

The Food Price Crisis of 2007/2008: Evidence and Implications

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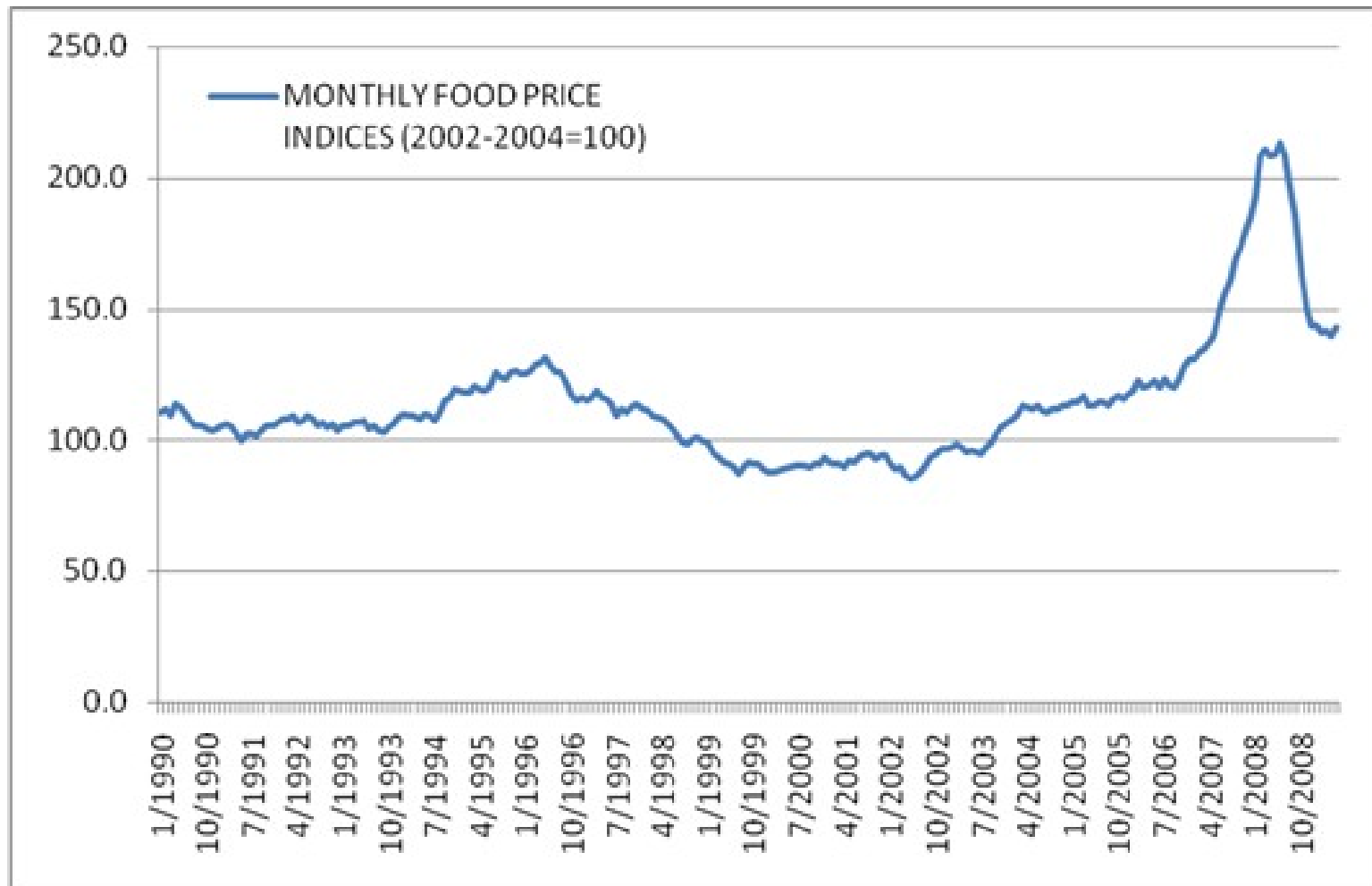
And

***Brian Wright
University of California, Berkeley.***

Food Price Volatility: Renewed Concern

- Recent high prices have focused world attention on global food security
- Poorest market-dependent consumers are the most vulnerable
- Widespread urban unrest, political pressure
- [Longer-run question: a new regime of scarcity?]

The Food Price Spike of 2007/08



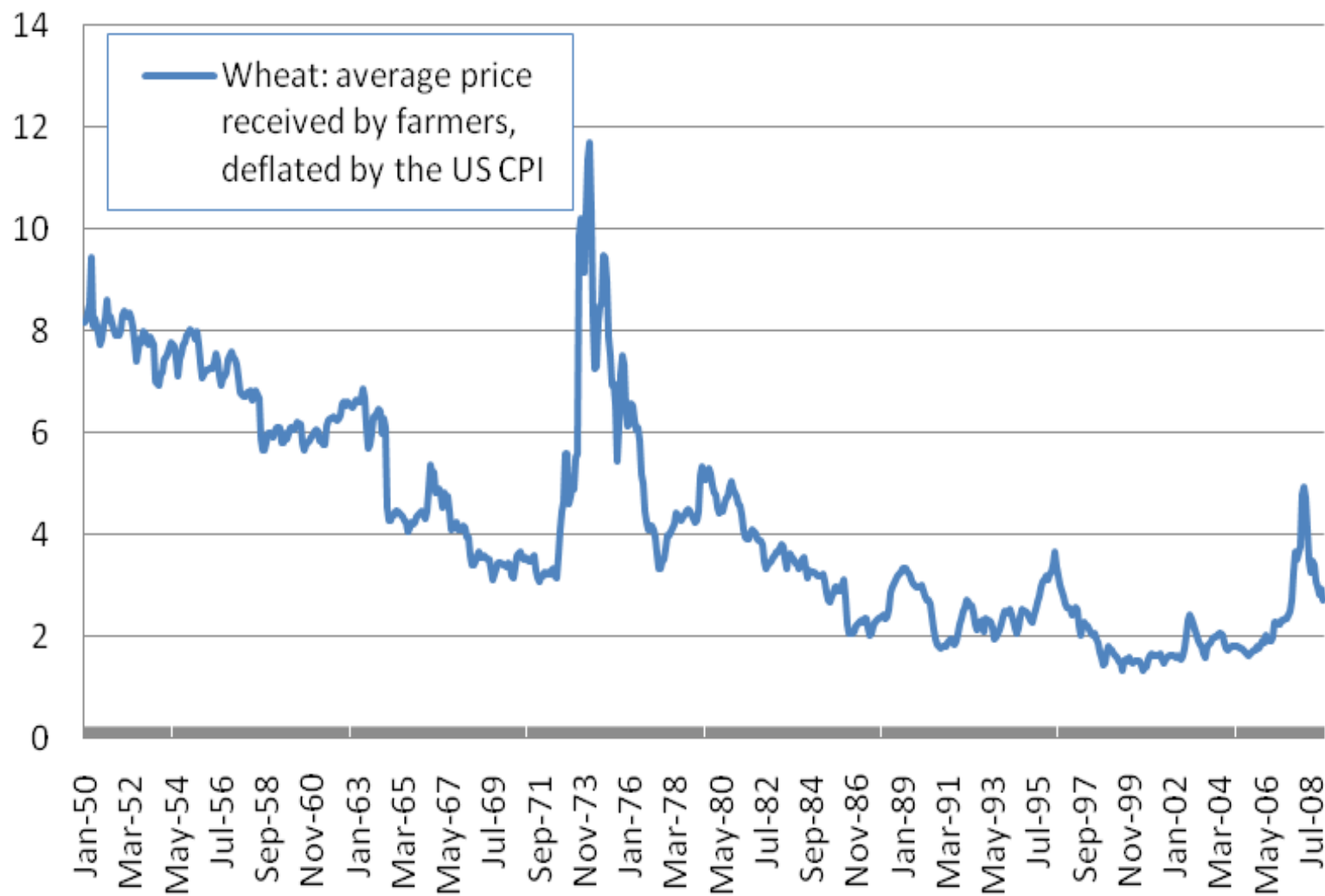
(source: FAO)

