

# Global Agricultural Supply and Demand: Factors contributing to recent increases in food commodity prices

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*Ron Trostle*

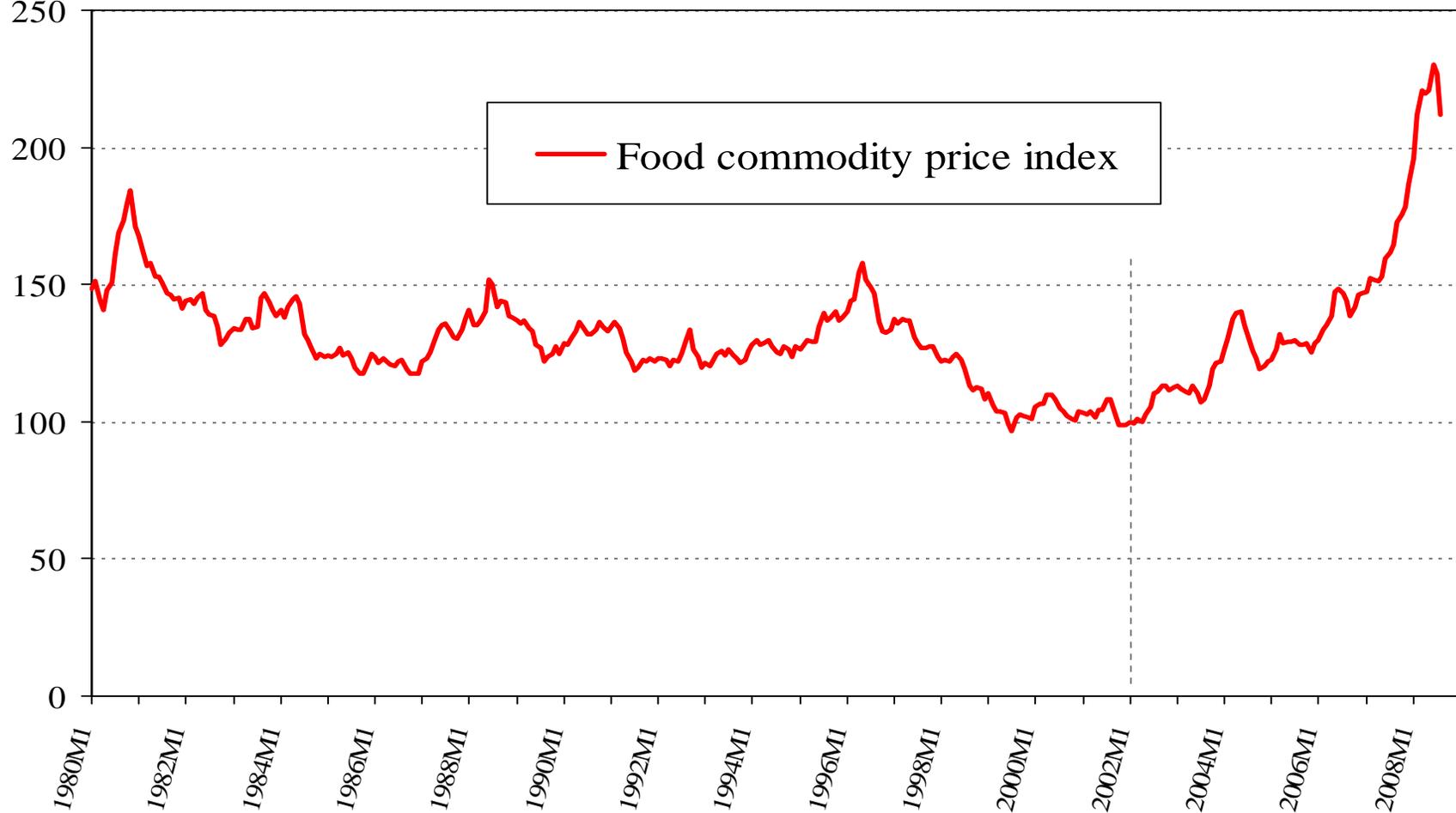
*Economic Research Service  
U.S. Department of Agriculture*

*Agricultural Markets and Food Price Inflation  
Federal Reserve Bank of Chicago*

*October 2, 2008*

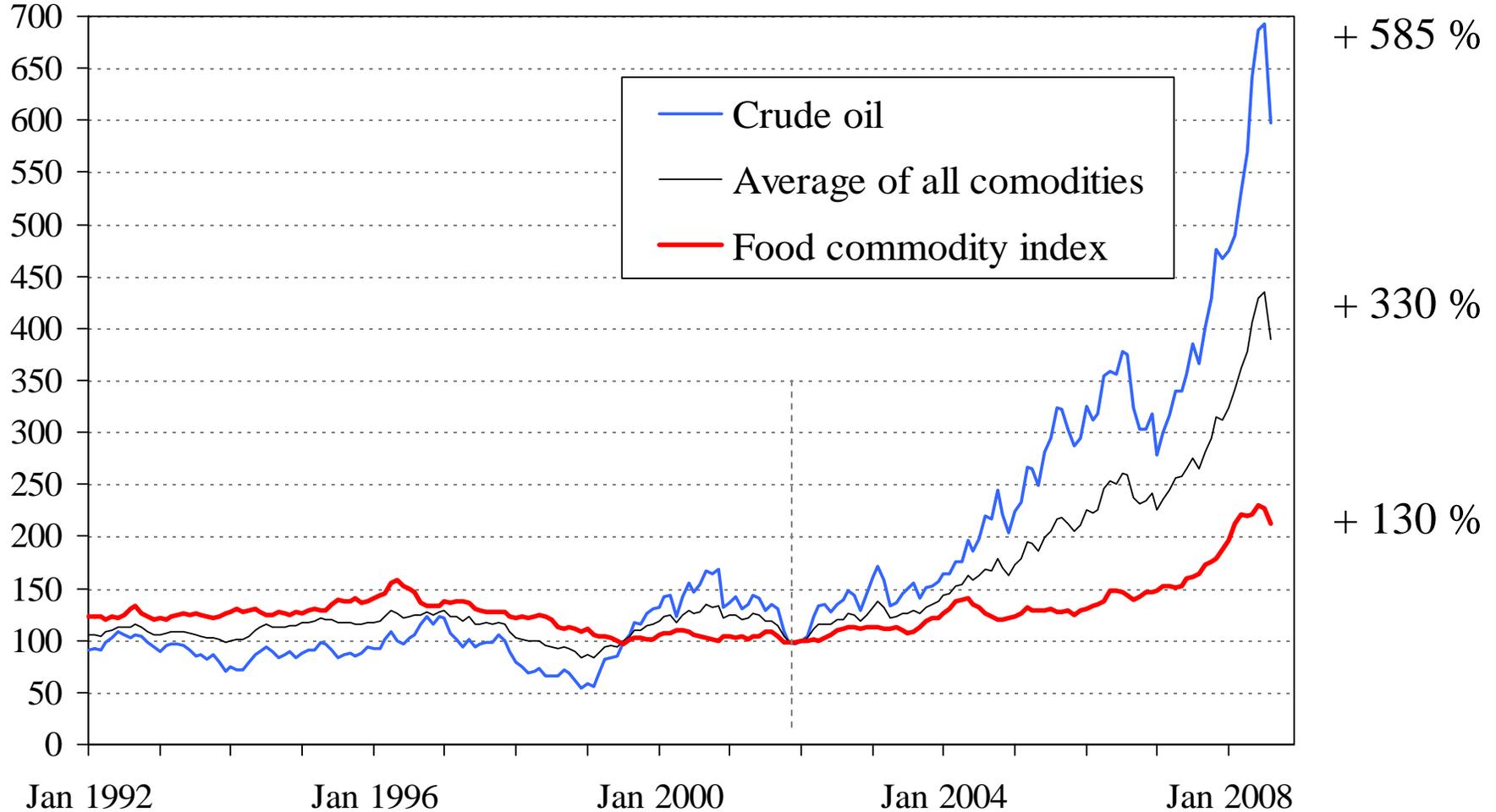
# Food commodity prices have risen 130 % since January 2002 (>70% in last two years )

