



Price volatility in agricultural markets: drivers and implications

18 December 2012

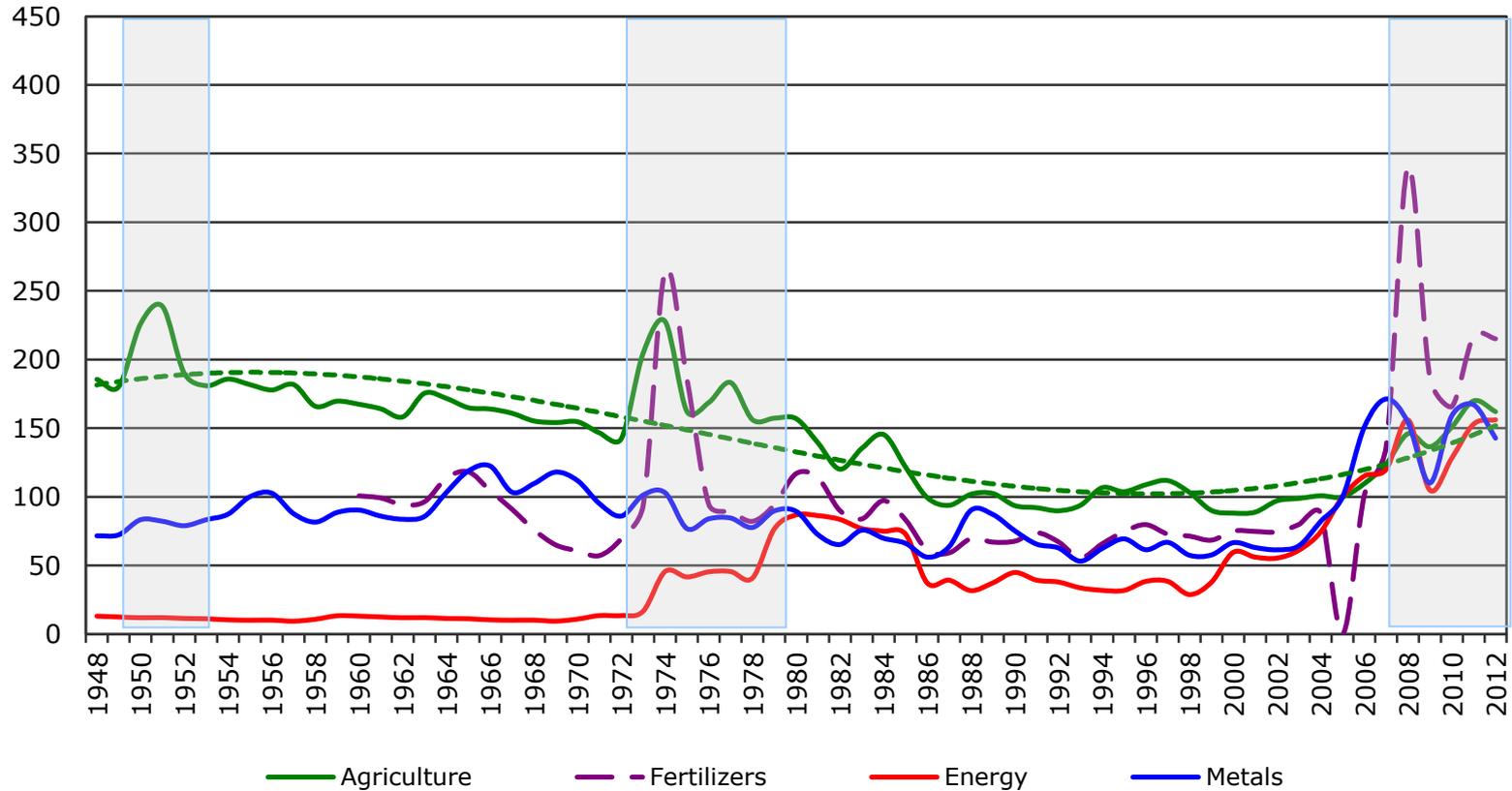
*DG Agriculture and Rural Development
European Commission*

Outline

1. Driver(s) of price volatility: no "smoking gun"?
2. What people says. What data shows
3. Implications

Long term commodity price trends

(World Bank MUV-deflated indices, 2005 = 100)



Source: World Bank. Note: 2012 figures are forecasts as of September 2012.

While the commodity price boom has been attributed to many factors...

Common/macro factors

- Economic growth
- Weak dollar
- Fiscal expansion
- Low cost of capital
- Financialisation of commodities

Sector-specific factors

Exogenous to agriculture

- Energy prices
- Weather
- Food demand
- Biofuels

Endogenous to agriculture

- Policies
- Underinvestment
- Low stocks

... the "perception" attributes the 2007-2008 agricultural price boom to a selective few

Common/macro factors

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Sector-specific factors

Exogenous to agriculture

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Endogenous to agriculture

- Policies
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Four basic questions to understand high and volatile commodity prices

1. Is price volatility higher than in the past?
2. Is this driven by higher yield variability?
3. Is it due to a sharp increase in food demand?
4. Are agricultural prices more sensitive to stock changes?

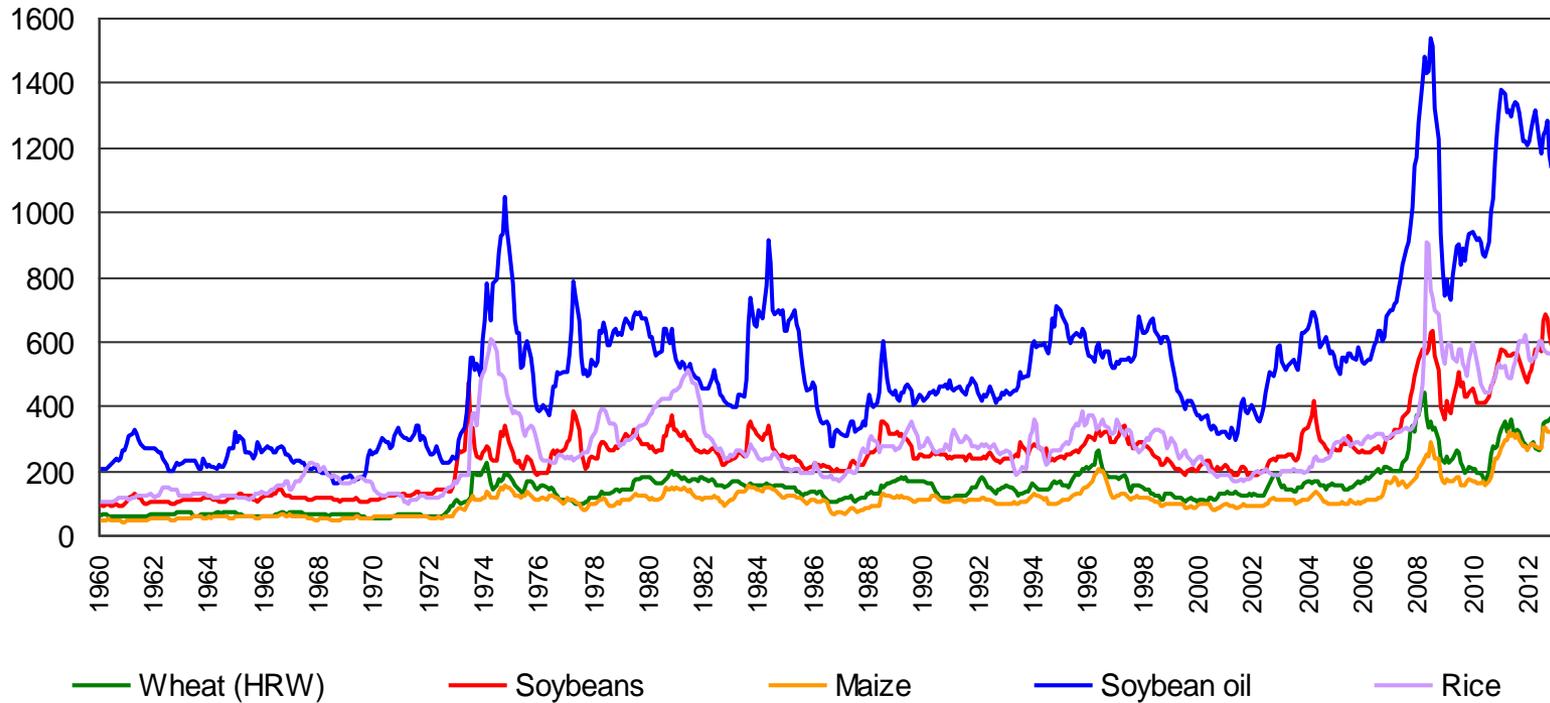
1. Is price volatility higher than in the past?