Focus of Study: *Market Volatility*

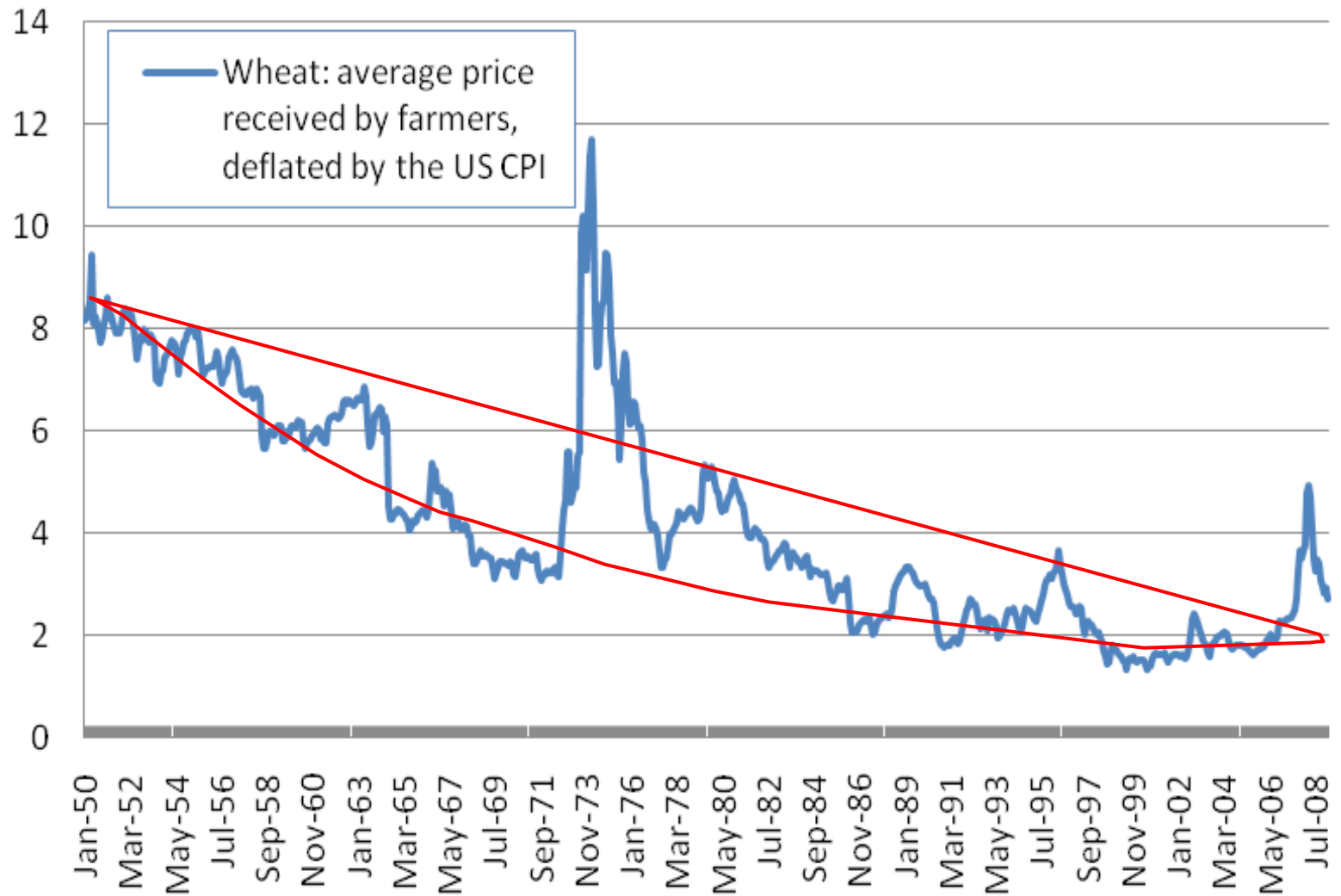
Preliminary Question:

When was the last time real grain prices as volatile as they have been recently?