Index: January 2002 = 100



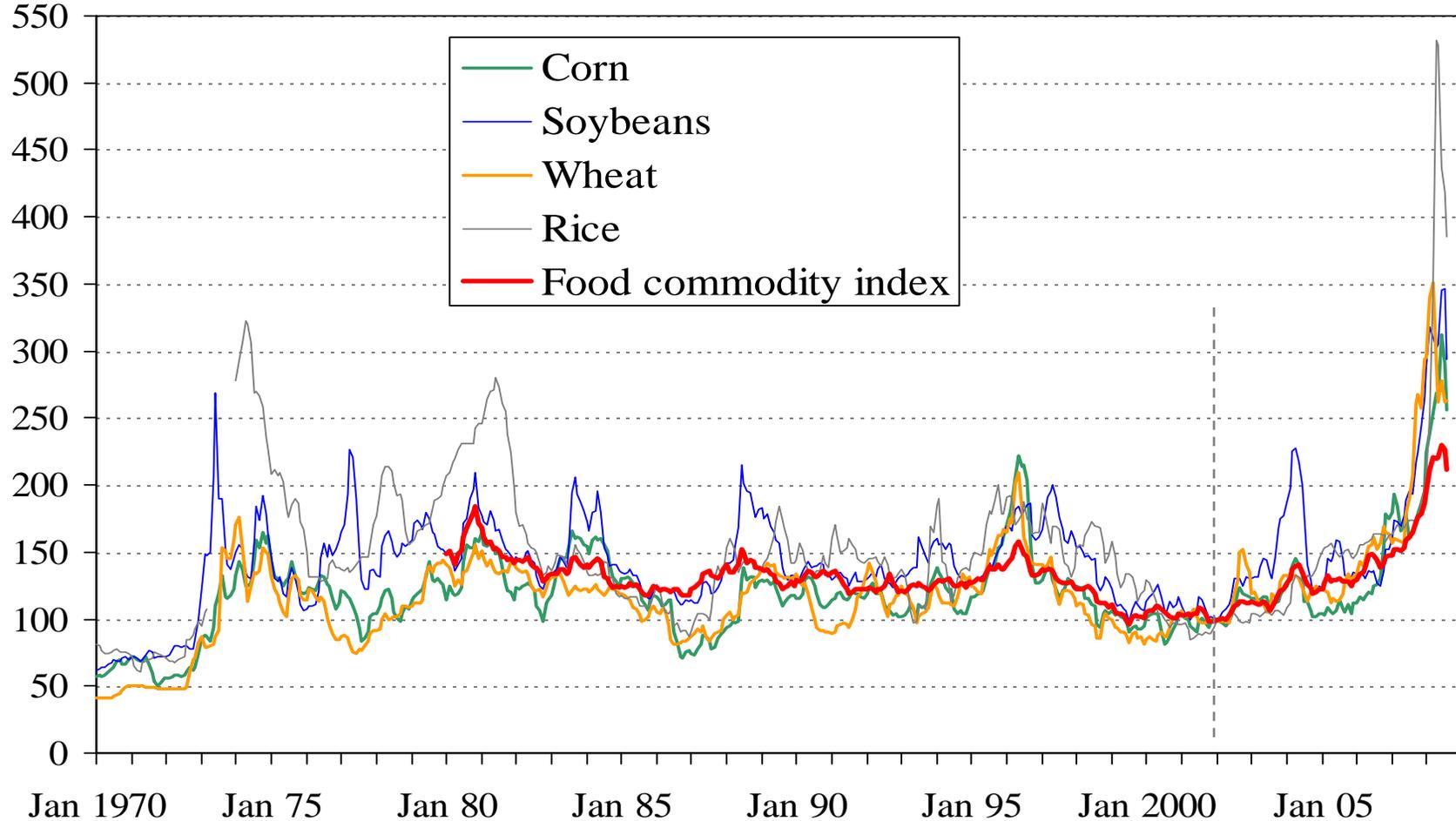
# Prices of many commodities rose even more