The analysis over the last 50 years shows:

- Price volatility higher in recent decade for most products, but lower lately
- Exception only for beef, poultry, sugar (higher in the 70s)
- EU price volatility was higher than at world level (CAP reform process of market orientation)

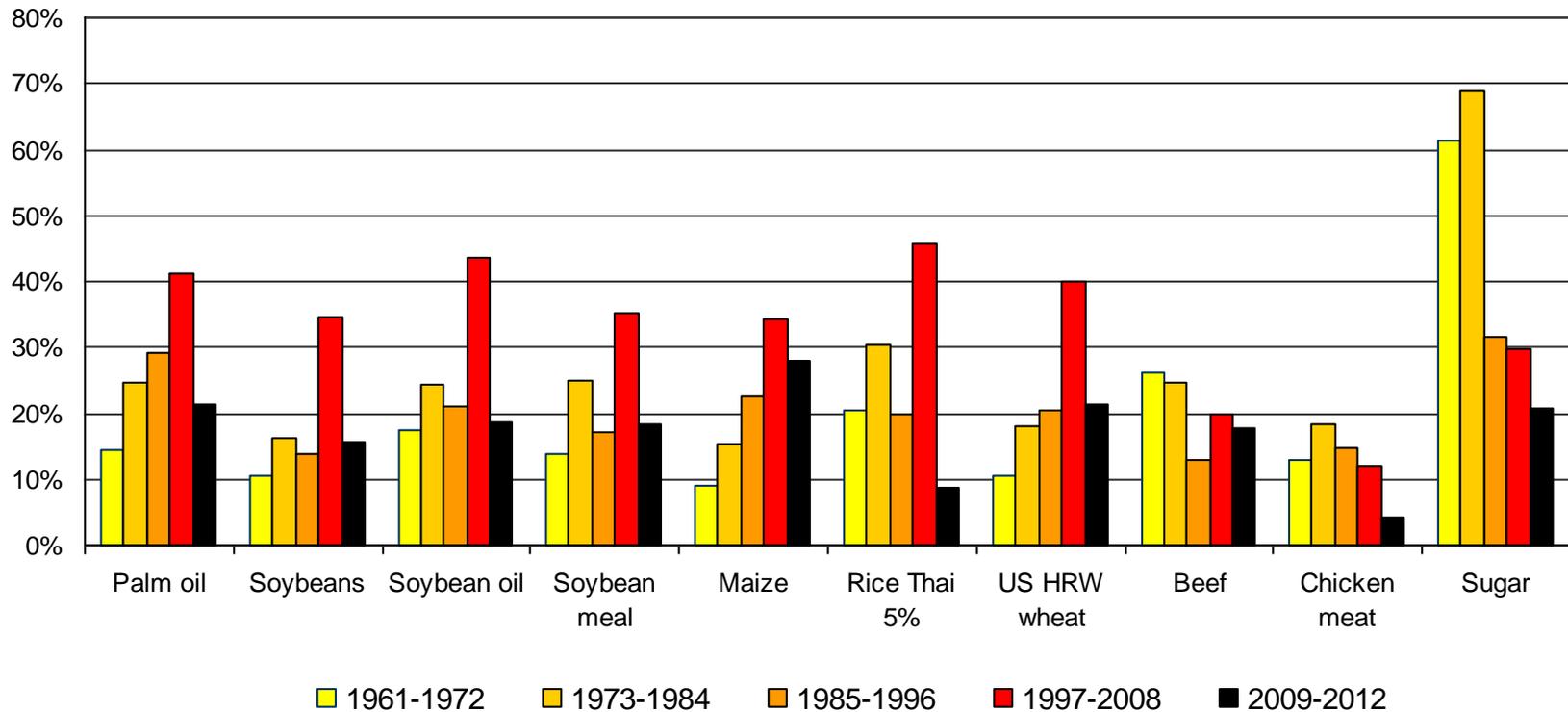
Long term price developments for key agricultural commodities

USD/mt in current USD



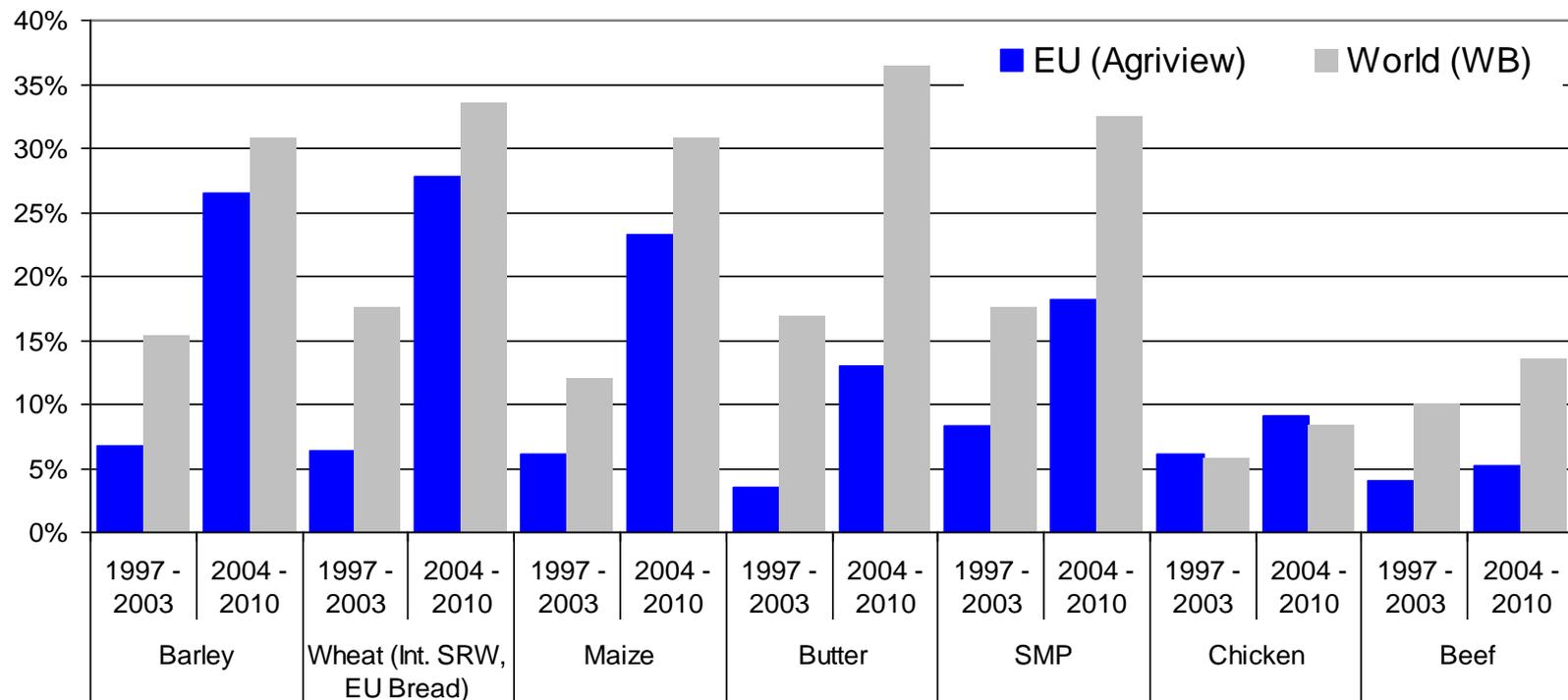
Source: World Bank

Coefficient of variation for selected products, long-term price series



Source: World Bank

Coefficient of variation for comparable products, 1997-2003 vs 2004-2010, EU and World



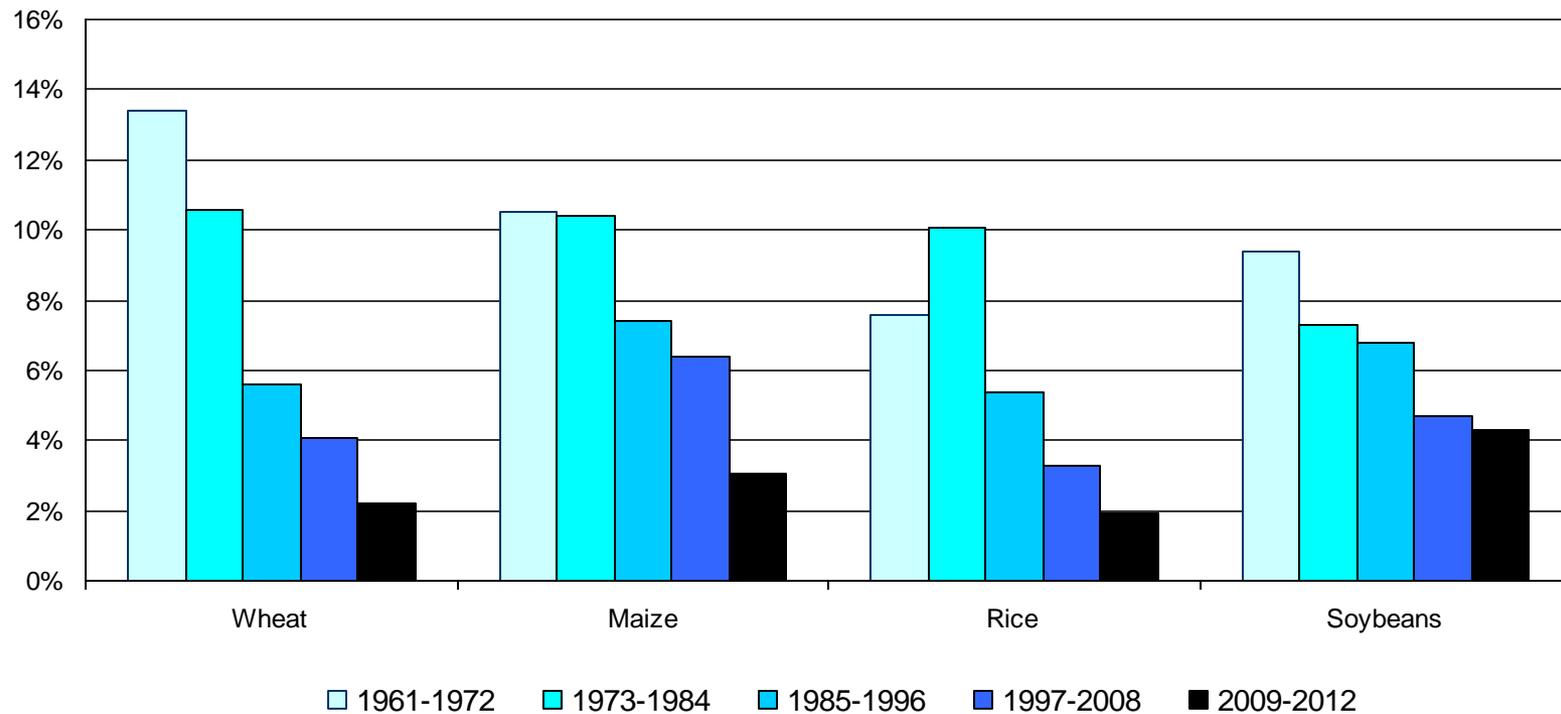
Sources: Agriview and World Bank

2. Is higher price volatility driven by higher yield variability?

The analysis shows:

