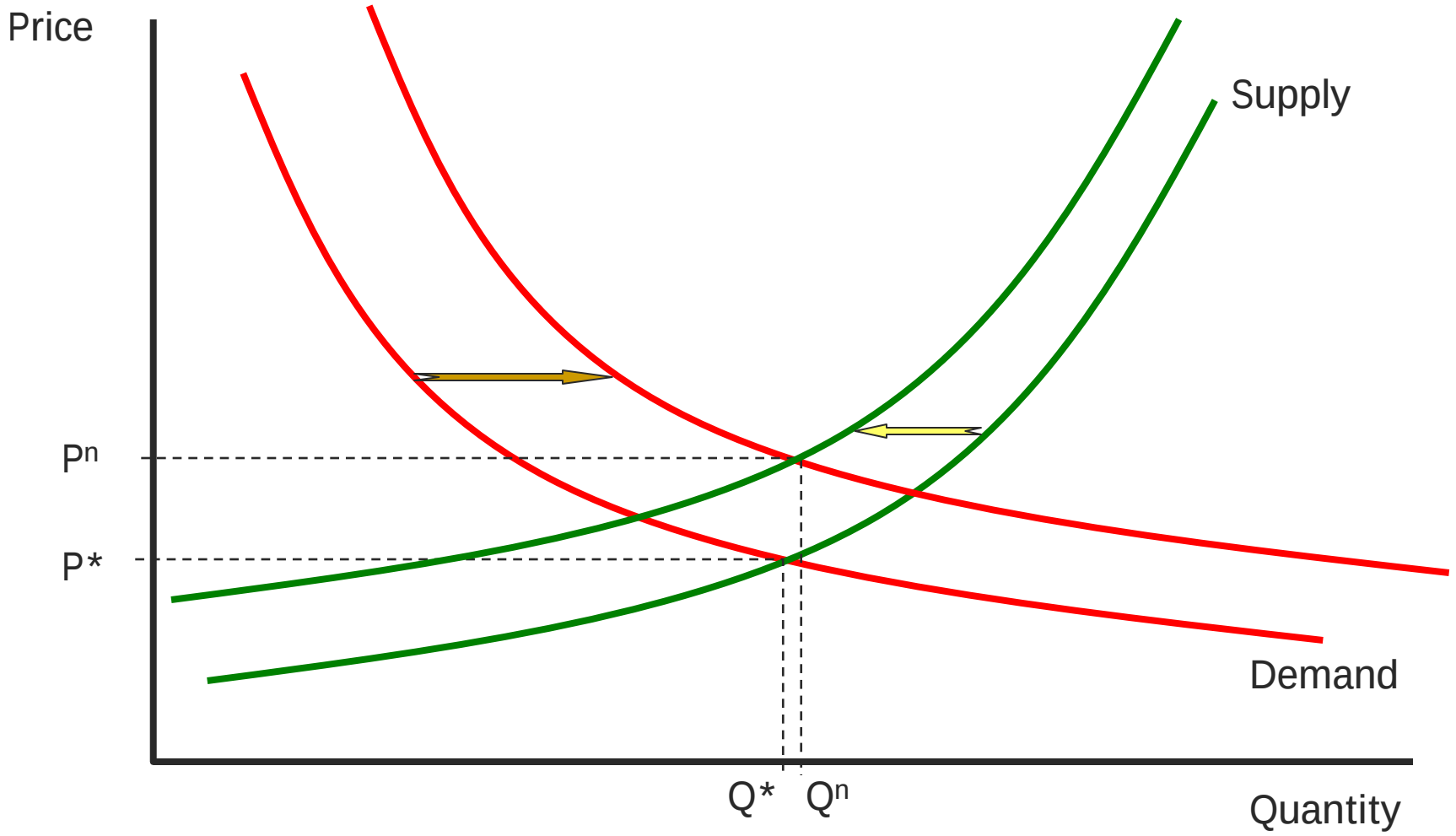
Demand Shocks



Demand Shocks



Supply & Demand Shocks



A Series of Unfortunate Events

—with respect to Lemony Snicket's

- Seasons, cycles and trends would have forecasted a major price trough in 2009
- On top of that we have experienced a huge demand shock

- Volatility was inevitable… or was it?

The Good Old Days?