Index: January 2002 = 100



# Food commodity prices: Indices for selected crops and total food

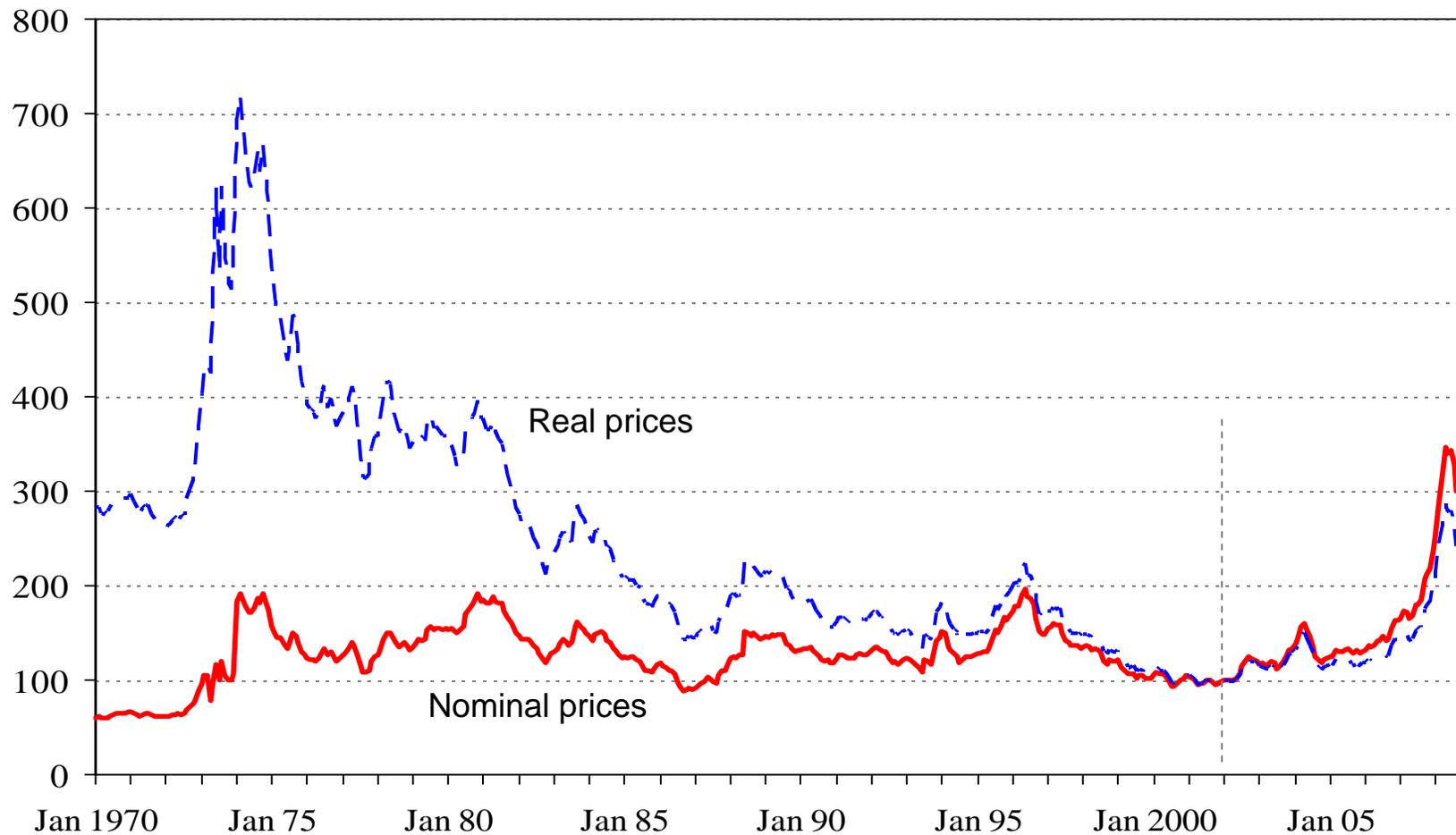
Index: January 2002 = 100



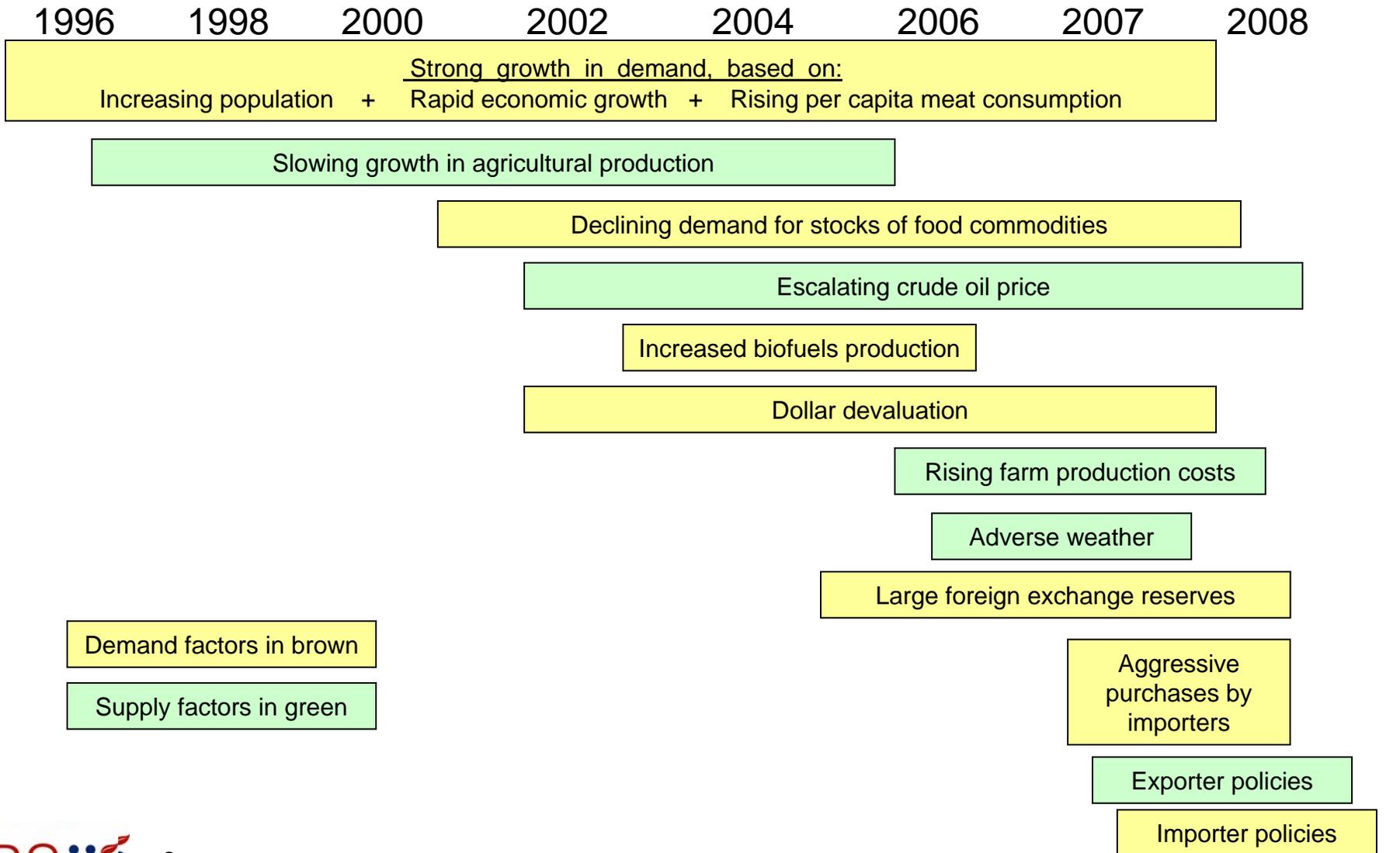
# Crop price increases: real vs. nominal

Average of 4 crops (wheat, soybeans, corn & rice)