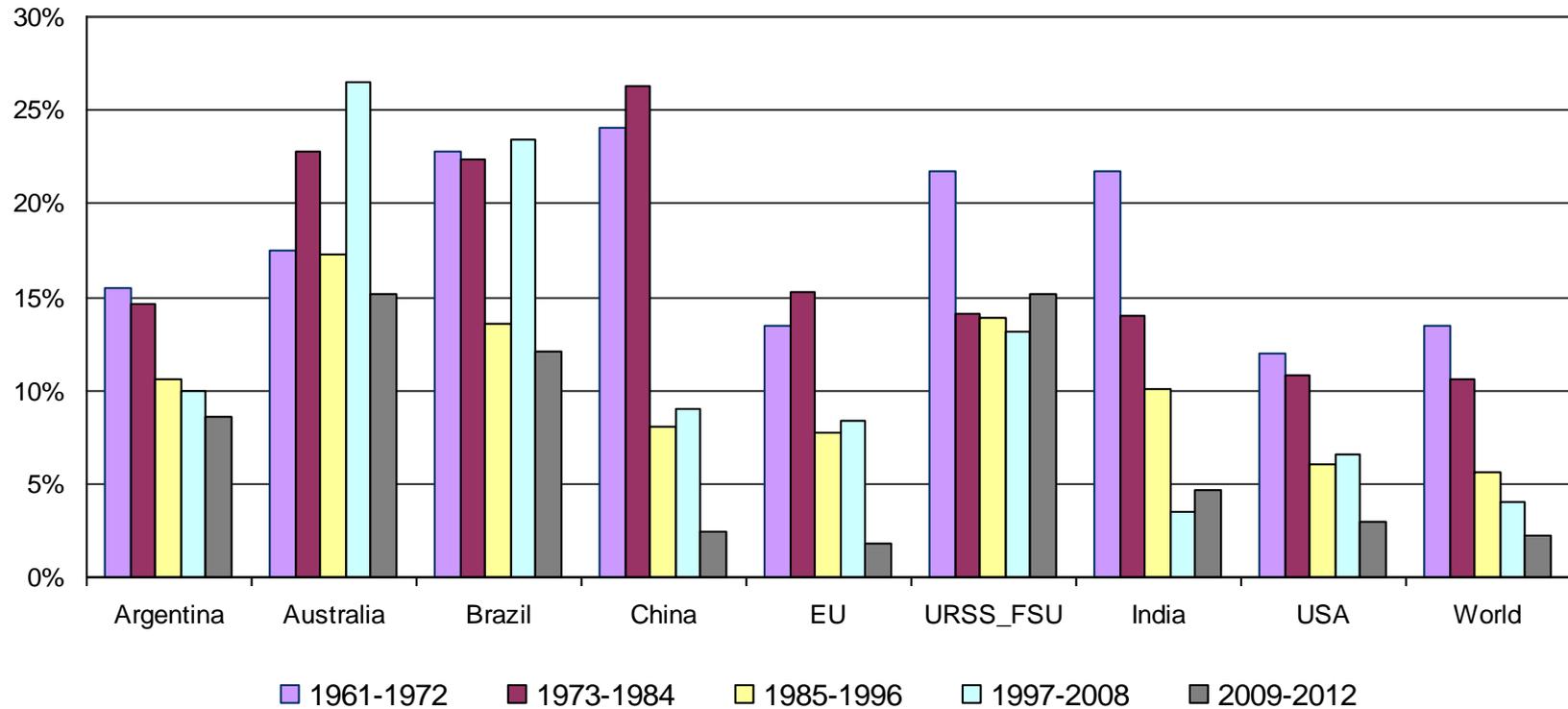
- No straightforward conclusions can be drawn
- Different between countries and commodities