- An active price support program did dampen the volatility that is endemic to the dairy industry.
- Producers are looking for ways to dampen it again.

Growth Management Plan (GMP)

- Objective: Manage milk supply growth for more stable prices
  - All producers must participate
  - Facilities are not restricted from production growth

How Would GMP Work?

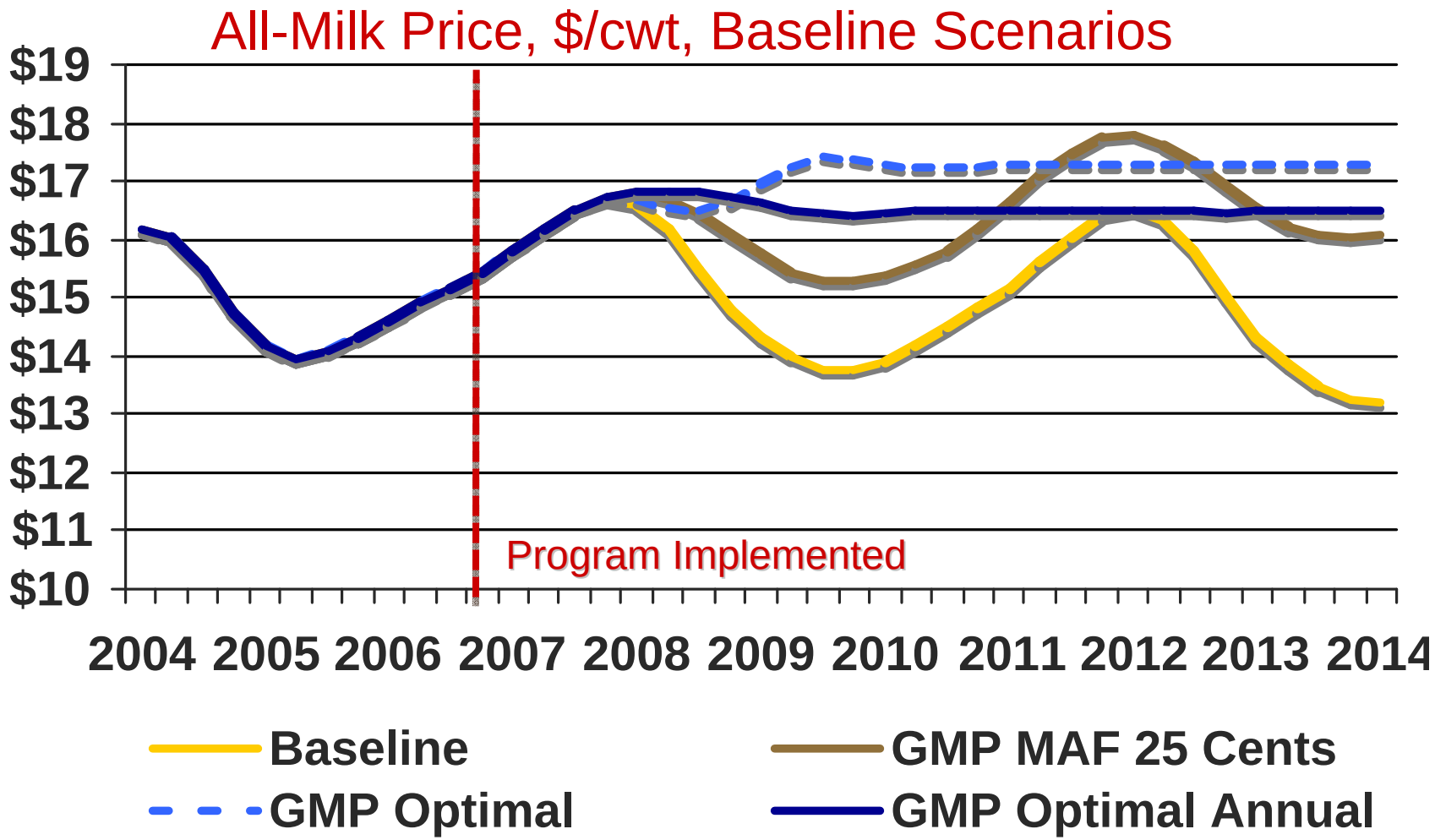
- Set and allowable annual % growth
  - Same for all producers
  - Typically greater than zero
- Milk production in current quarter is compared against same quarter last year plus allowable growth
- If milk is more than allowable growth, then facility pays a “market access fee” on all milk produced.