Index: January 2002 = 100

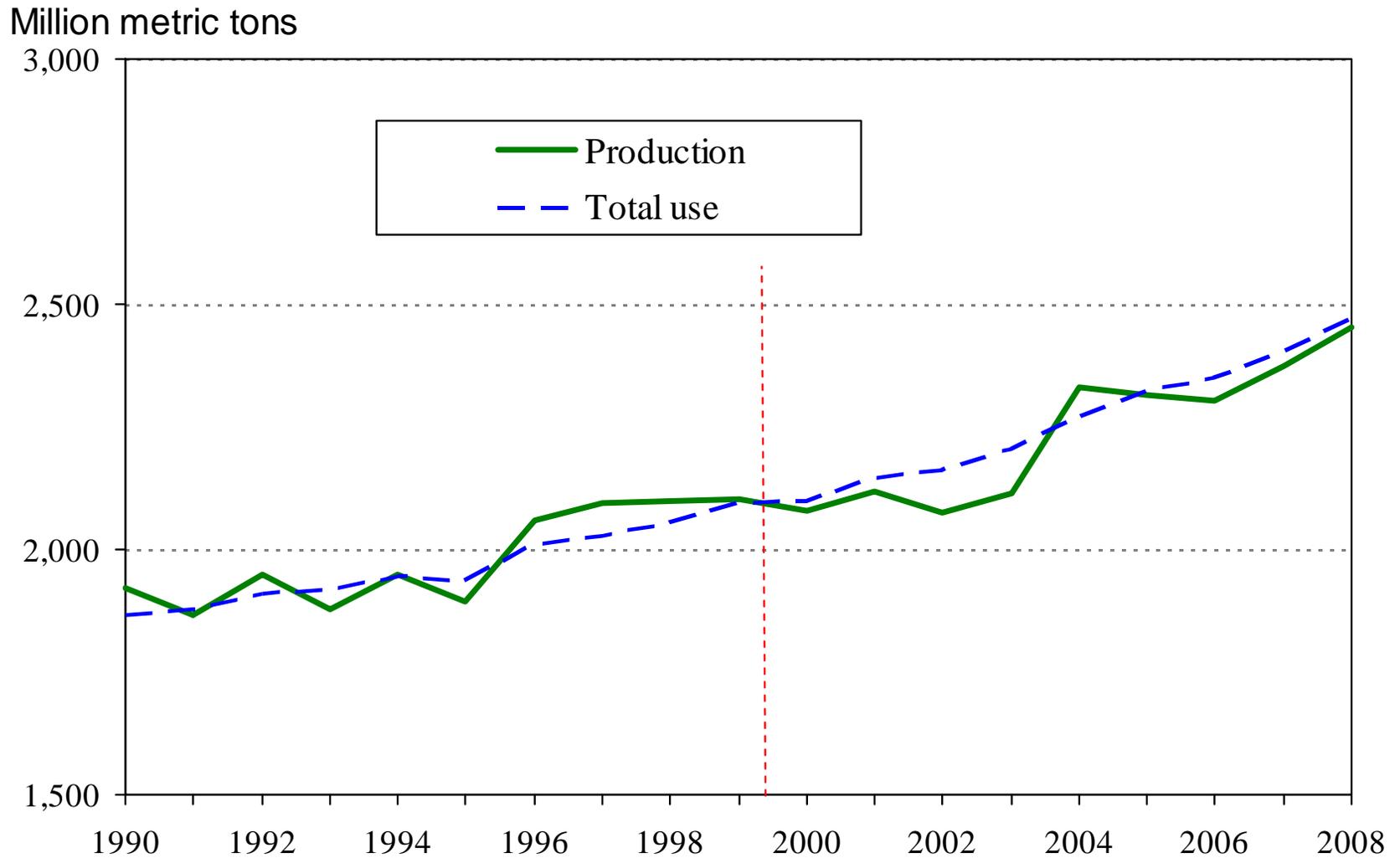


# Factors contributing to higher food commodity prices



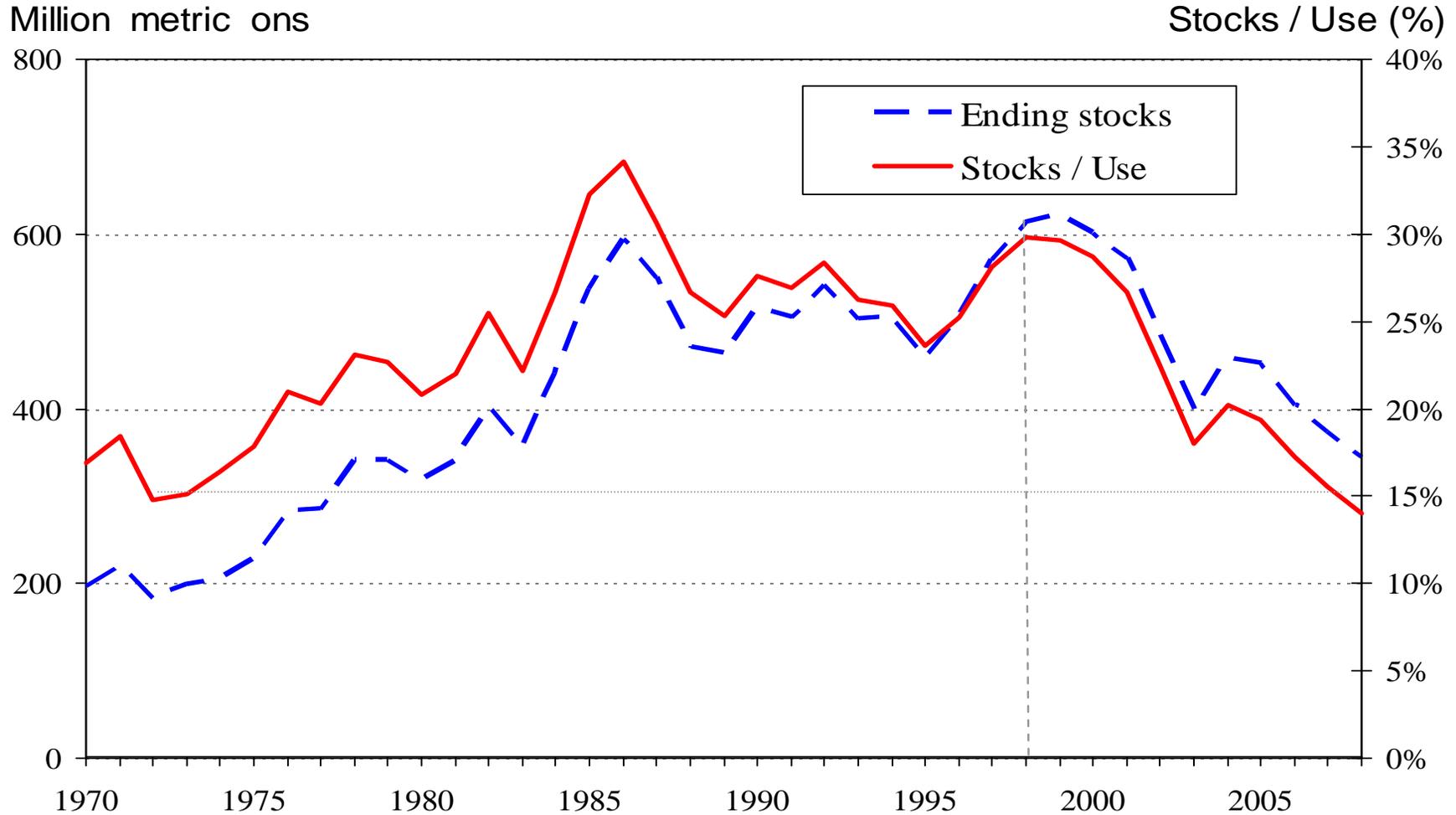
# World grain & oilseeds

## Total production and use



# Total world grain & oilseeds

## Stocks and stocks-to-use ratio



# Long-term trends contributing to higher prices:

## 1. Supply-side factors

- Slower growth rate in yields

## 2. Demand-side factors

- Population growth
- Income growth
- Increased per capita meat consumption

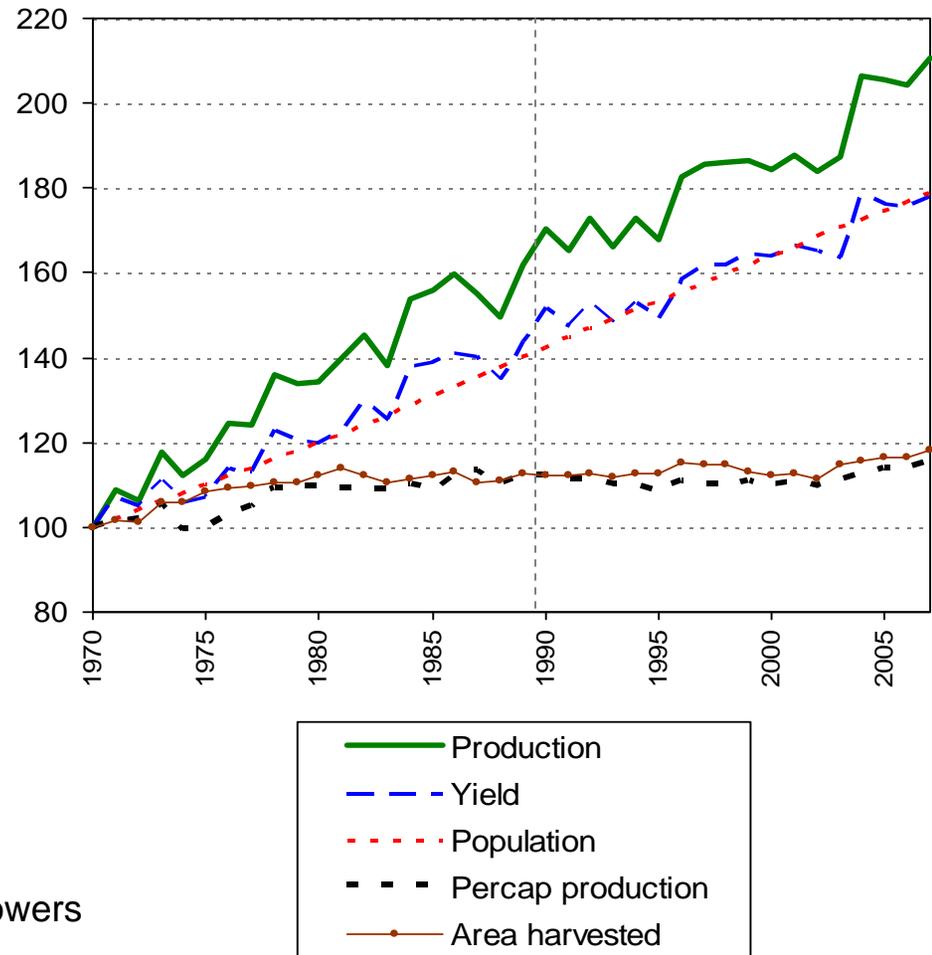
# Total world grain & oilseeds<sup>1</sup>

Production, yield, area harvested, population & percap production

**Exponential trend growth rates:**

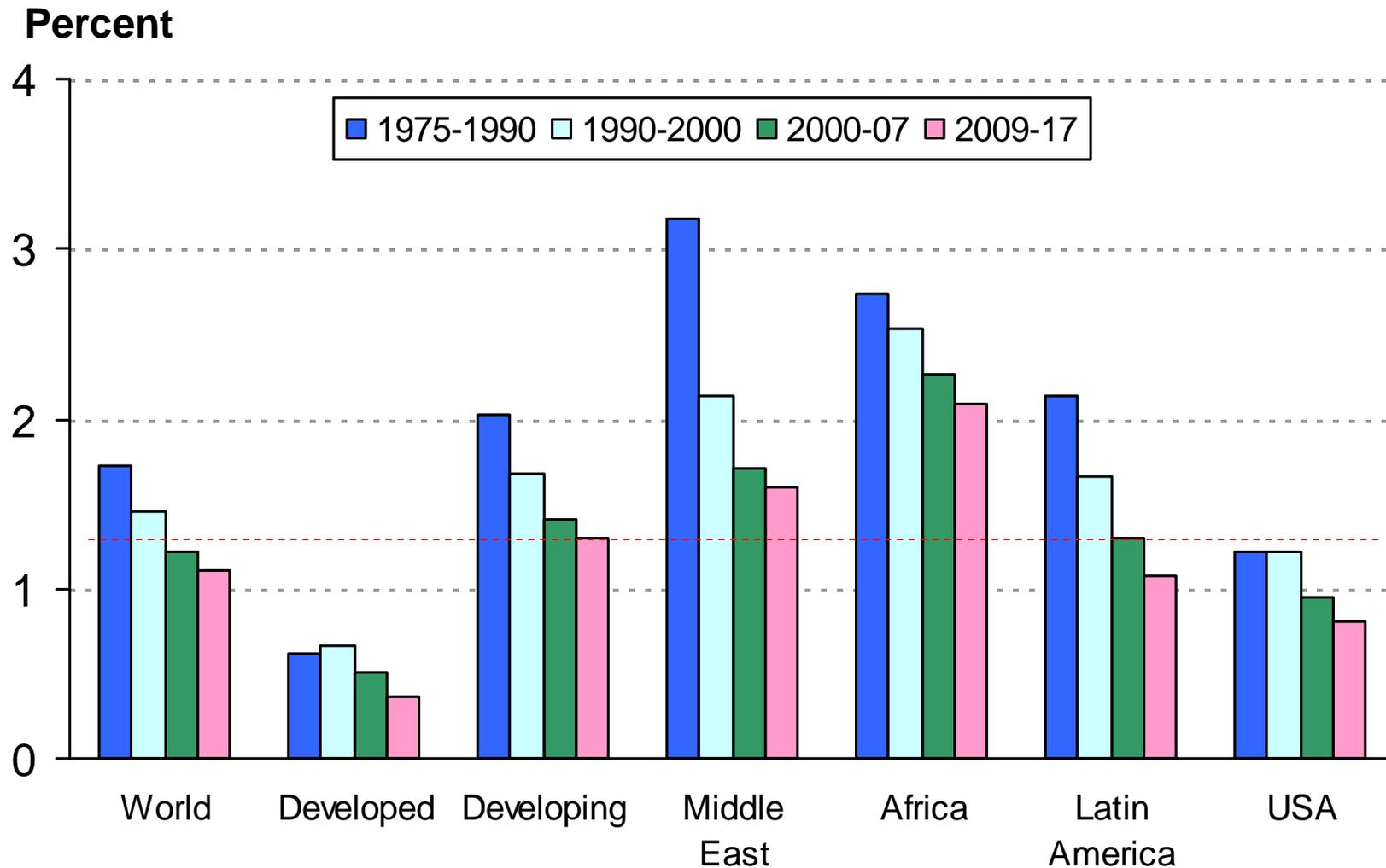
	1970-90	90-07
Production	2.2	1.3
Yields	2.0	1.1
Area	0.15	0.14
Population	1.7	1.4
Per capita use	0.56	0.11