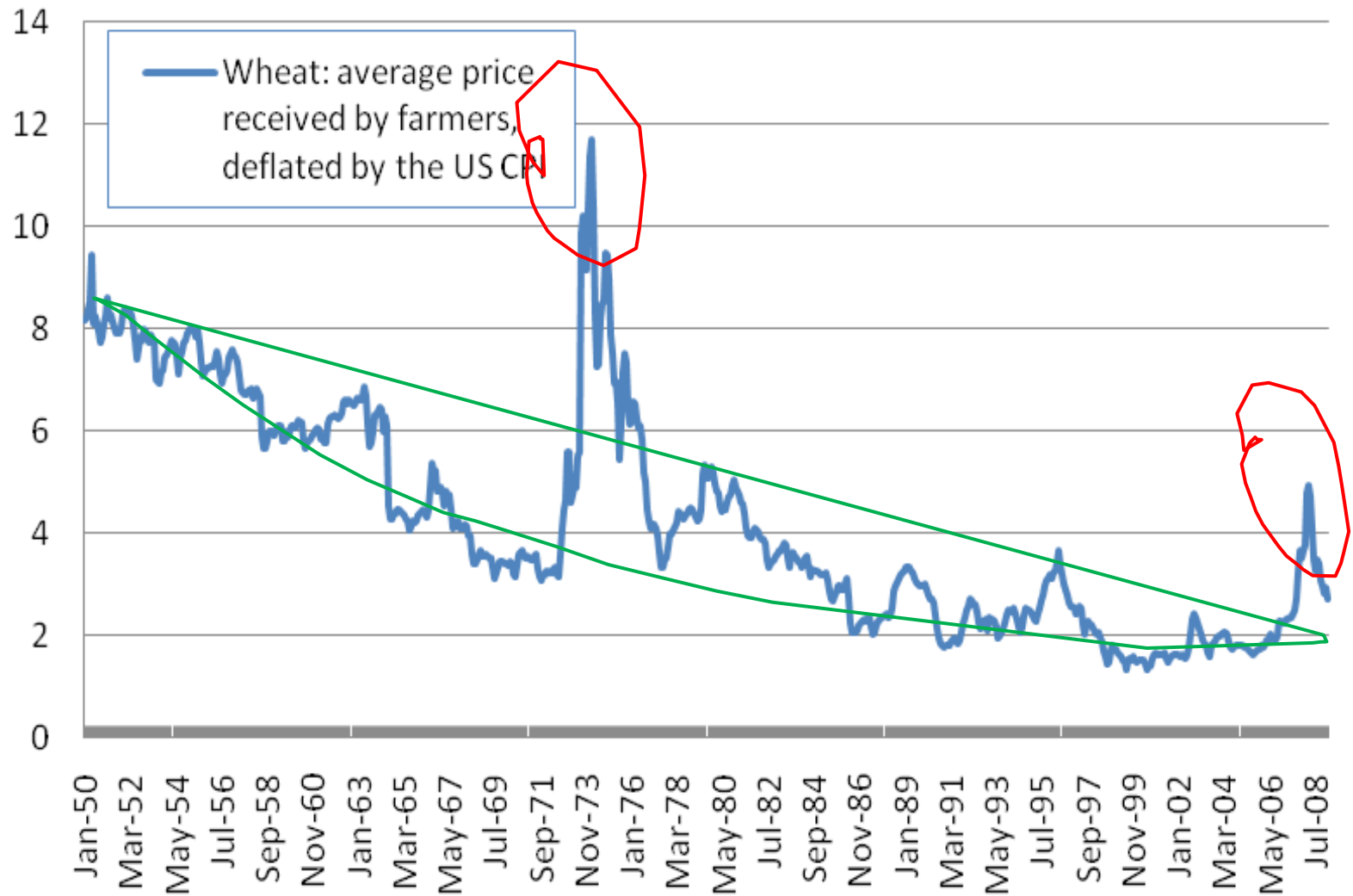
Volatility in perspective: Wheat prices



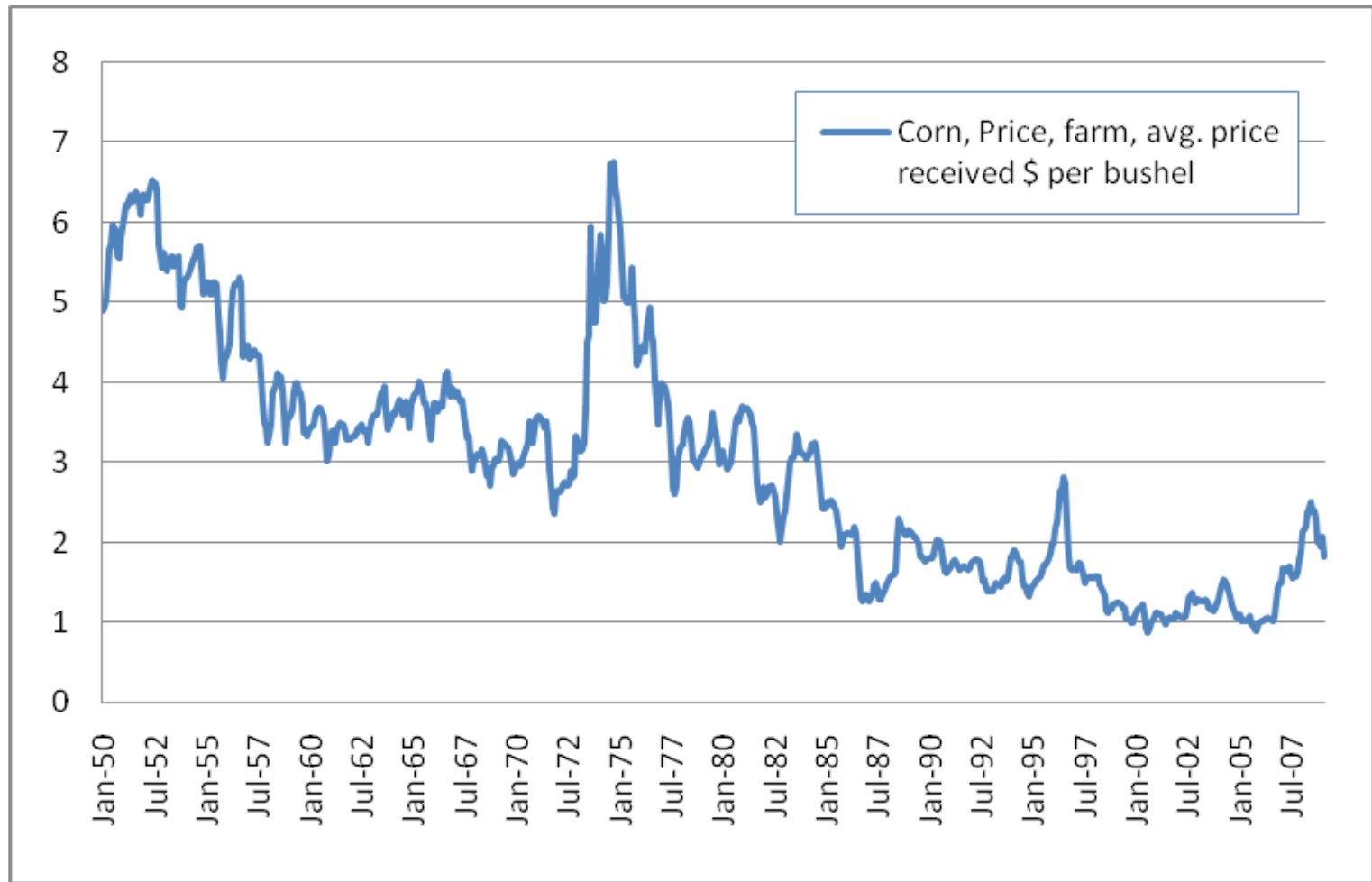
Volatility in perspective: Wheat prices



Volatility in perspective: Wheat prices



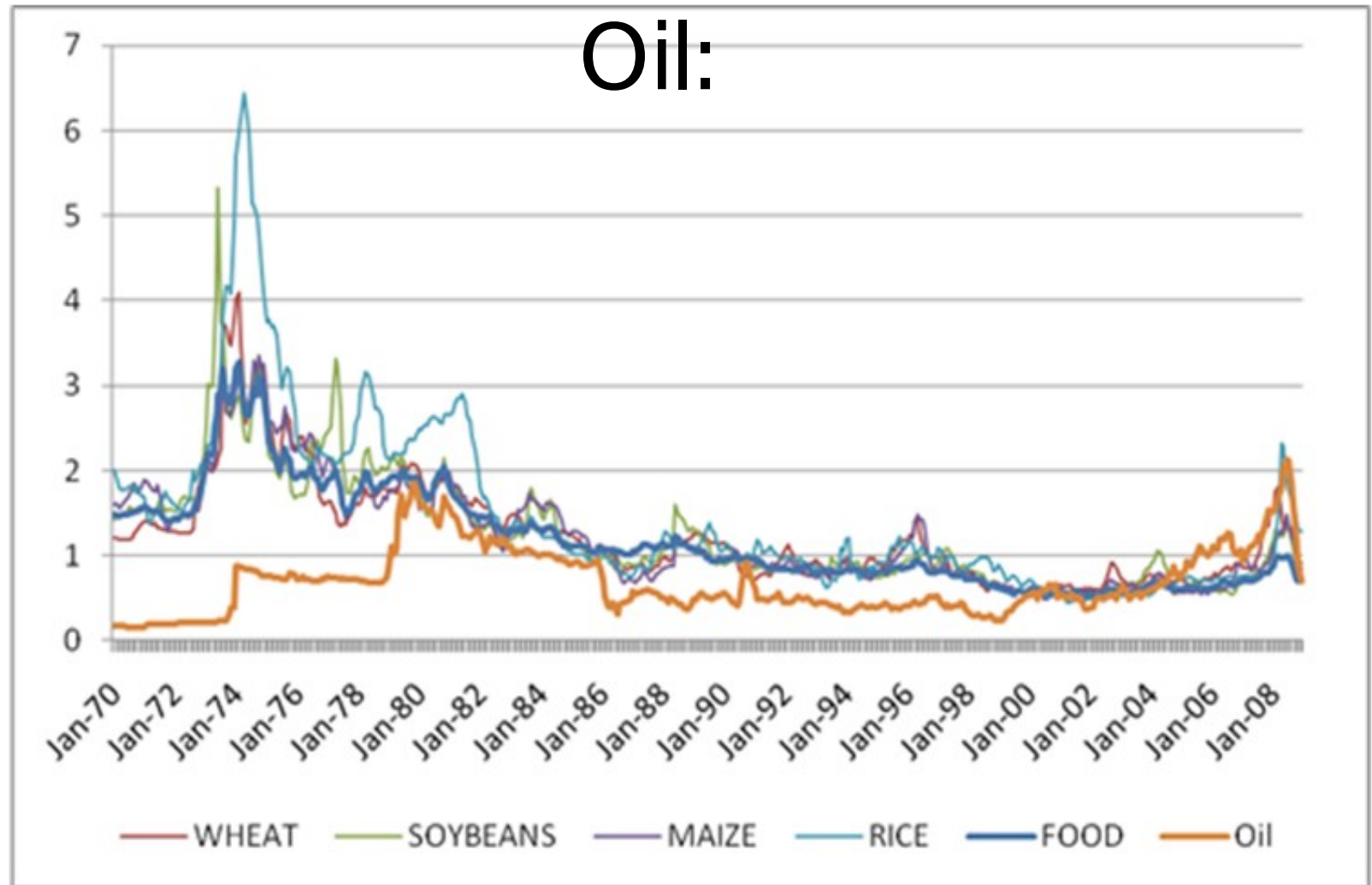
Does maize price history look similar?



Characteristics of Grain Prices

- Long downward *trends*
- Generally moderate, smooth movements around trend, interspersed by occasional steep *spikes*
- *Recent spikes do not look anomalous*

Add Soybeans, All Food, and Crude Oil:

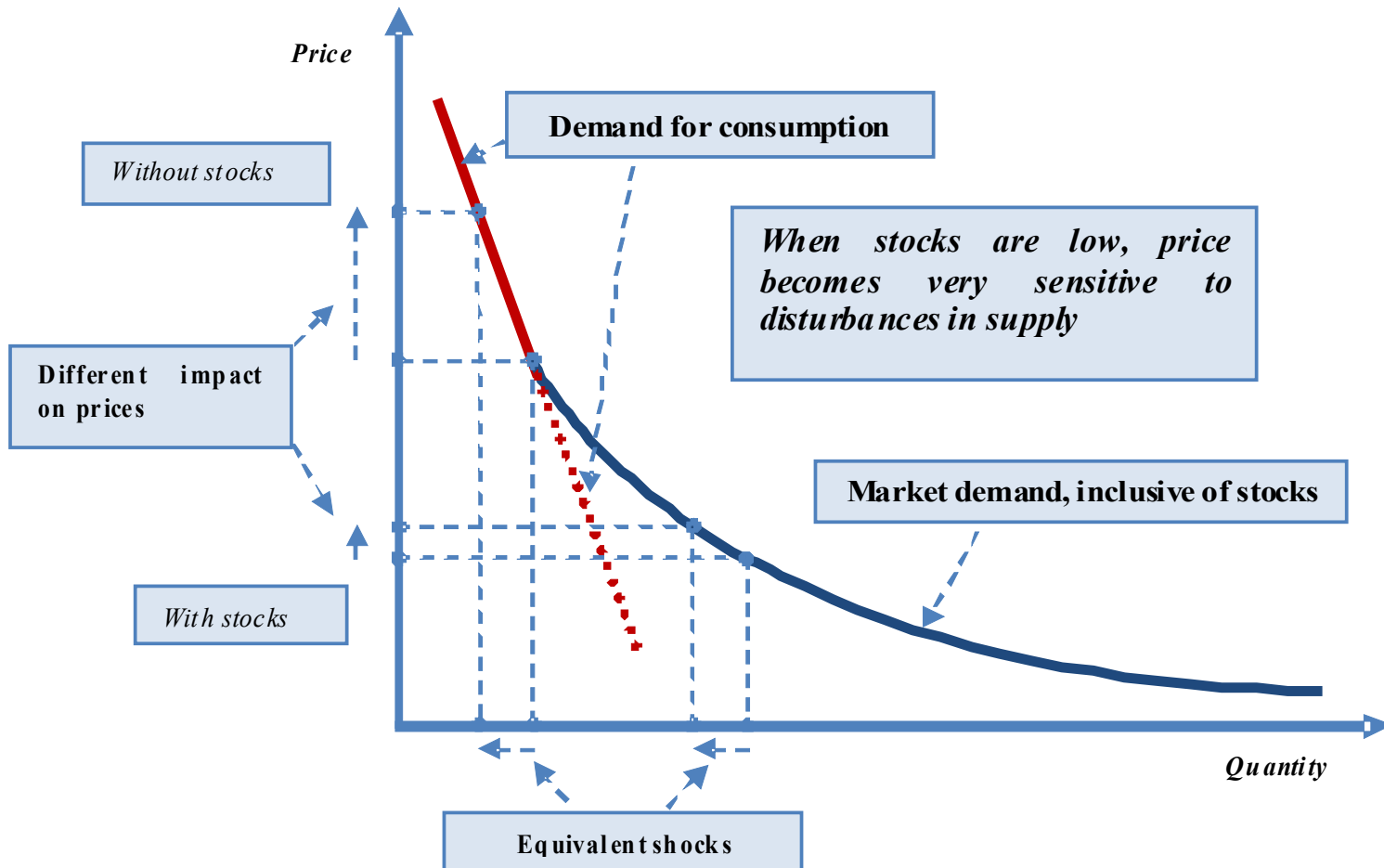


Long run movements of prices
IMF Commodity price indexes deflated by the US CPI

Effects of Storage on Prices

- Storers smooth out troughs in price after high harvests by “buying low to sell high”
- Storers smooth rises caused by expected shortages *if cash is available to invest in stocks*
- Storers smooth out peaks after *unexpected* shocks, but *only until their stocks run out*
- *When stocks run out, shocks must be matched by imports, drops in consumption of animals, biofuels processors, or (poor) people*

Why price is much more sensitive to shocks when stocks are minimal?



Relevance of storage model

- Deaton and Laroque (1992, 1995, 1996, 2003)

Their conclusions were discouraging regarding the contribution of storage models to our understanding of the nature of commodity price risk. They furnished a body of numerical and empirical evidence (Deaton and Laroque, 1992, 1995, 1996) against the ability of their model to explain commodity price behavior, nicely summarized by Deaton and Laroque (2003, p. 290): “[T]he speculative model, although capable of introducing some autocorrelation into an otherwise i.i.d. process, appears to be incapable of generating the high degree of serial correlation of most commodity prices.”

Problem: numerical inaccuracy



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The empirical relevance of the competitive storage model[☆]

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A B S T R A C T

The empirical relevance of models of competitive storage arbitrage in explaining commodity price behavior has been seriously challenged in a series of pathbreaking papers by Deaton and Laroque (1992, 1995, 1996). Here we address their major criticism, that the model is in general unable to explain the degree of serial correlation observed in the prices of twelve major commodities. First, we present a simple numerical version of their model which, contrary to Deaton and Laroque (1992), can generate the high levels of serial correlation observed in commodity prices, if it is parameterized to generate realistic levels of price variation. Then, after estimating the Deaton and Laroque (1995, 1996) model using their data set, model specification and econometric approach, we show that the use of a much finer grid to approximate the equilibrium price function yields quite different estimates for most commodities. Results are obtained for coffee, copper, jute, maize, palm oil, sugar and tin that support the specifications of the storage model with positive constant marginal storage cost and no deterioration as in Gustafson (1958a). Consumption demand has a low response to price and, except for sugar, there are infrequent stockouts. The observed magnitudes of serial correlation of price match those implied by the estimated model. [^]

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World market prices show effects of storage.

- Storers smooth out troughs in price and low-value consumption after high harvests by “buying low to sell high”
- Storers smooth **expected** shortages *if cash is available*:
 - *invest in stocks, raise current price, reduce expected shortage*

World market prices show effects of storage.

- Storers smooth out peaks after *unexpected* shocks, but *only until their stocks run out*
- *When stocks run out, price spikes are required, to force consumers to respond one-for-one to shocks*

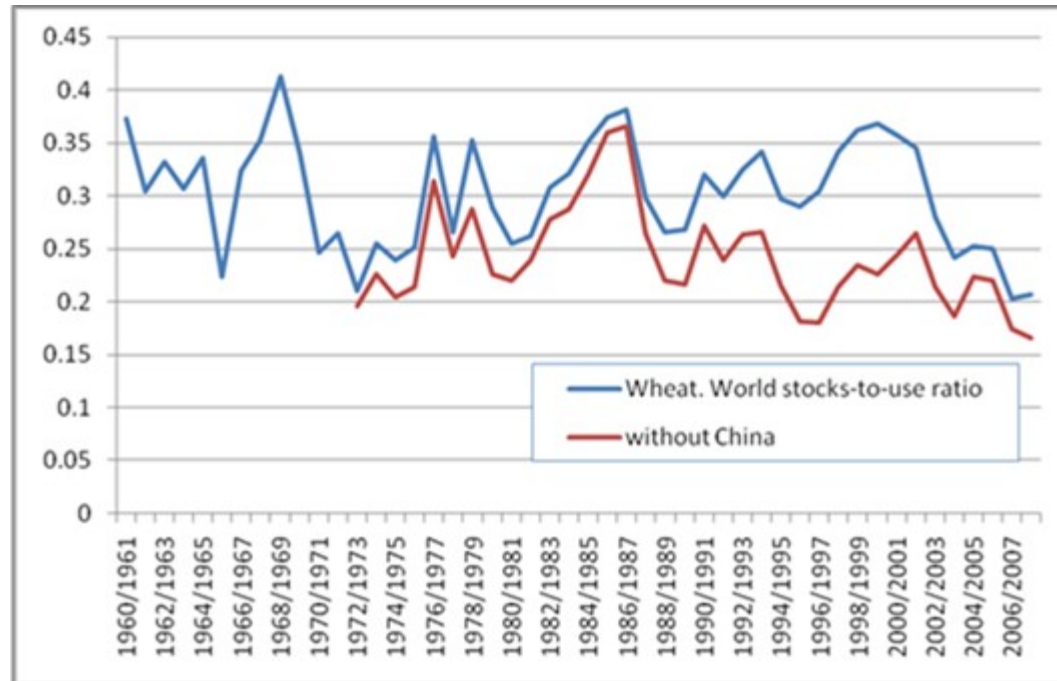


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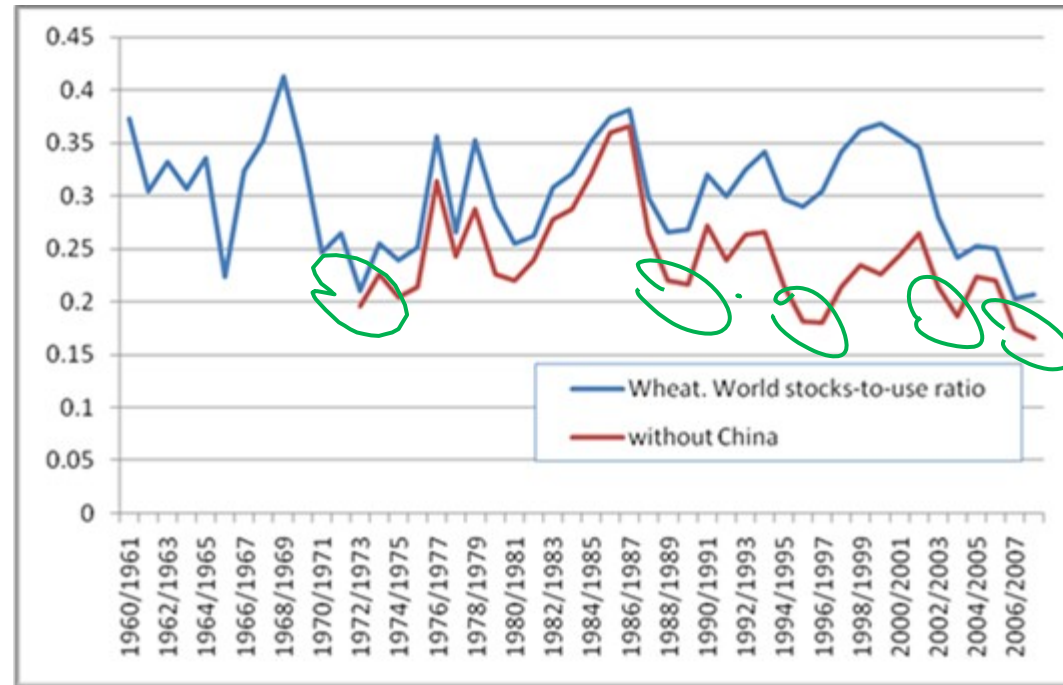
**SPIKES OCCUR ONLY IF STOCKS
MINIMAL**