How Would GMP Work?

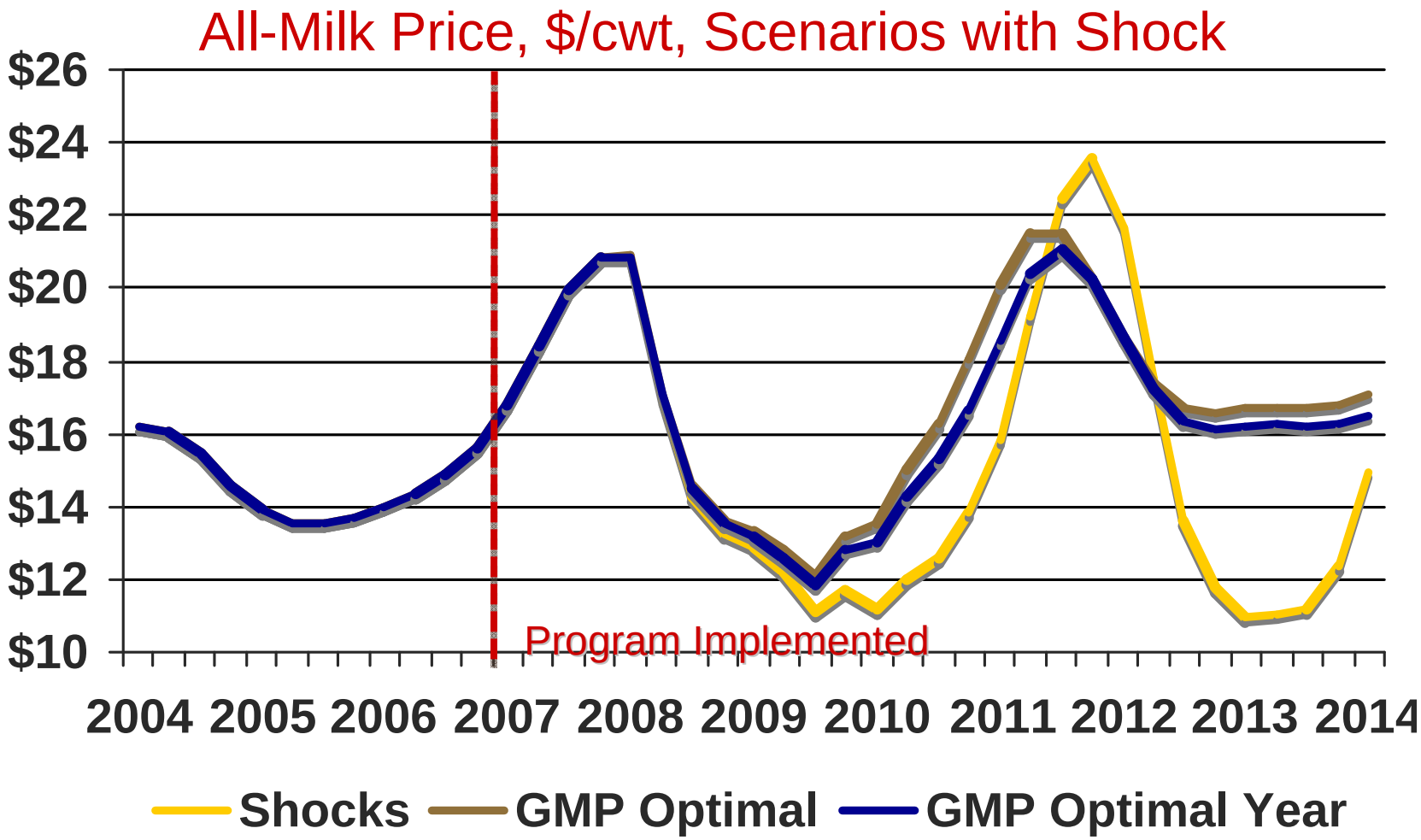
- Pool all market access fees
- Pay refunds to all facilities that did not exceed allowable growth

- Refund size depends on:
  - Size of the market access fee
  - Amounts of qualifying and non-qualifying milk