Index: 1970 = 100



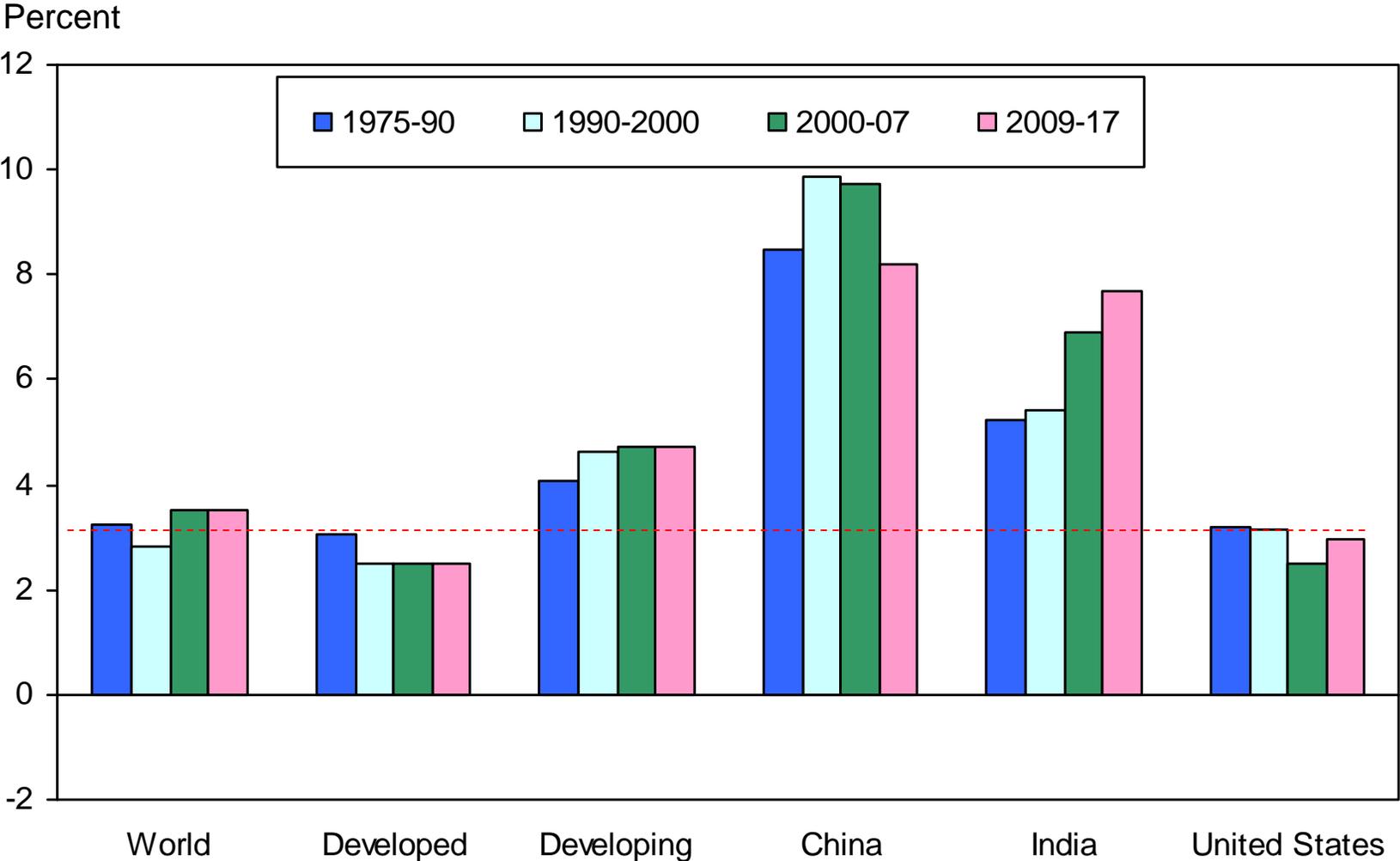
<sup>1</sup> Total oilseeds = soybeans + rapeseed + sunflowers