Yield variability for 12 years periods - World



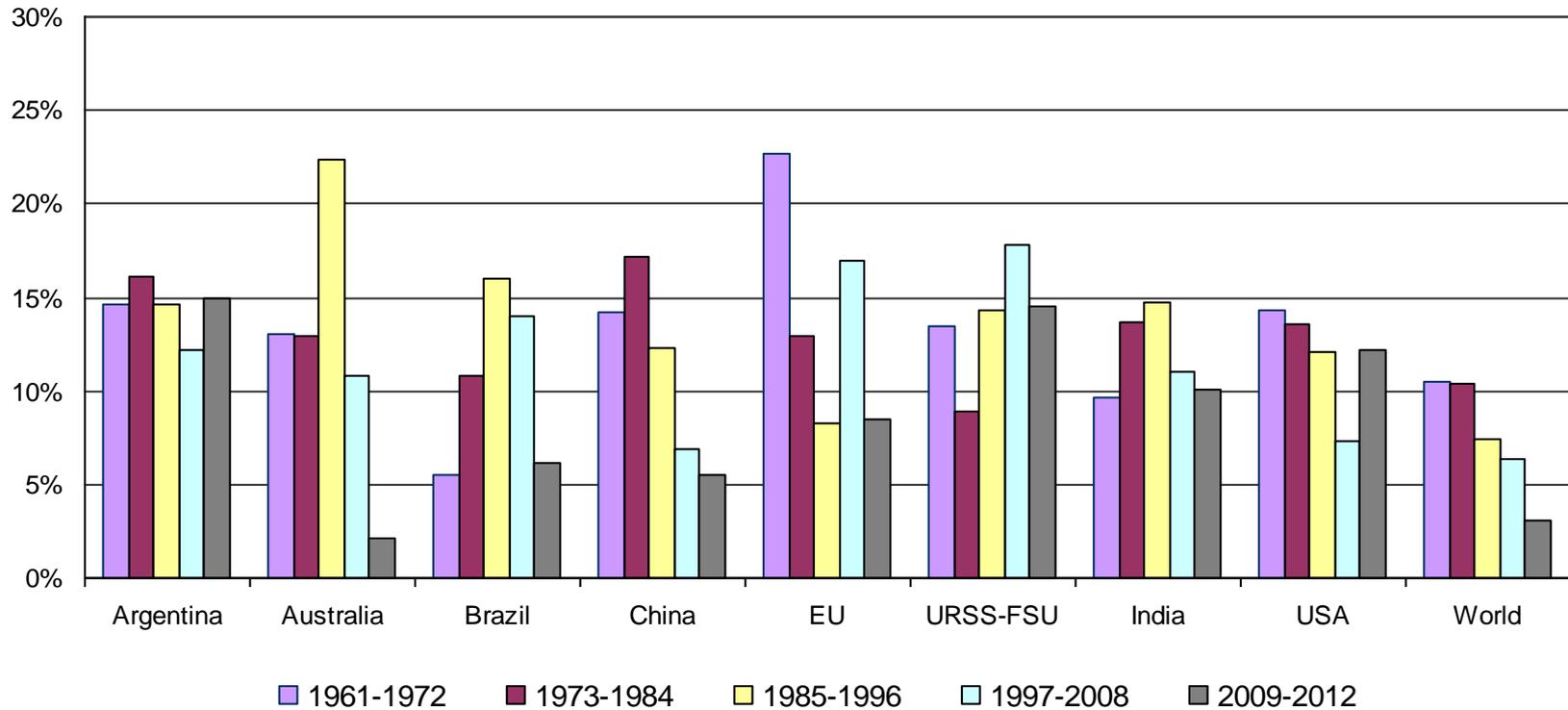
Sources: USDA, FAO

Yield variability for 12 years periods - Wheat



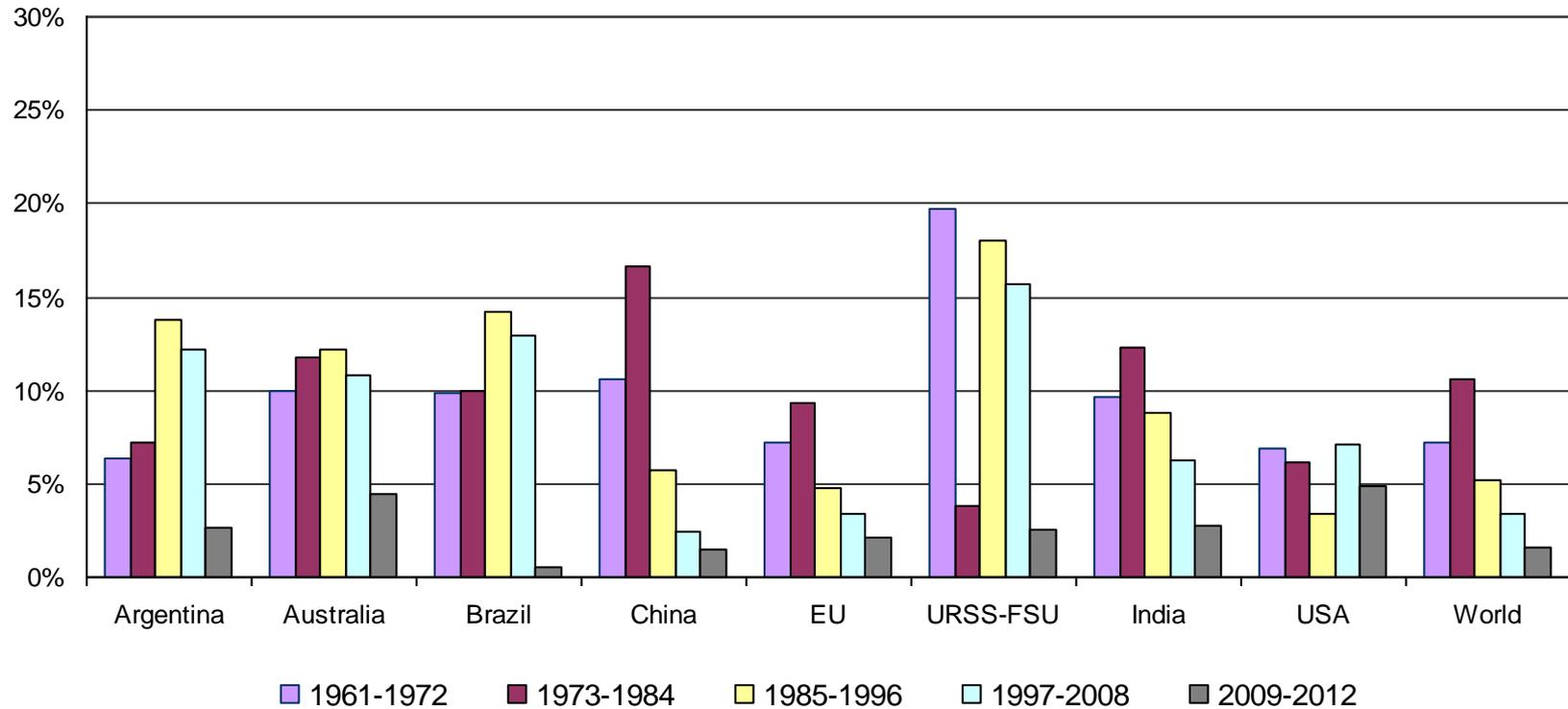
Sources: USDA, FAO

Yield variability for 12 years periods - Maize



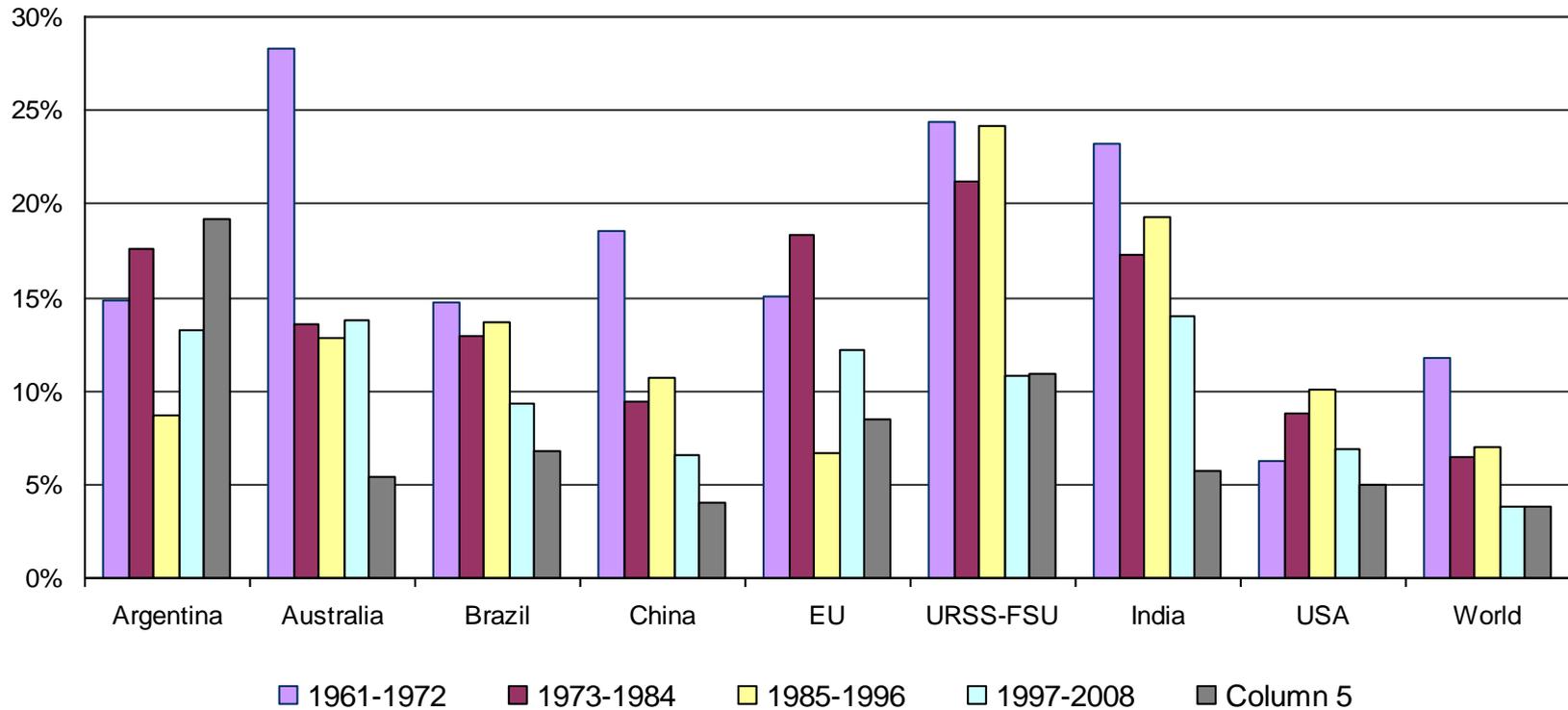
Sources: USDA, FAO

Yield variability for 12 years periods - Rice



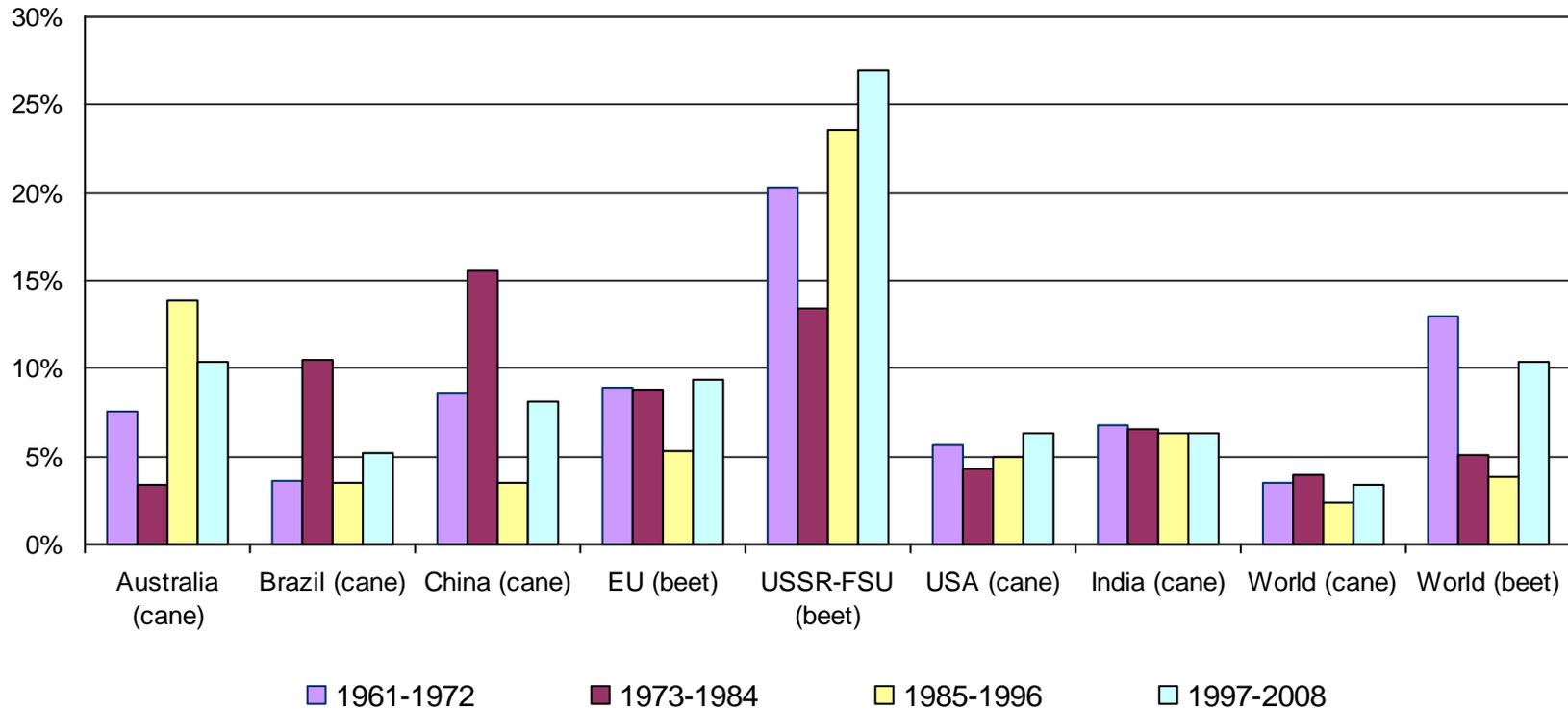
Sources: USDA, FAO

Yield variability for 12 years - Soybeans



Sources: USDA, FAO

Yield variability for 12 years - Sugar



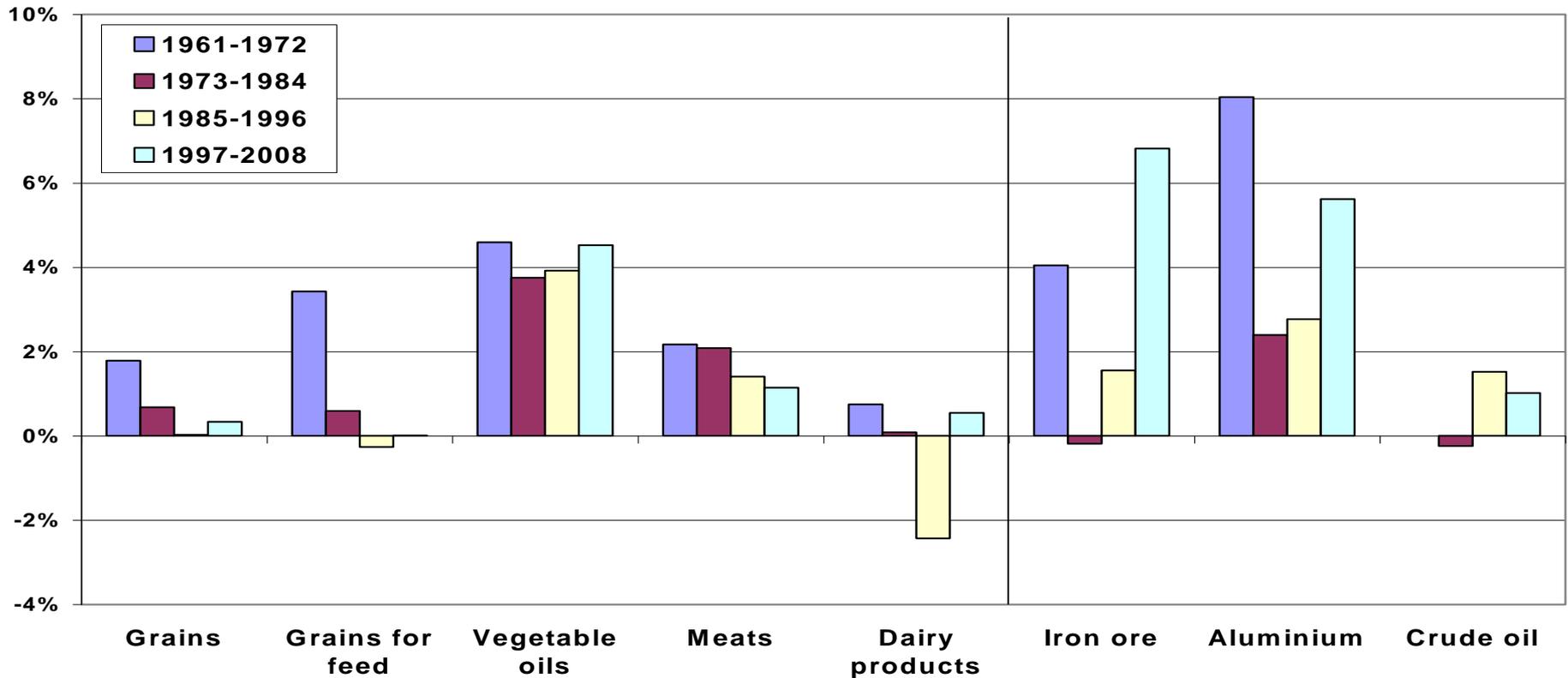
Sources: USDA, FAO

3. Is higher price volatility driven by sharp increase in food demand?