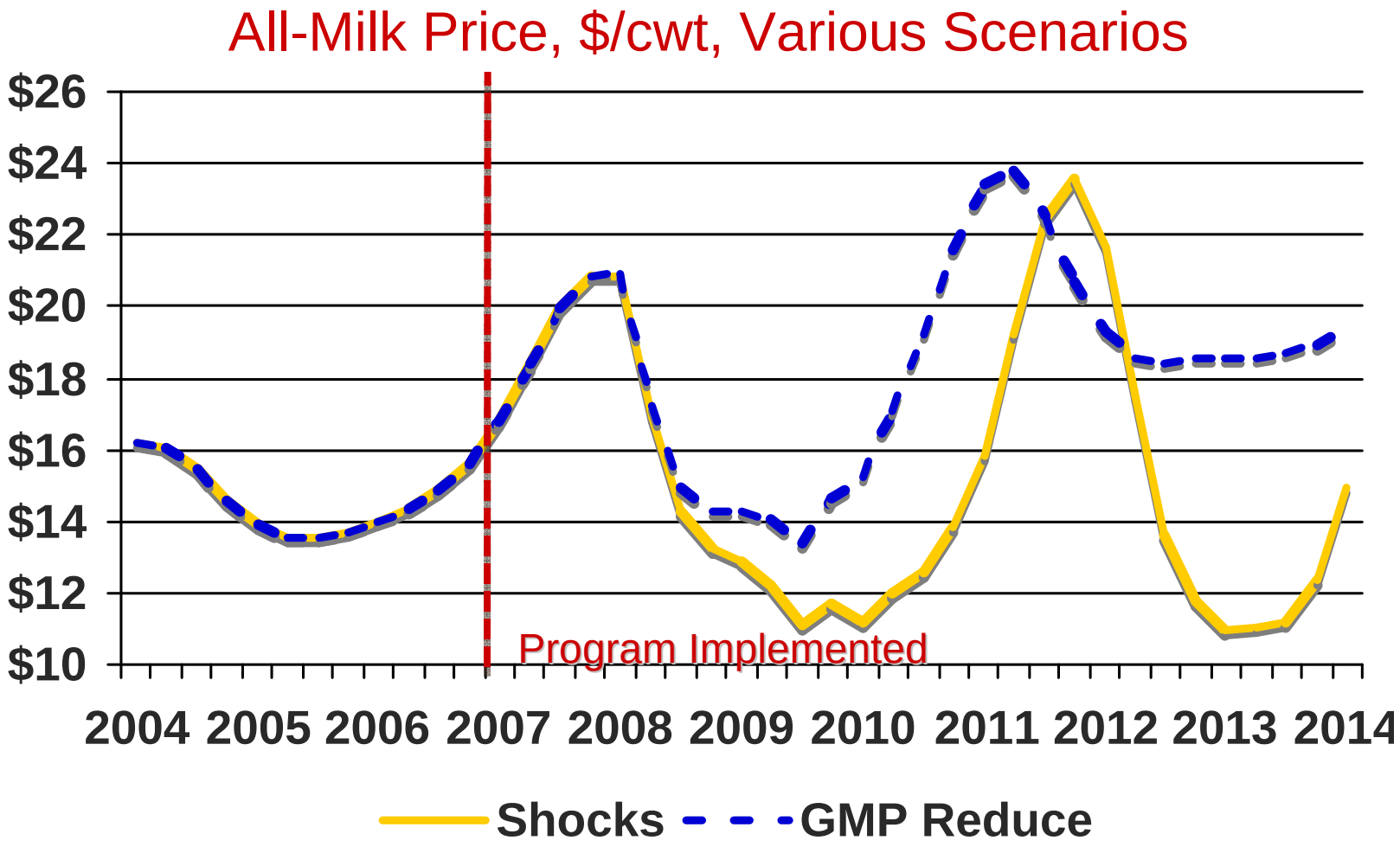
GMP and “Normal” Cyclical Variation



GMP with Feed and Demand Shocks



GMP with Shocks and Negative Growth



If accept reductions in allowable milk production, can mitigate shock better

Bottom Line…

- Volatility is endemic to the dairy industry
- Supply response to market signals seems stronger today causing cycles to be different and more pronounced than 40 years ago
- Policy could help to dampen price swings