- *is this true?*

World stocks-to-use ratios: wheat

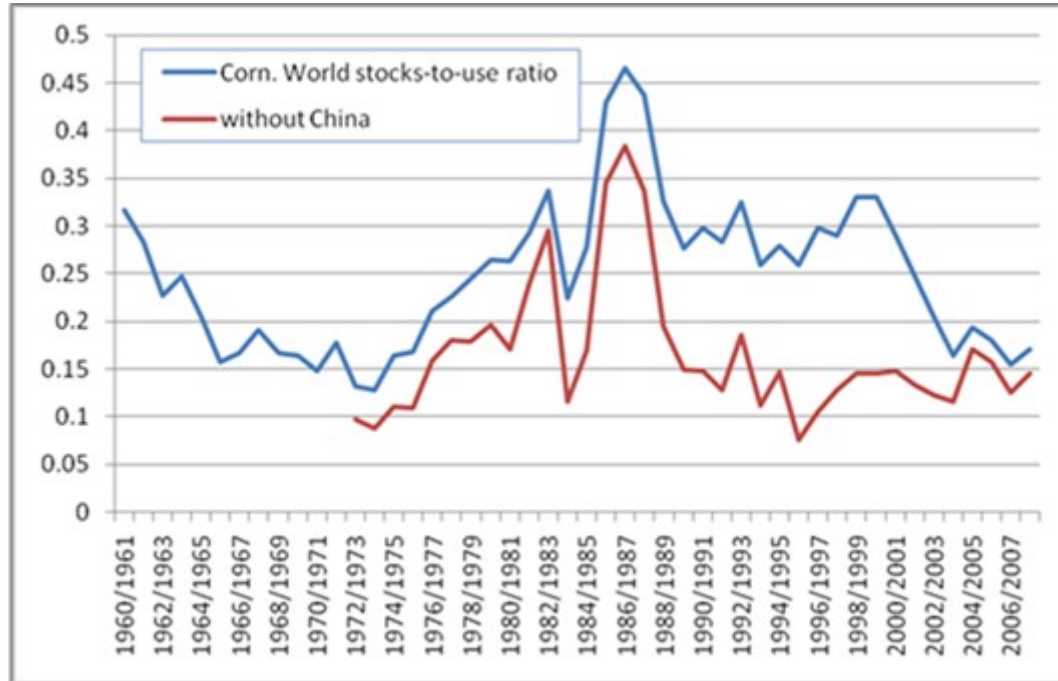


Stocks-to-use ratios: wheat

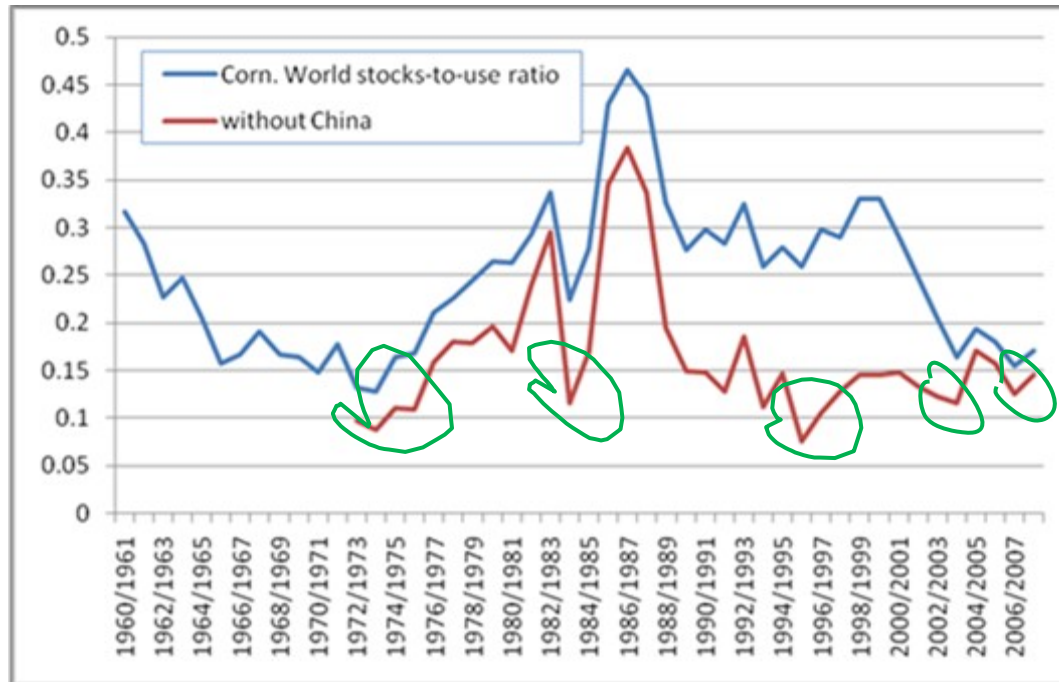


If China's stocks are irrelevant, price spikes are likely in early 1970s, 1996,

Stocks-to-use ratios: Maize

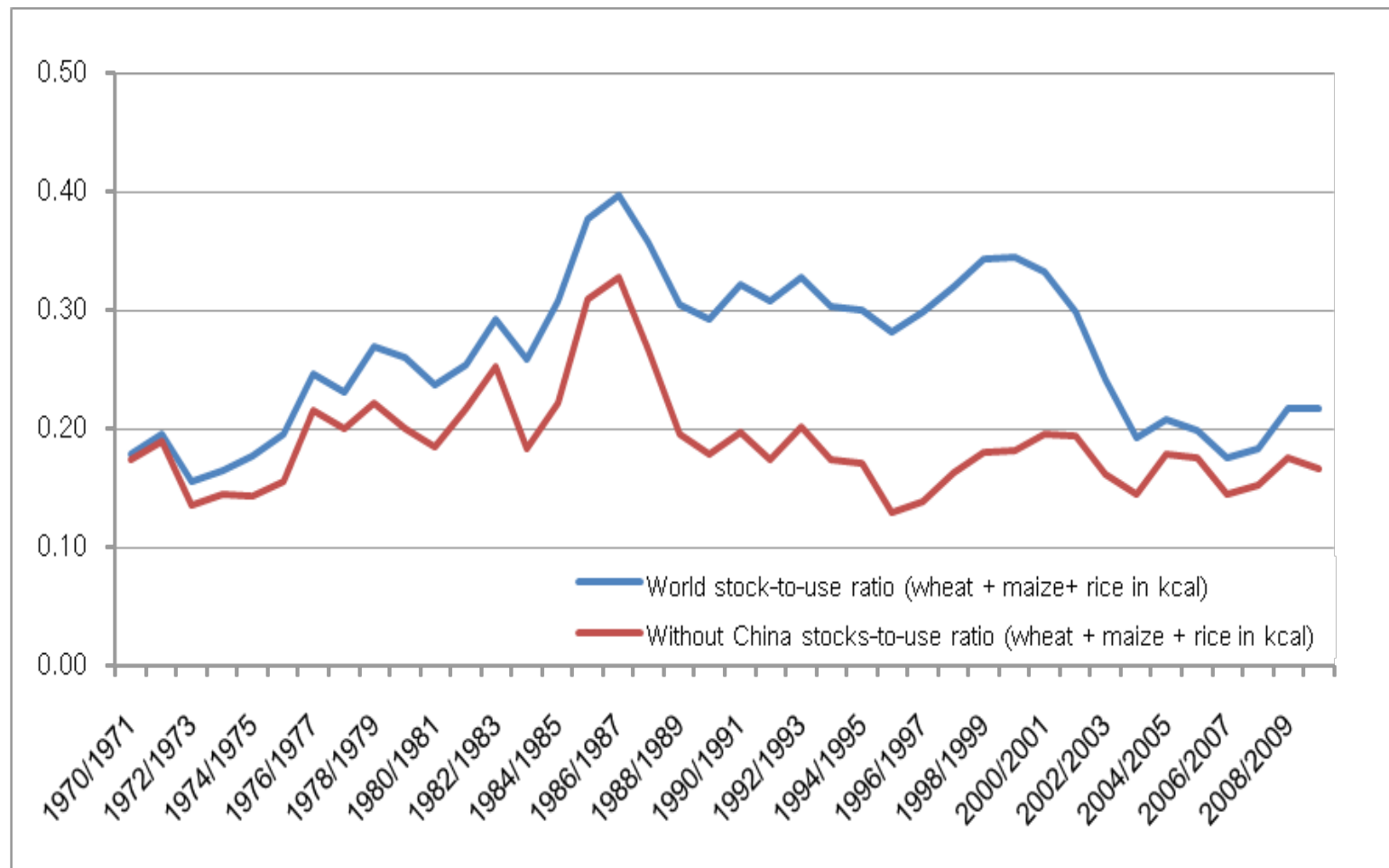