The analysis shows:

- Agricultural products: Demand growth has decreased over the last 50 years for most products and countries (exception veg. oils and dairy products)
- Energy and minerals/metals: Demand growth is on the increase since mid 80s (iron, aluminium) and mid 90s (crude oil)

Growth rates for main agricultural products, crude oil and selected minerals/metals



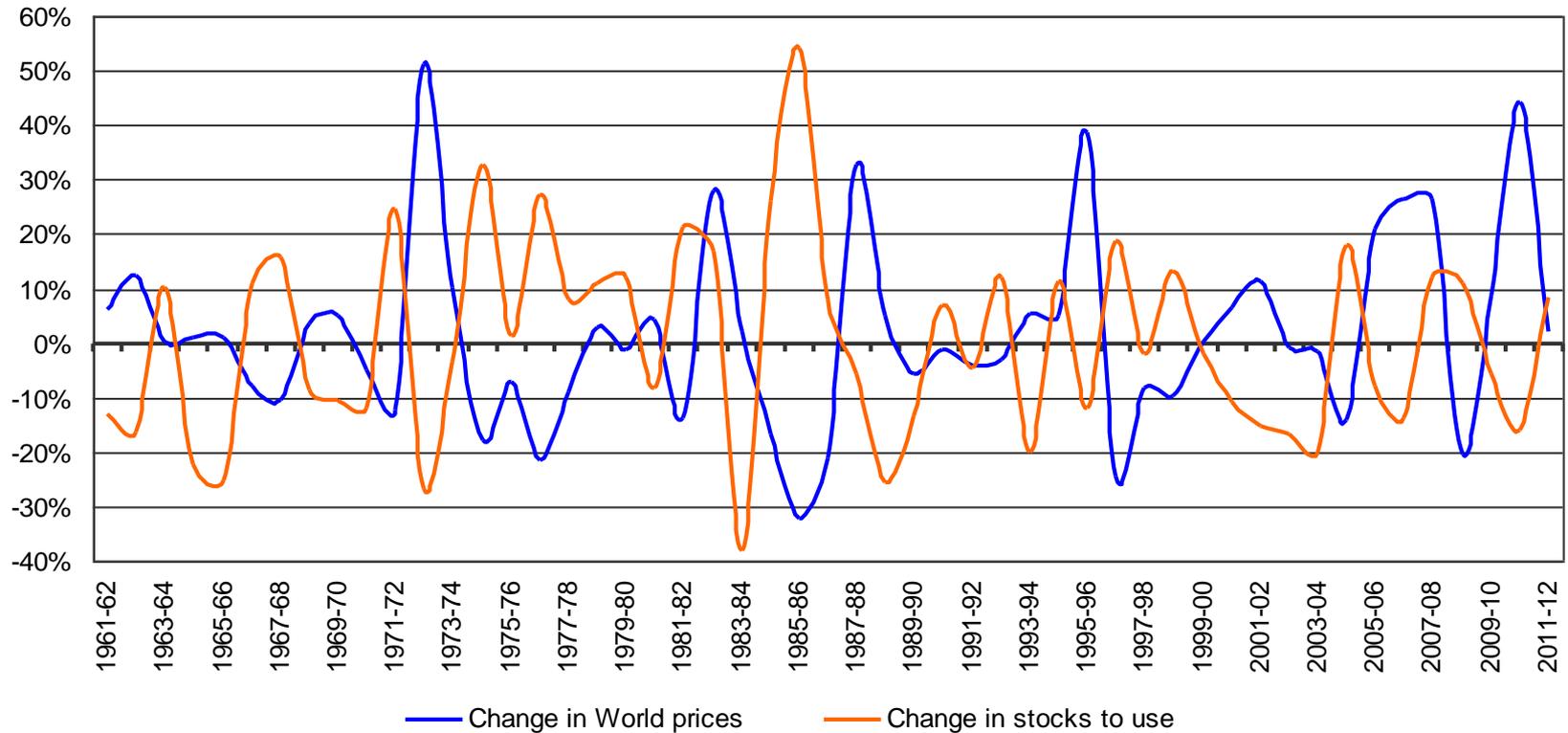
World per capita demand growth for agricultural commodities, USDA, FAO. World production growth for crude oil (International Energy Agency) and Metals/minerals (U.S. Geological Survey)

4. Are agricultural prices more sensitive to stock changes?

The analysis shows:

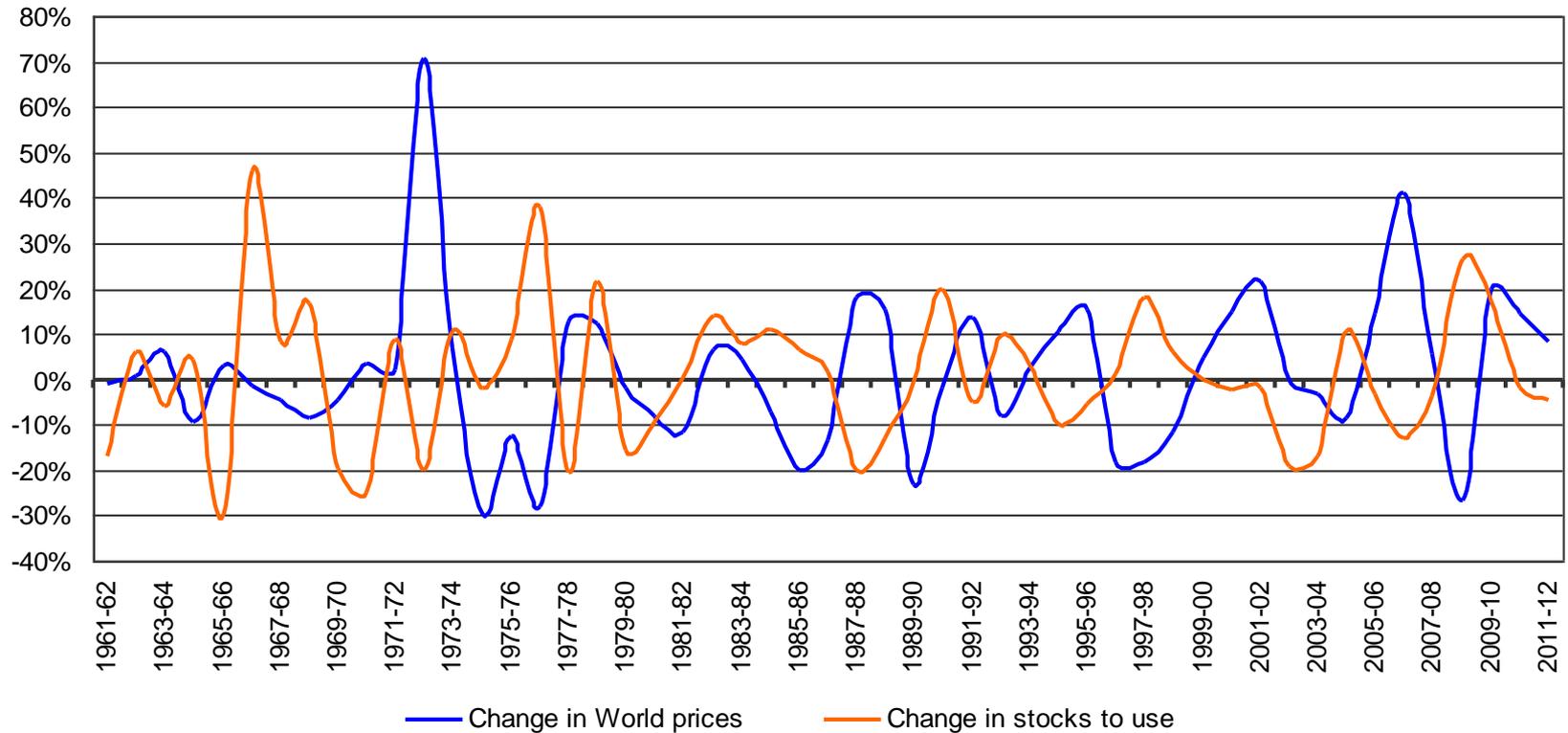
- The relationship between stock-to-use and world prices did not change much over the last 50 years.
- A certain increase in responsiveness can be observed for the main crops (wheat, maize, soybean) in the two past decades.
- Sugar prices on the other hand were more sensitive to stock changes in the 70s and 80s than recently (link with oil price).
- No significant linkage for rice and vegetable oils.