# Population growth rates decline (Percent by period)



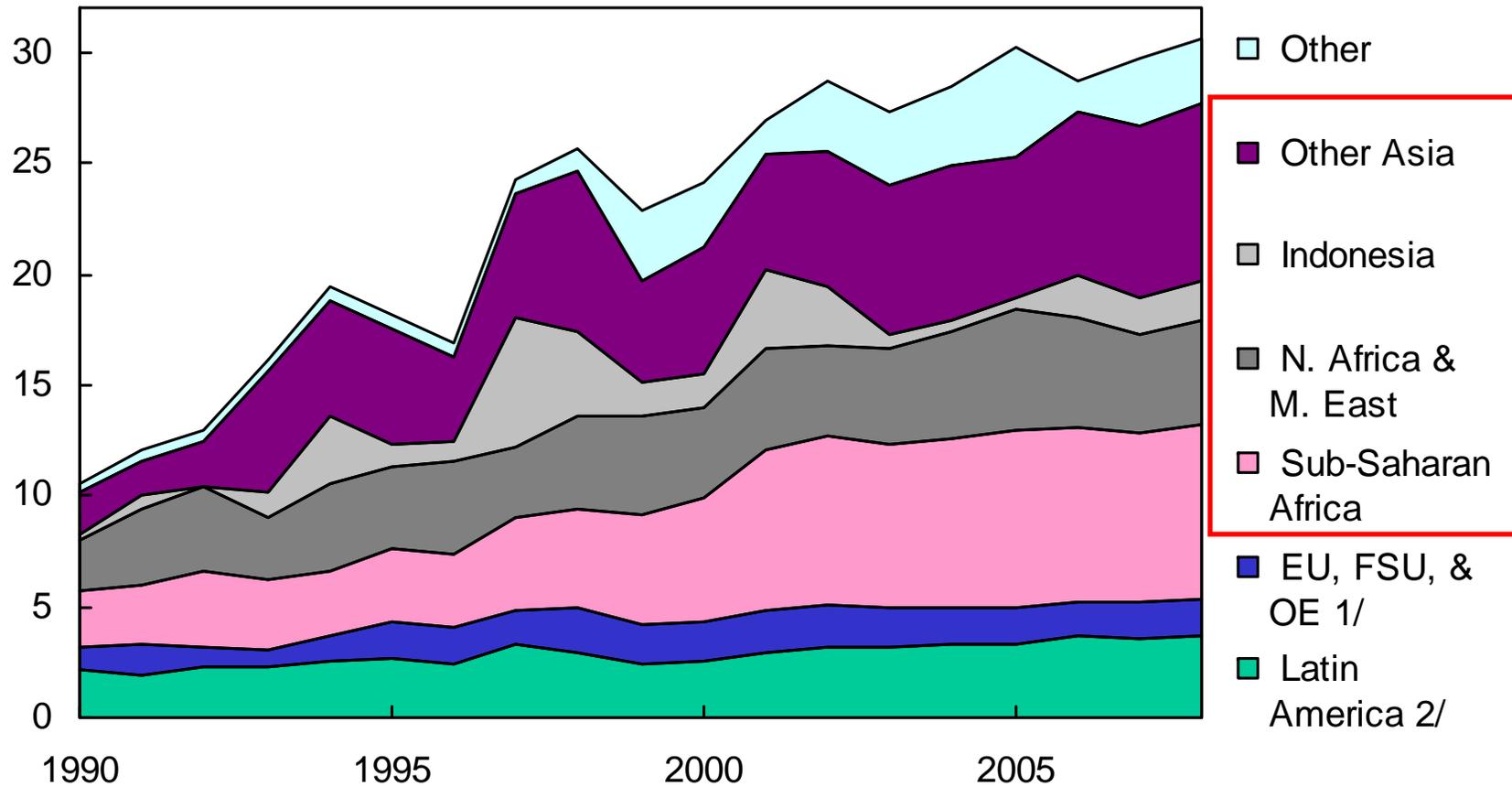
# Strong economic growth

## Average Real GDP growth rates



# Global rice imports

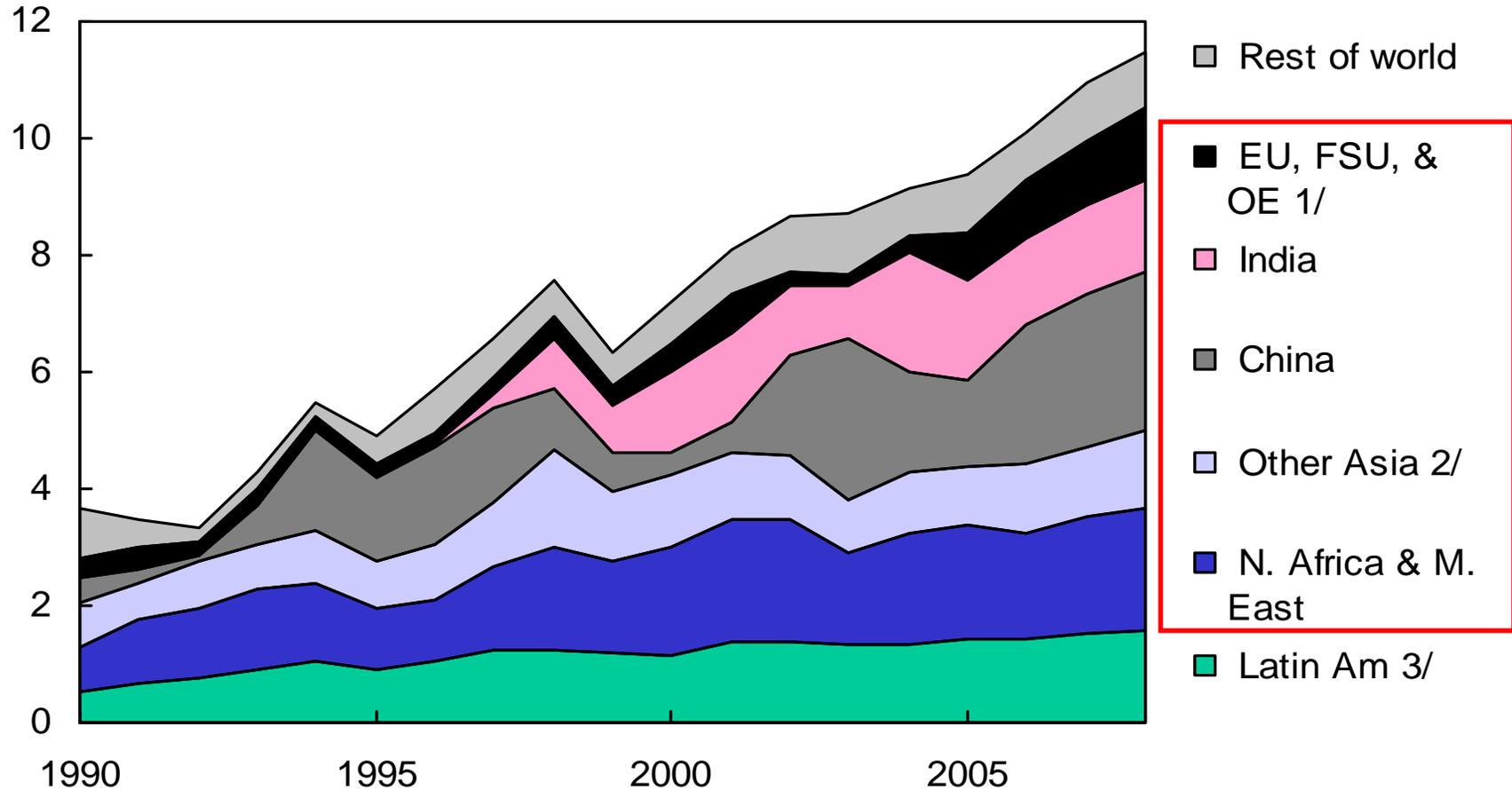
Million metric tons



1/ European Union, former Soviet Union, and other Europe. 2/ Includes Mexico.

# Global soybean oil imports

Million metric tons



1/ European Union, former Soviet Union, and other Europe.

2/ Asia excluding India and China. 3/ Includes Mexico.

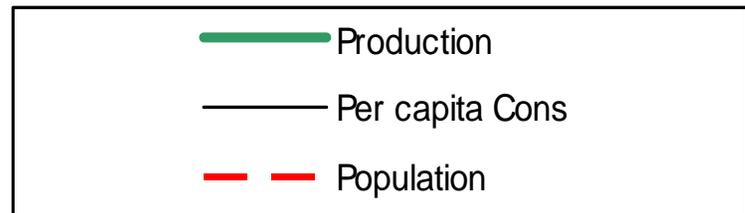
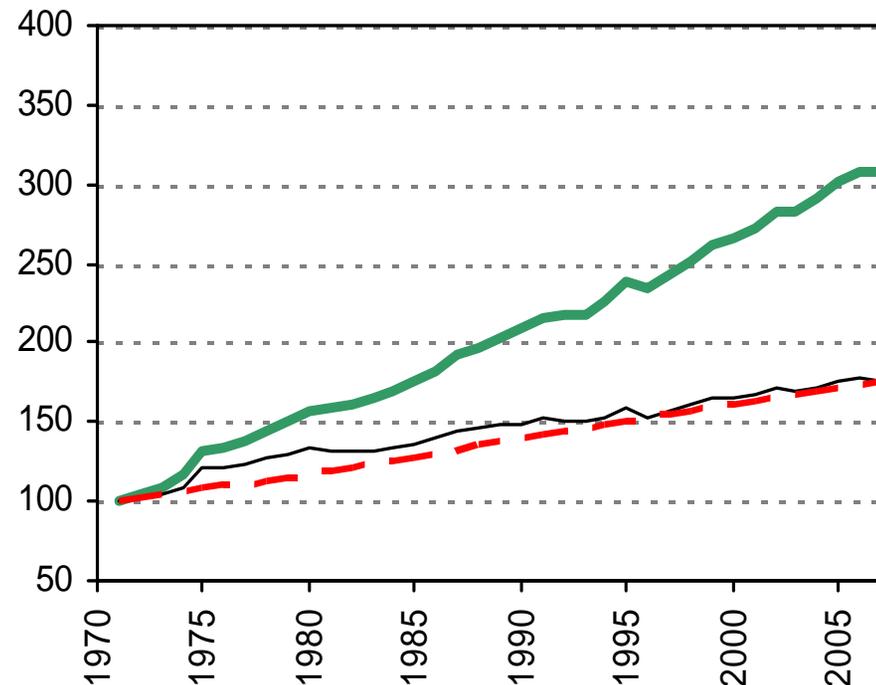
# Global meat<sup>1</sup>

## Production, per capita consumption, and population

### Exponential trend growth rates:

	1975-90	90-07
Production	3.1	2.5
Population	1.7	1.4
Per capita consumption	1.4	1.1

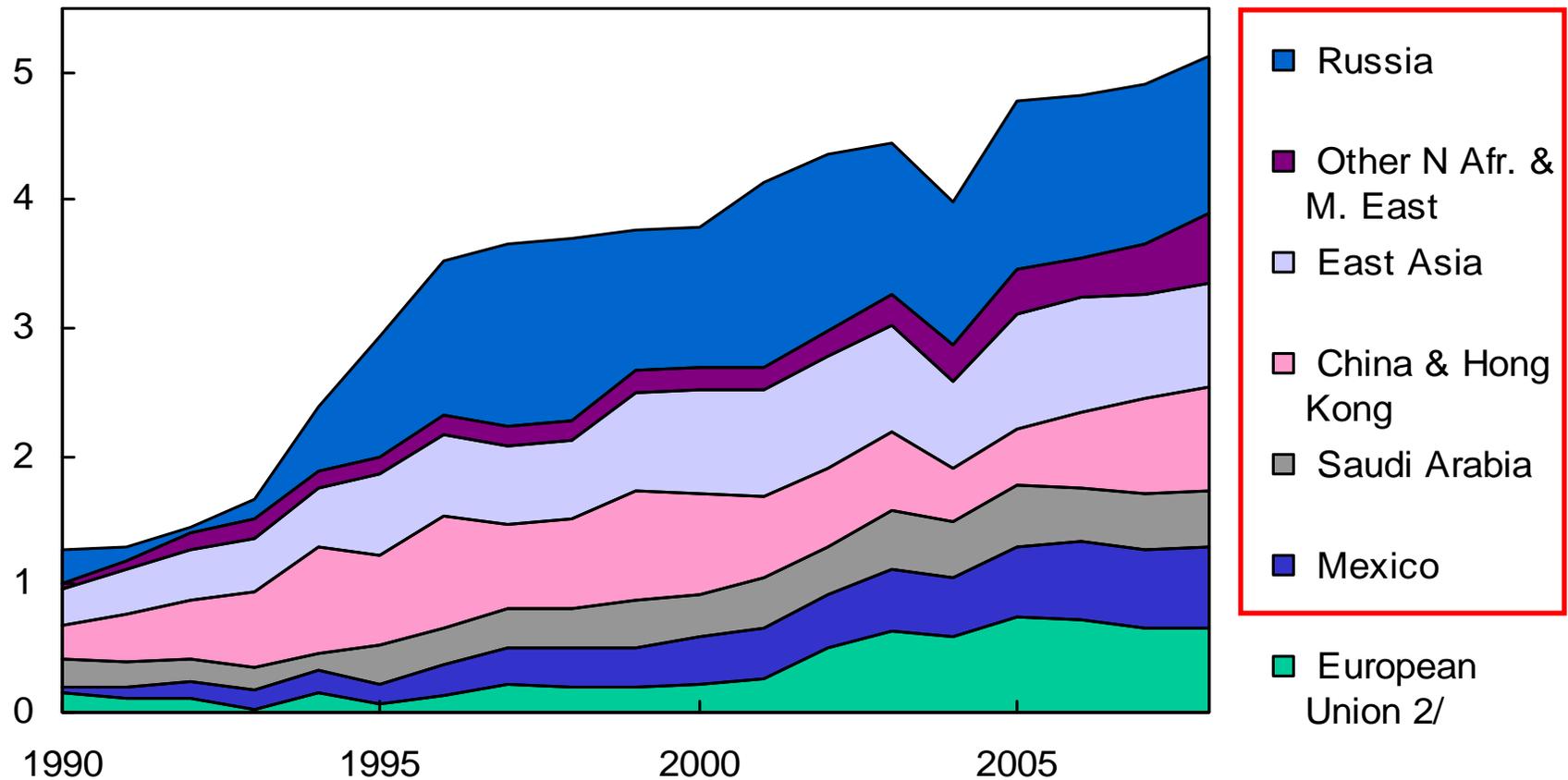
Index: 1971 = 100



<sup>1</sup> Total meat = beef + pork + chickens & turkeys.