Stocks-to-use ratios: Maize

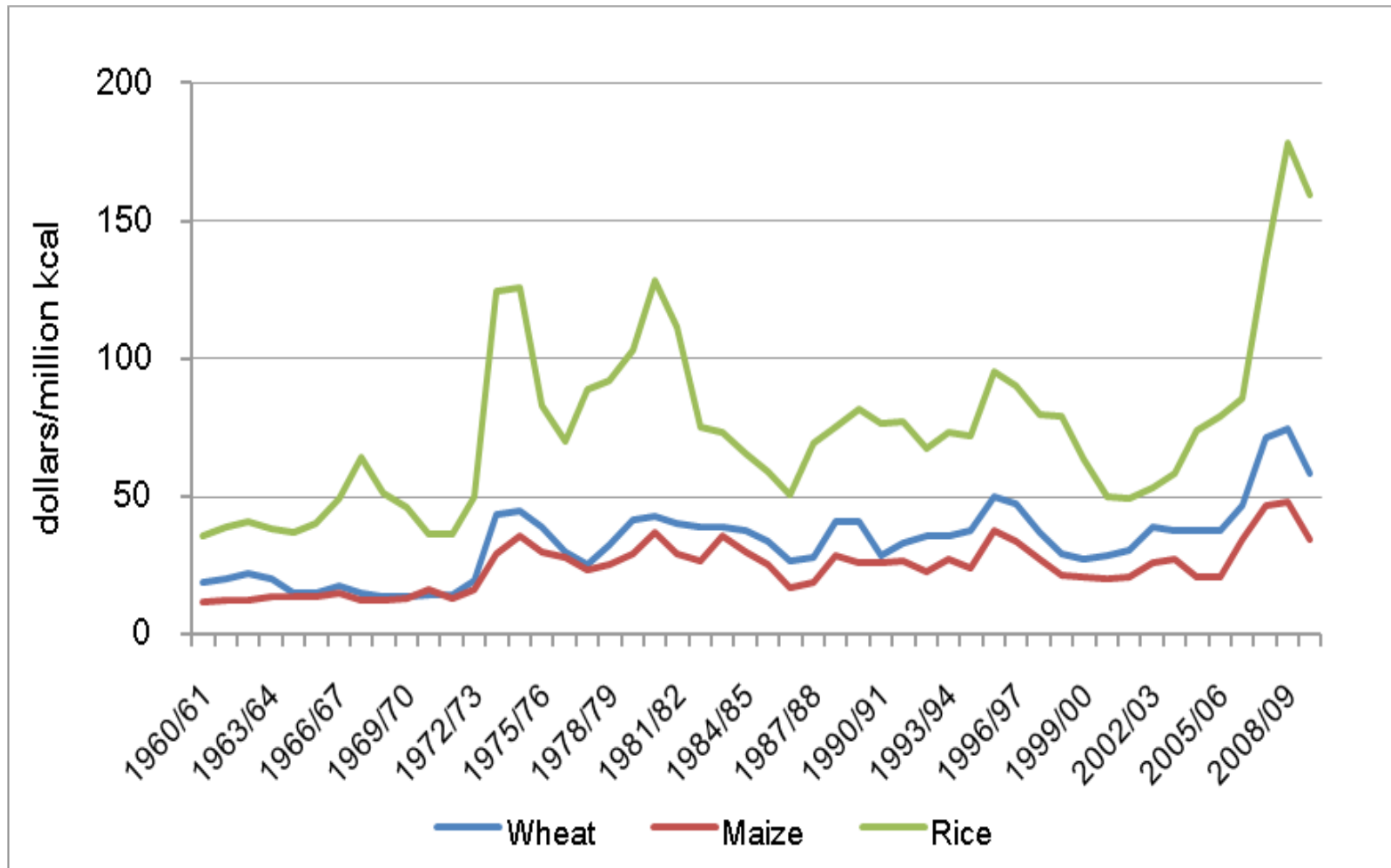


If China's stocks are irrelevant, price spikes are likely in early 1970s, 1982/3, 1996, 2003, 2007

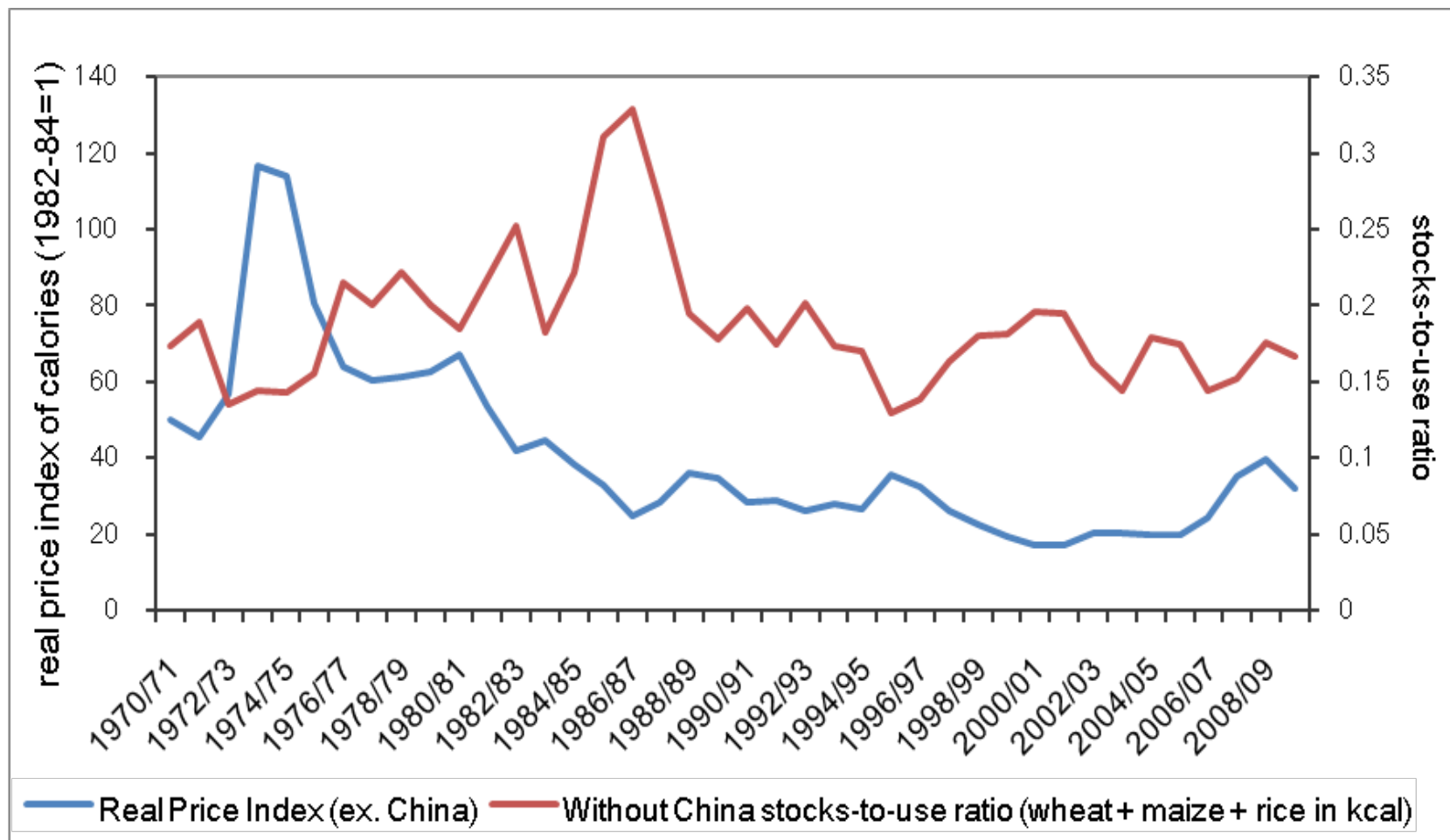
World stock-to-use ratios for calories from wheat, maize and rice