Yearly changes in stocks to use and prices Maize



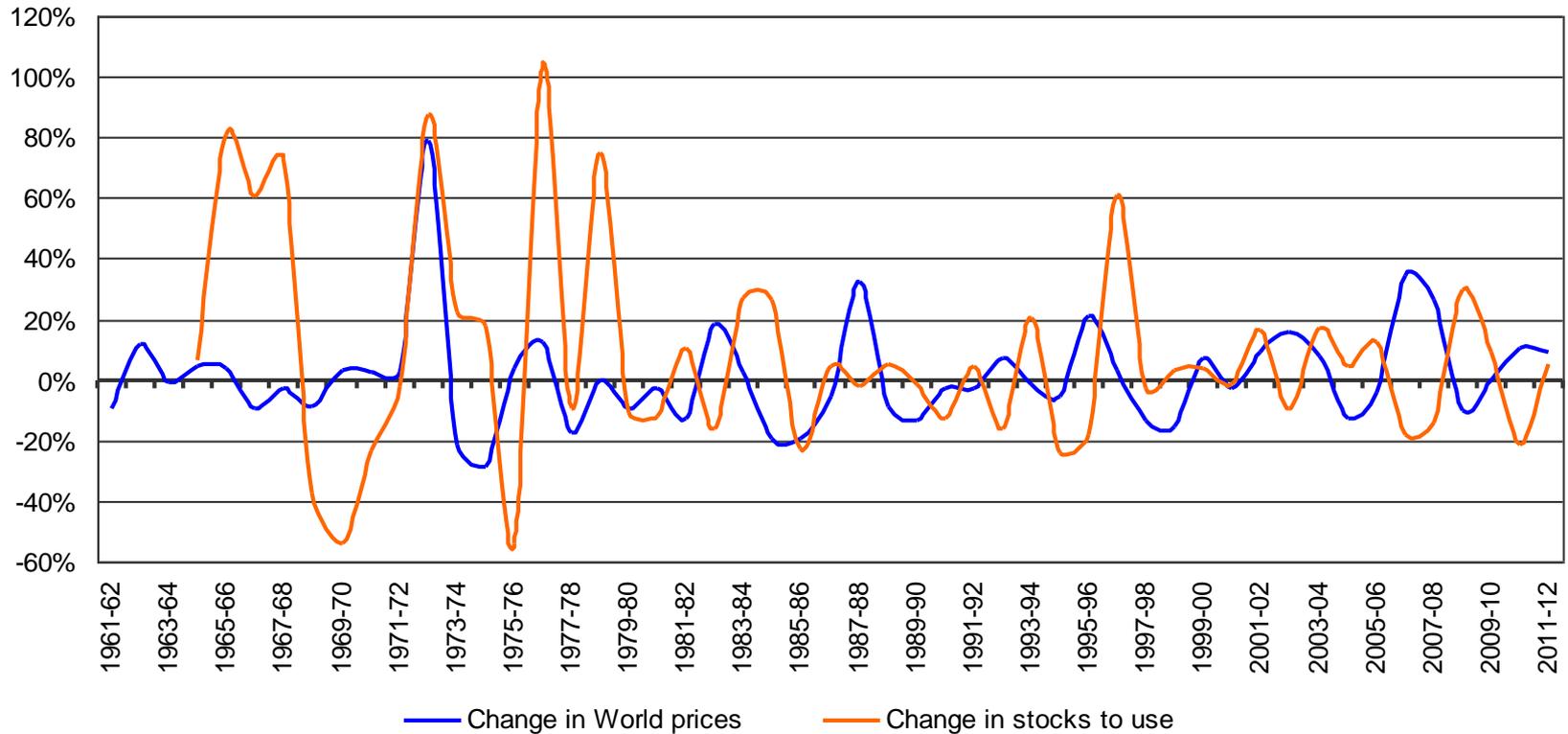
Source: World Bank, USDA

Yearly changes in stocks to use and prices Wheat



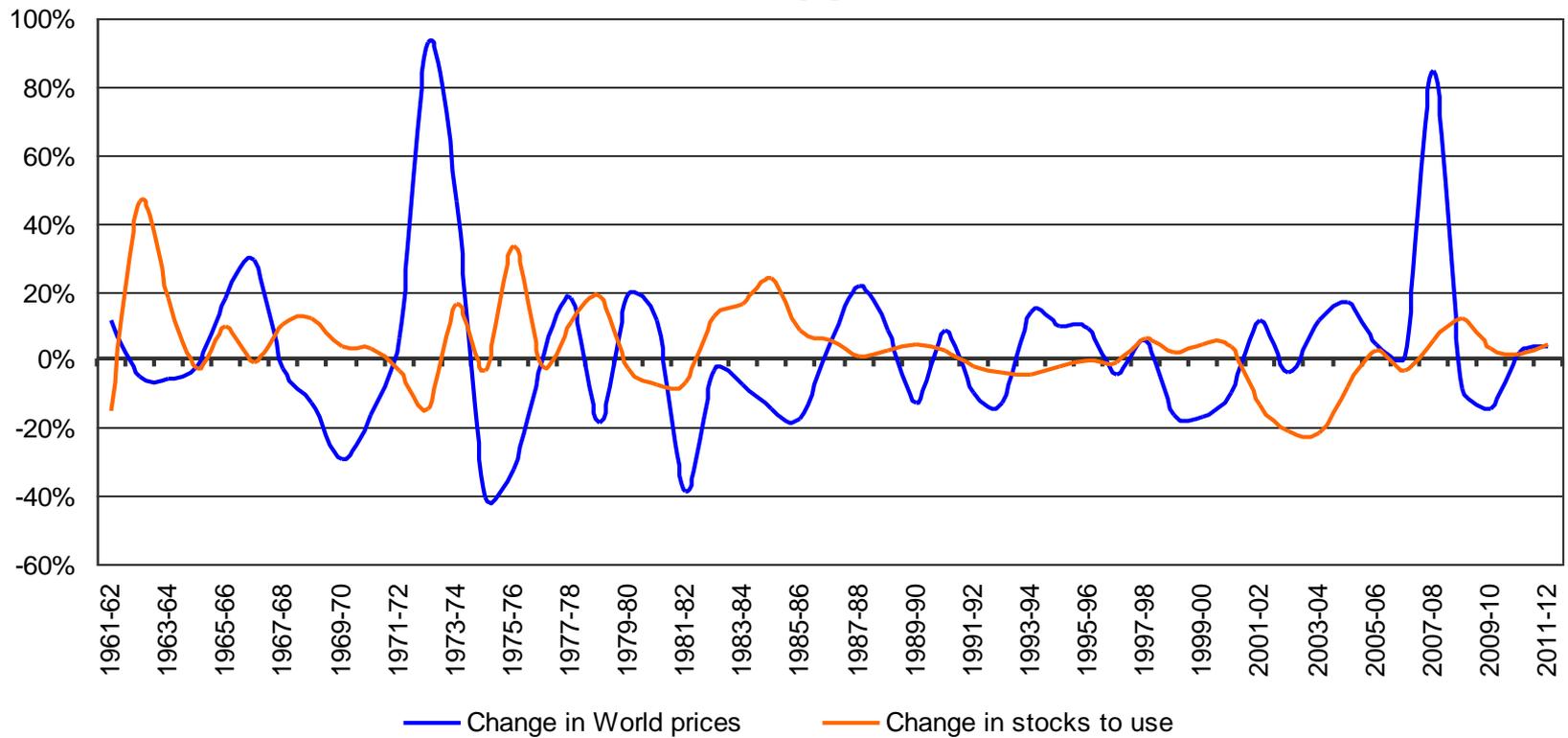
Source: World Bank, USDA

Yearly changes in stocks to use and prices Soybeans



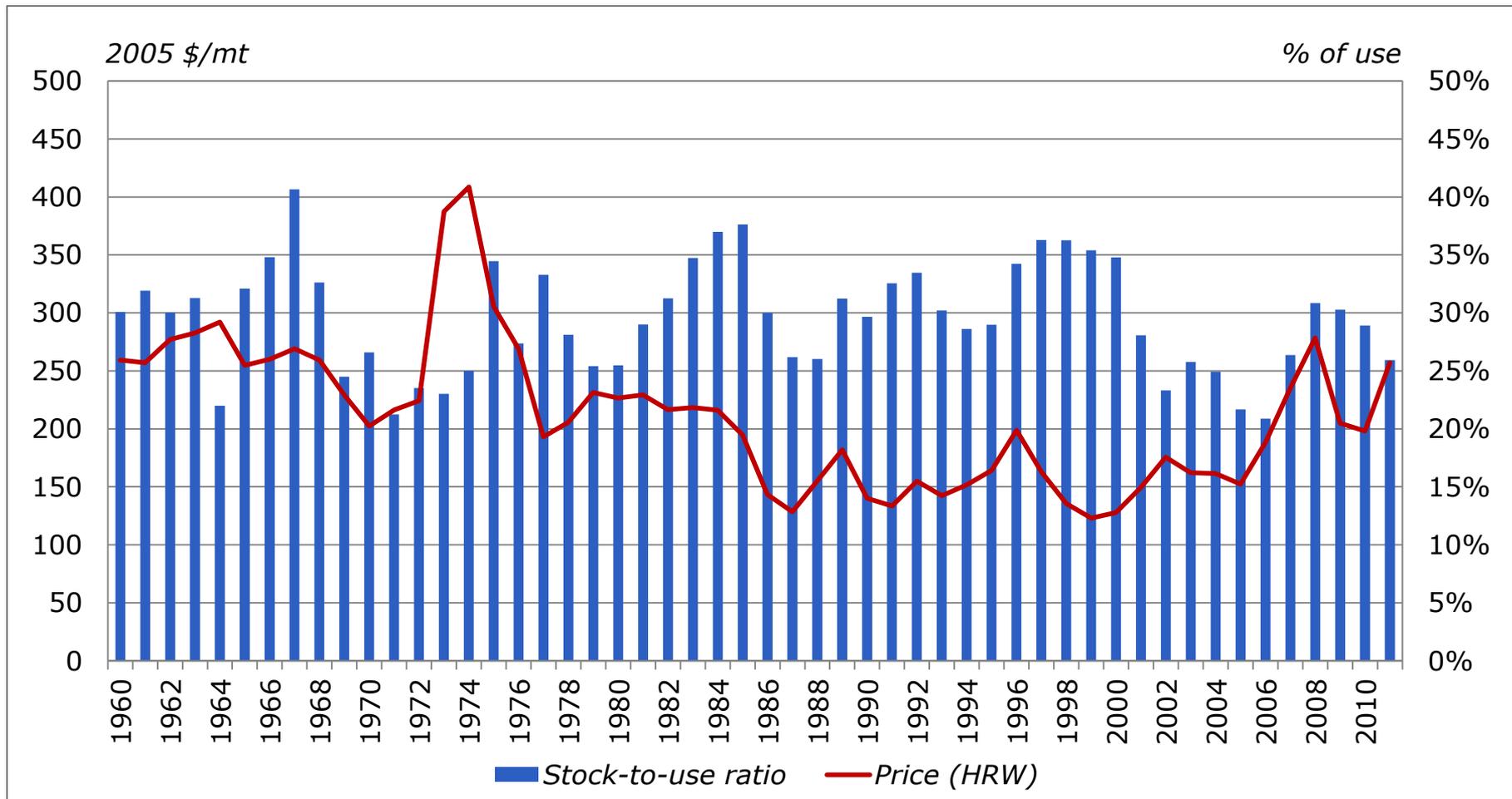
Source: World Bank, USDA

Yearly changes in stocks to use and prices Rice



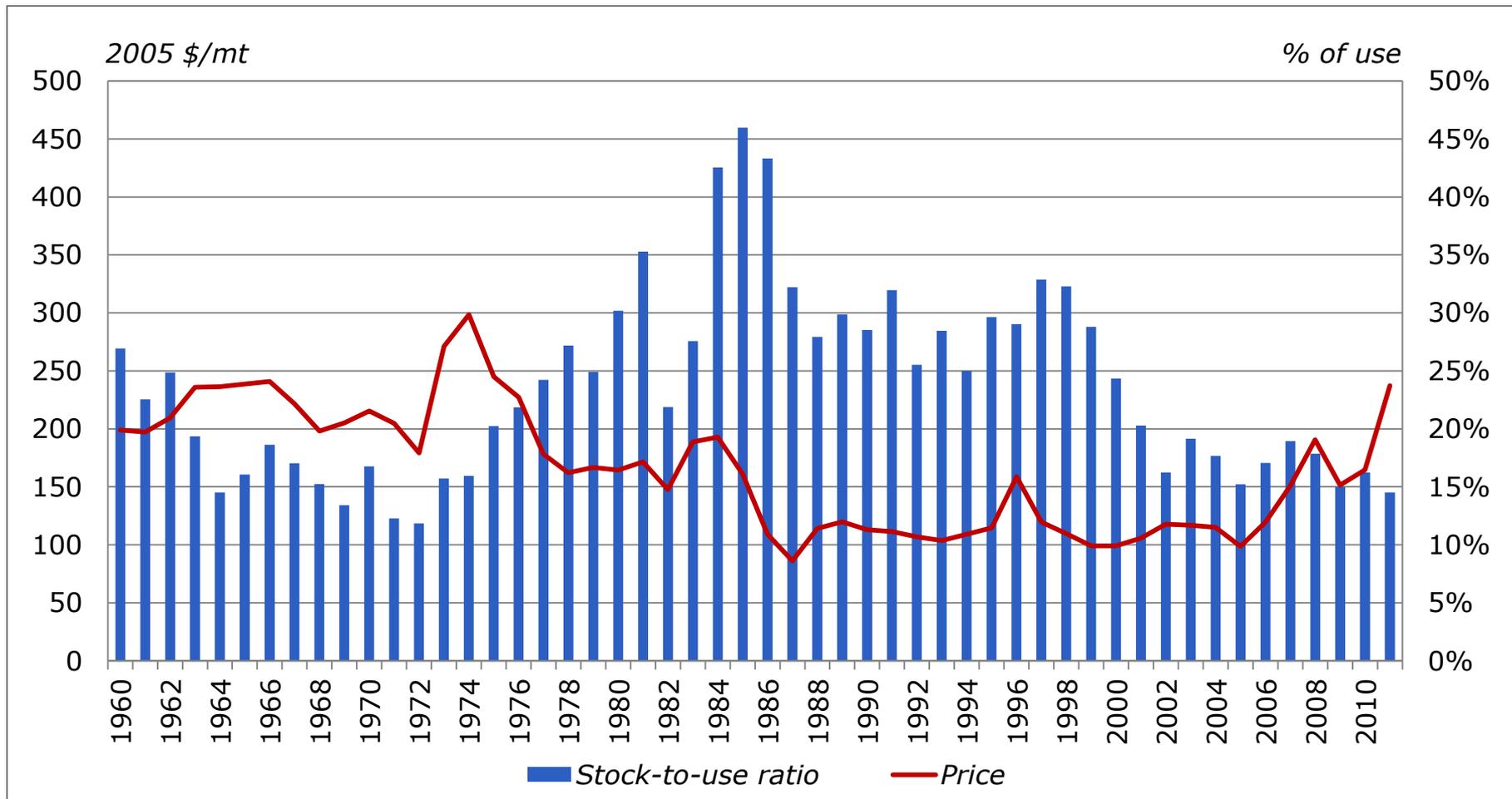
Source: World Bank, USDA

Evolution of stock-to-use ratio - wheat



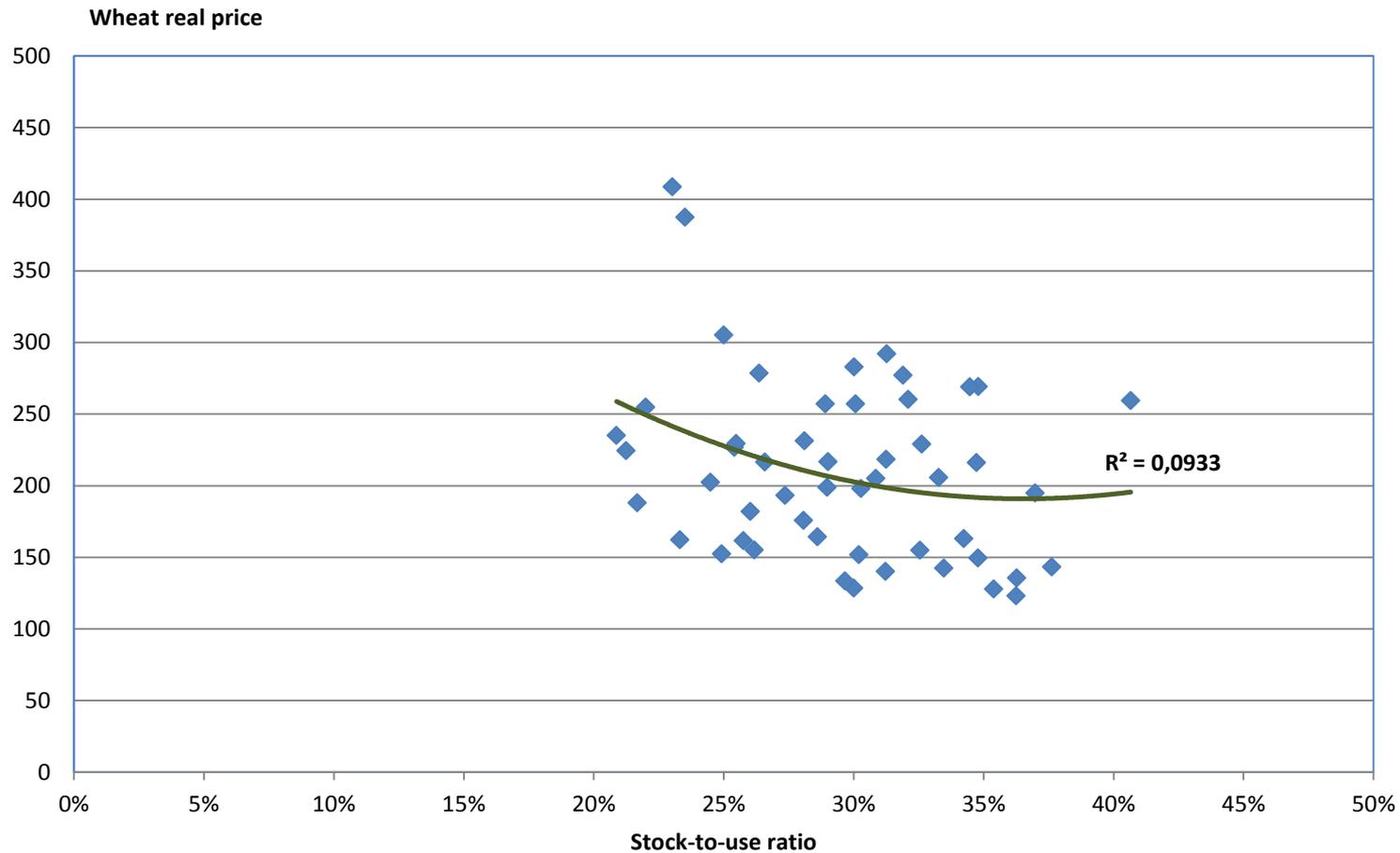
Sources: USDA for stocks and use, World Bank for prices (nominal prices)

Evolution of stock-to-use ratio - maize

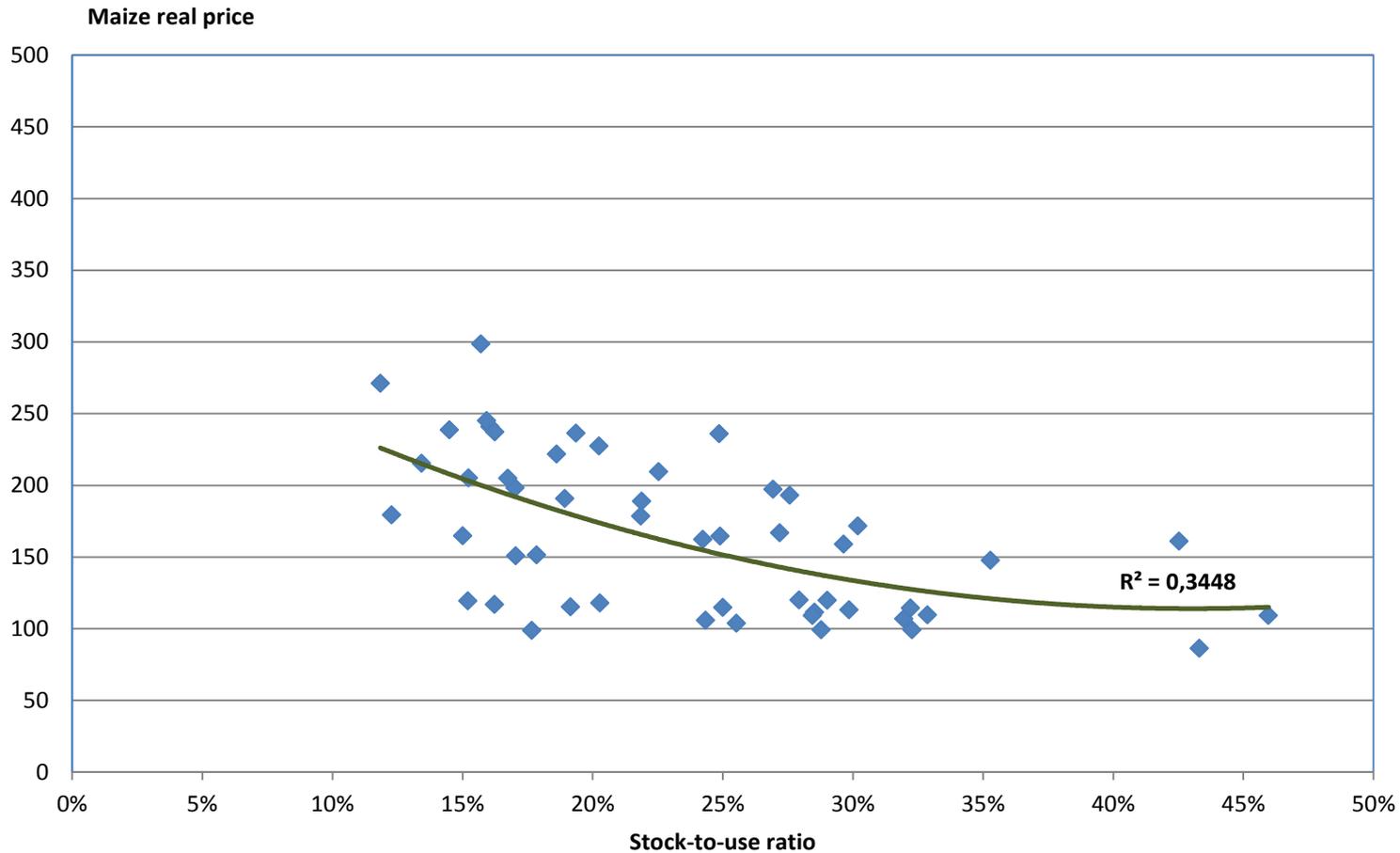


Sources: USDA for stocks and use, World Bank for prices (nominal prices)

Stock-to-use / price relation: wheat



Stock-to-use / price relation: maize



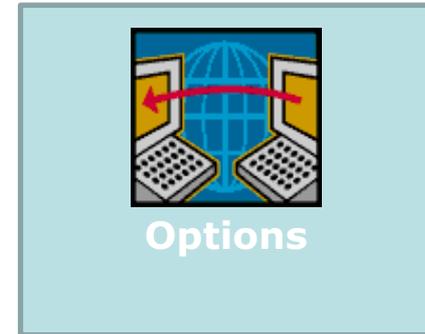
What matters most for what prices?

Contribution of each variable to price changes from 2000-05 to 2006-10, percent

	Maize	Wheat	Rice	Soybeans	Palm oil
S/U ratio	12.0	14.4	0.9	-2.4	1.3
Oil price	32.6	41.4	27.2	57.0	58.2
Exchange rate	-0.1	11.5	25.4	19.9	11.9
Interest rate	0.5	-0.5	-2.0	0.6	0.3
GDP	0.4	0.4	1.2	-0.4	-0.3
Inflation	13.6	1.7	-8.4	-0.2	0.7
Trend	-0.3	-0.1	-0.1	-0.2	-0.3
SUM (of the above)	58.7	68.8	44.2	74.3	71.8
Residual	41.3	31.2	55.8	25.7	28.2
ALL (SUM + Residual)	100.0	100.0	100.0	100.0	100.0

Source: World Bank Global Economic Prospects January 2012 – Commodity Annex

Ongoing research: are there distortions?



**Convergence
close to
maturity**

- **High frequency volatility estimation**
- **Historical vs risk neutral measure for put&call pricing**

Implications

- Higher prices for agricultural commodities will not necessarily result in higher income for farmers, especially if their margins are squeezed by increased costs
- With higher output prices expected, there is less and less scope for "traditional" intervention tools, such as price support
- Excessive price volatility affects profitability and hinders investments in the agricultural sector
- Ad-hoc policy intervention in agriculture to address volatility may be questionable if volatility is "imported" from outside agriculture