# Poultry imports 1/

Million metric tons



1/ Selected importers.

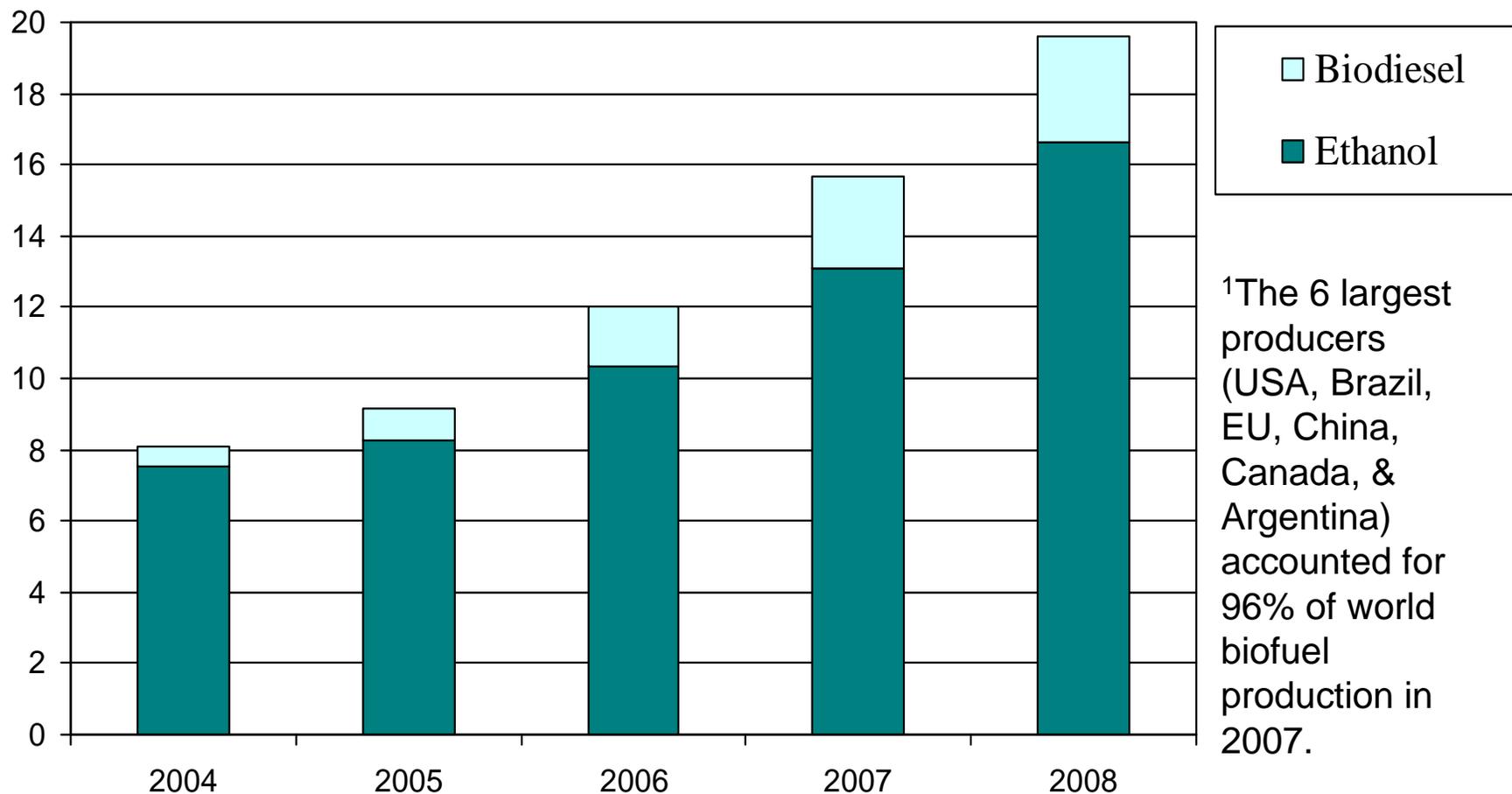
2/ EU-27 excludes intra-trade after 2002, EU-15 intra-trade before 2003, Slovenia before 1992.

## Role of biofuels:

- Major producers
- Impact on land use

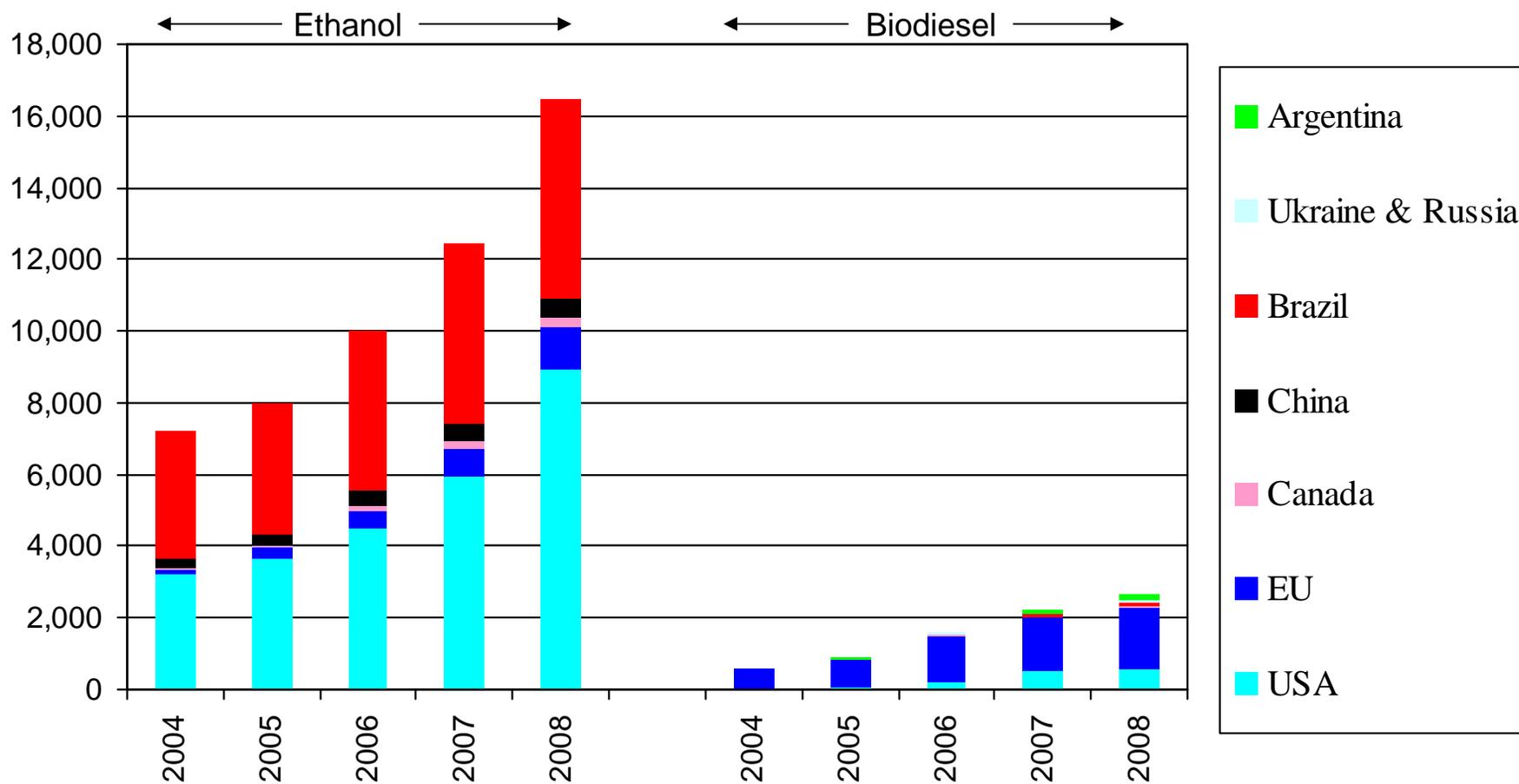
# Biofuels production: Total of largest producers<sup>1</sup>