Price of calories from wheat, rice and maize



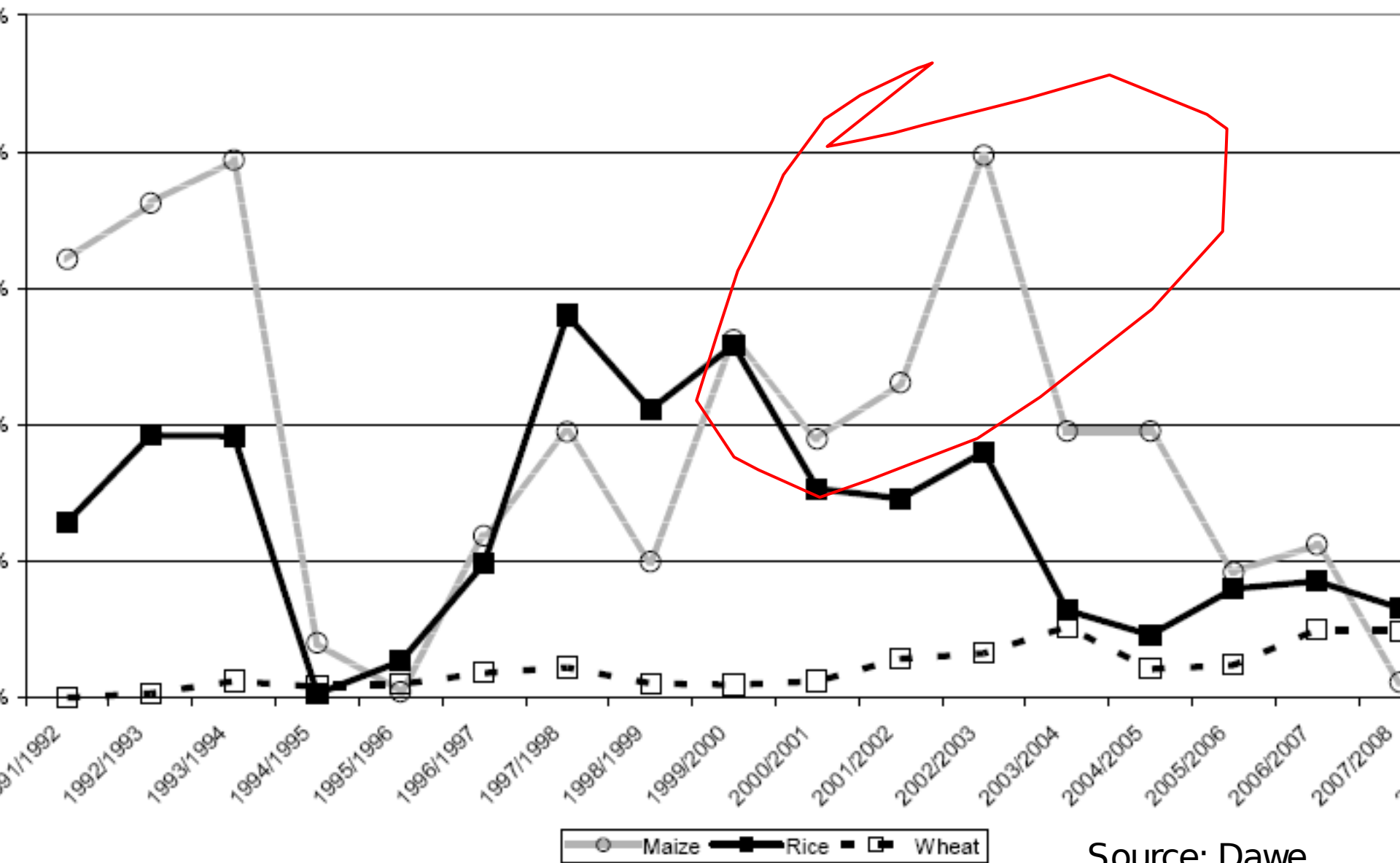
World grain calorie prices and stock-to-use ratios



Does Stocks-to-use Ratio identify times of susceptibility to spikes?

1. Stocks-to-use predicts spike years as vulnerable for wheat and maize **but adds 2002/03 as vulnerable, too**
 - In that year (in contrast to the others), **China made substantial exports.**
2. Predicts recent spike times as vulnerable for aggregate of the three grains, given China's export record

Figure 5. China's share of world cereal exports



Source: Dawe

Explaining the recent spikes Unpredictable changes in a market with minimal stocks:

- Further boosts in corn and oilseed ethanol and biodiesel mandates
- Spike in petroleum boosted biofuel demand
- Unprecedented extension of Australian drought
- Demands for rice, wheat induced by substitution in use, and competition for land, water and fertilizer

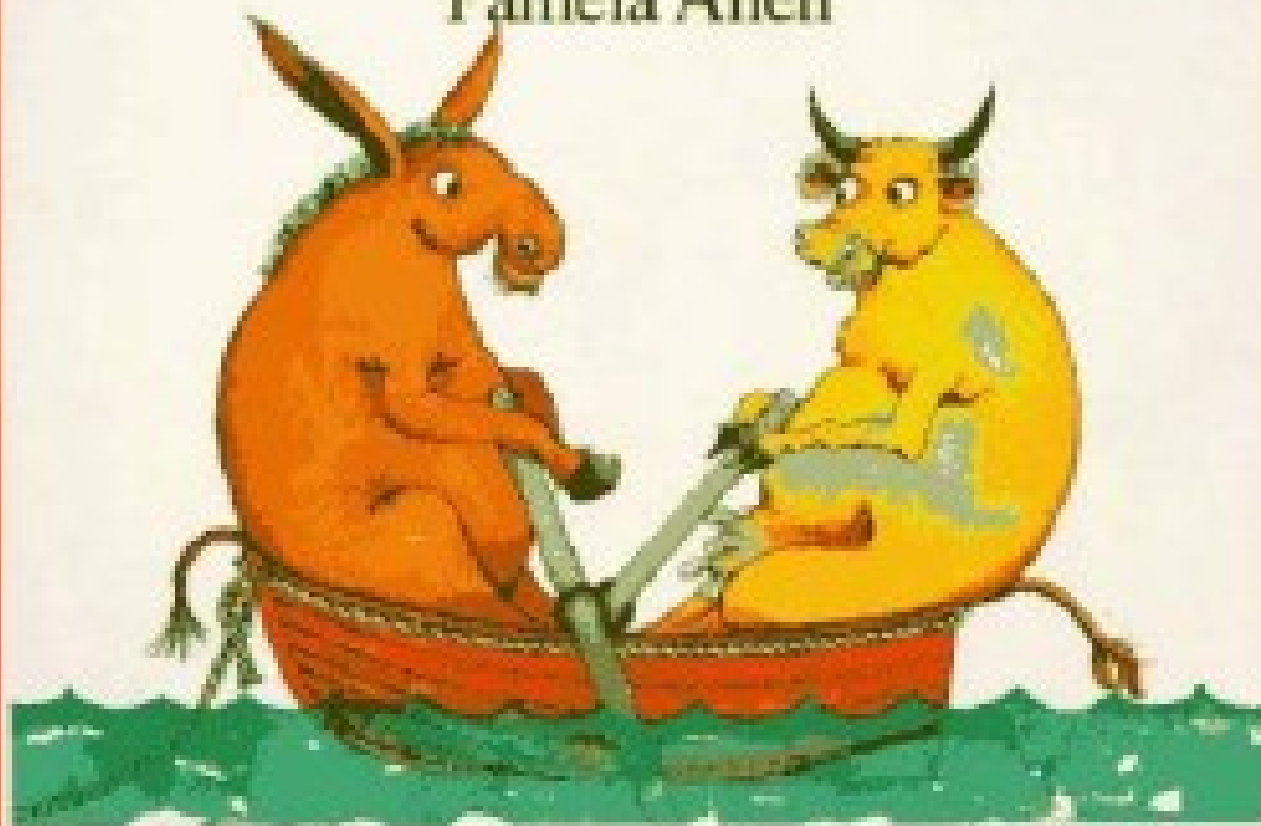
What percentage of “blame” goes to each of these causes

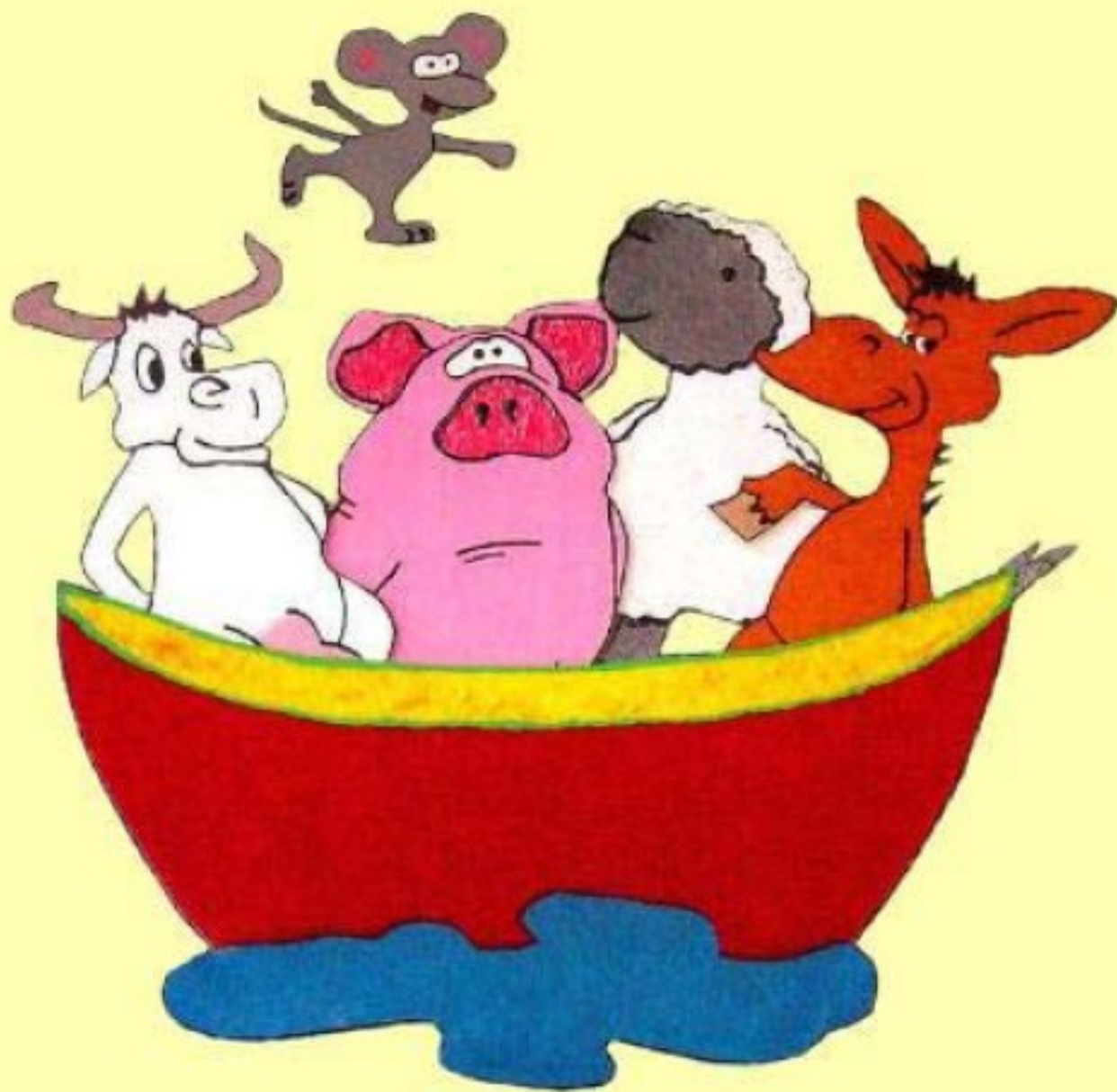
- Recent statement from FAO: Consensus that Biofuels caused about 30%
- But allocating percentages is impossible because *the relationship is nonlinear*
- To illustrate the importance of nonlinearity we must resort to a literature beyond economics

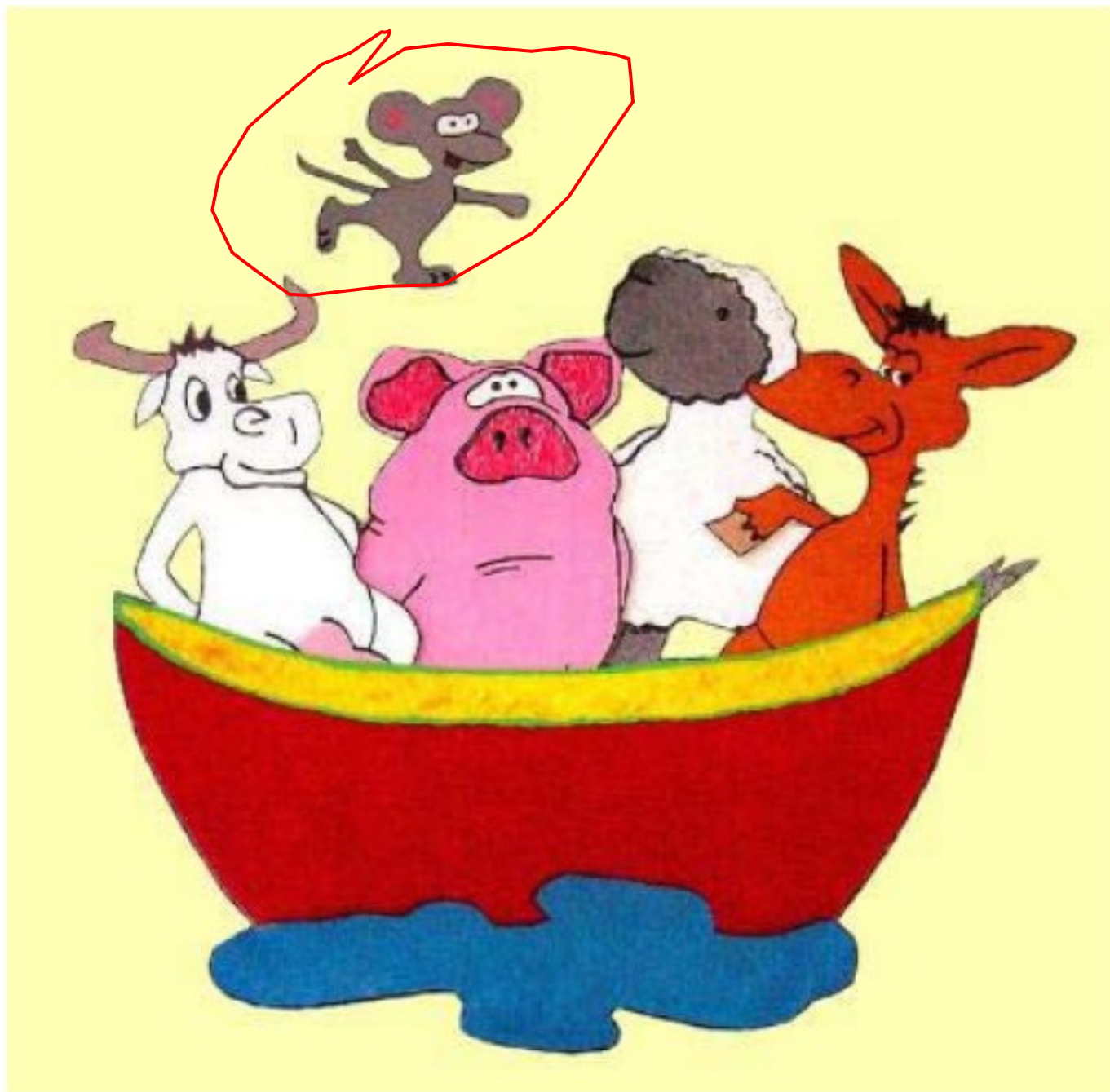


Who Sank the Boat?

Pamela Allen







- The boat sank only after the mouse jumped in after the cow, horse, pig etc. were already in the boat
- What percentage of “blame” goes to the mouse?

Conclusions

1. No evidence of a new regime of greater volatility.
2. As before, spikes occur only when stocks have run down and market is fragile
3. **Govt. shocks are crucial:** exporters cannot guarantee access even in “non-emergencies”

Conclusions

4. Importers need strategic stocks to protect the poor:
 - target consumption, not price
5. Better than stocks or production reserves?

Buy options/modify mandates, to divert grain to food uses in rare, specified emergencies.

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