Billion Gallons

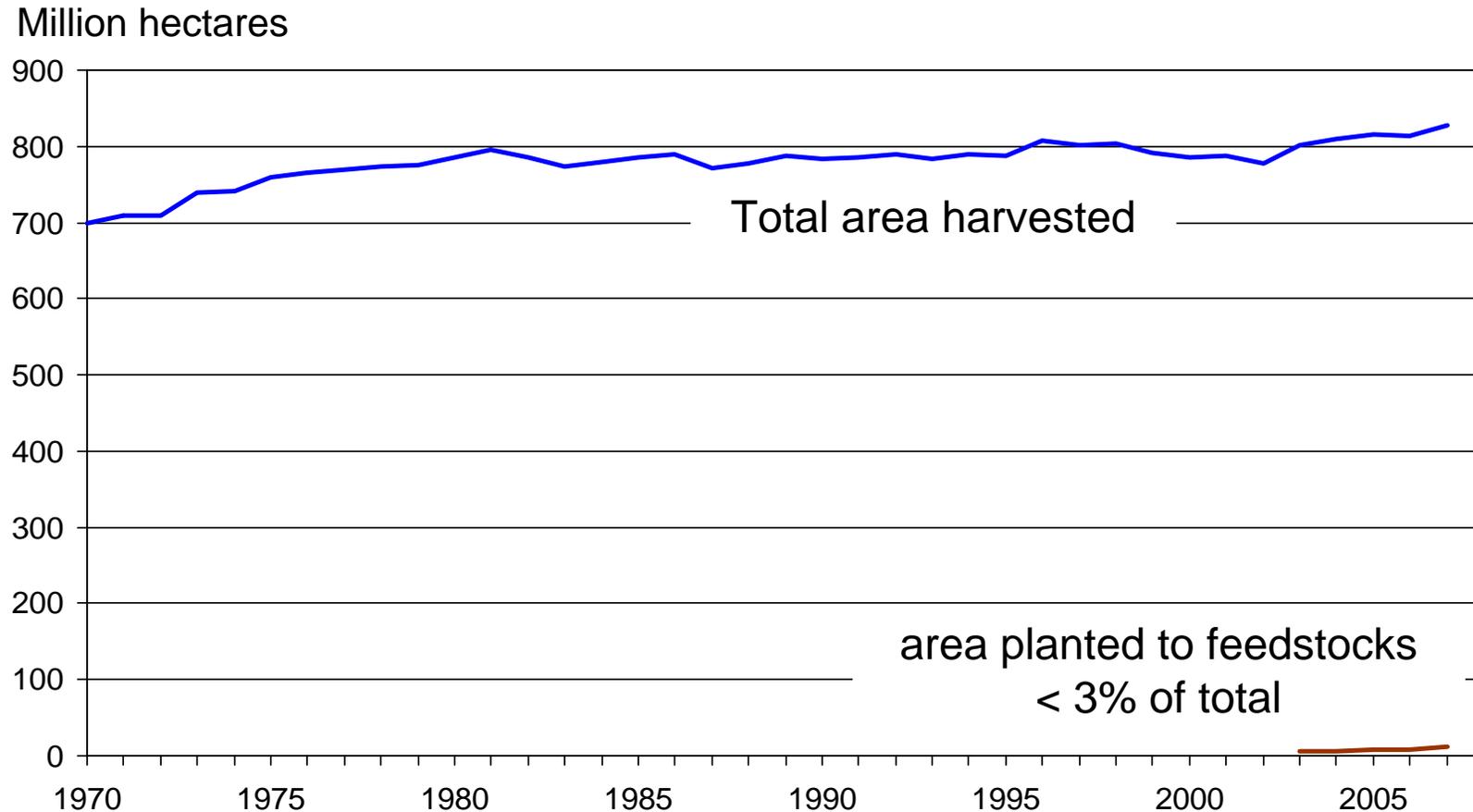


# Biofuels production: Largest producers

Million Gallons



# Global area harvested<sup>1</sup>: Total, and for biofuels feedstocks

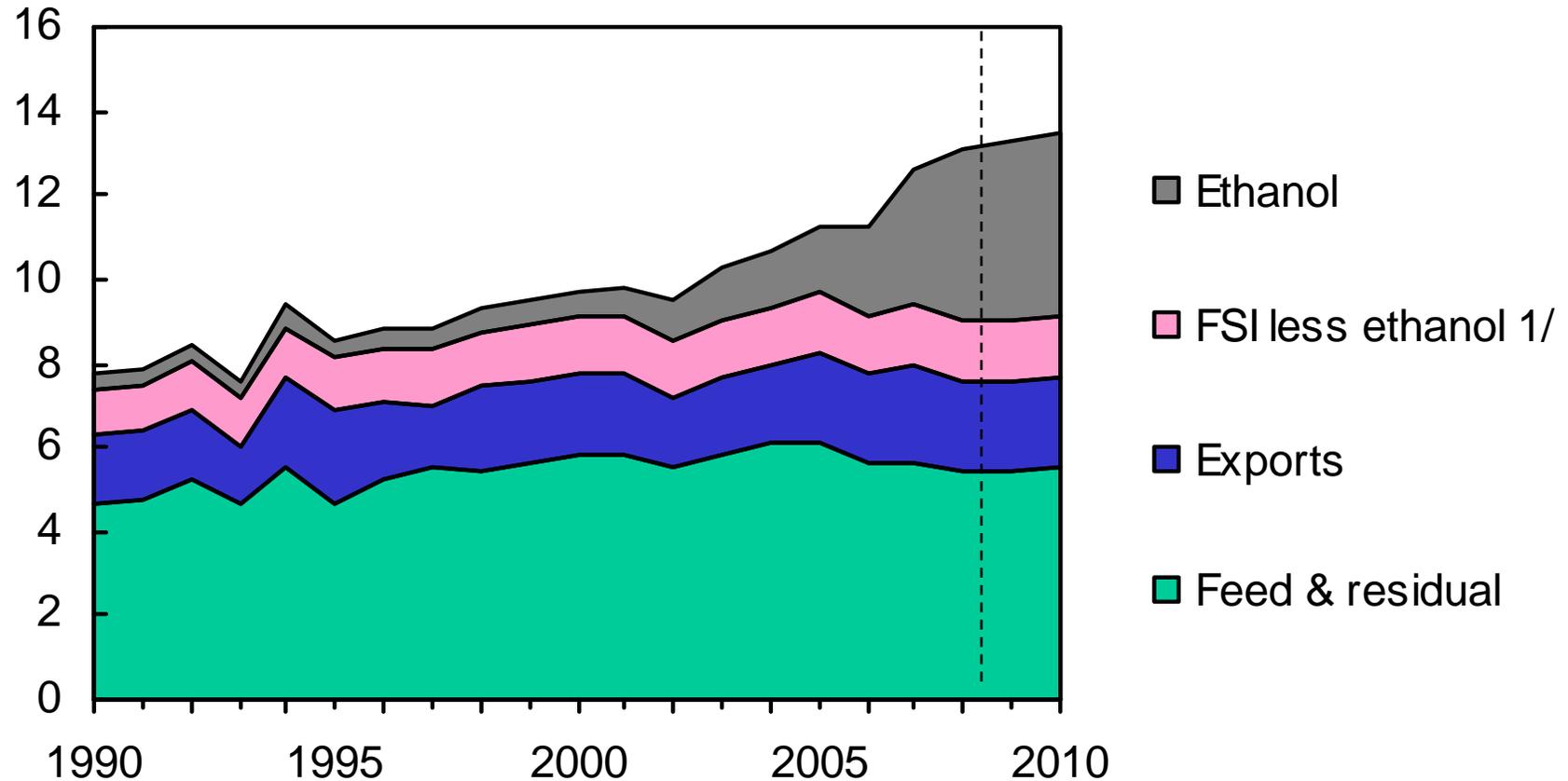


<sup>1</sup>Crops include:

Wheat, Rice, Corn, Barley, Sorghum, Other cereals,  
Soybeans, Rapeseed, Sunseed, Cotton. Excludes sugarcane and beets

# U.S. corn use

Billion bushels



1/ Food, seed, and industrial less ethanol.

# Growth in world wheat and coarse grains use: 1980/81 - 2002/03 vs. 2002/03 - 2007/08

Use	1980/81 to 2002/03		2002/03 to 2007/08	
	MMT	%	MMT	%
Food	160	49	79	44
Feed*	144	44	48	27
U.S. corn for ethanol	27	7	53	29
Total	328	100	180	100

# Adverse weather reduced production:

## ➤ In 2006

- Australia
- Ukraine & Russia

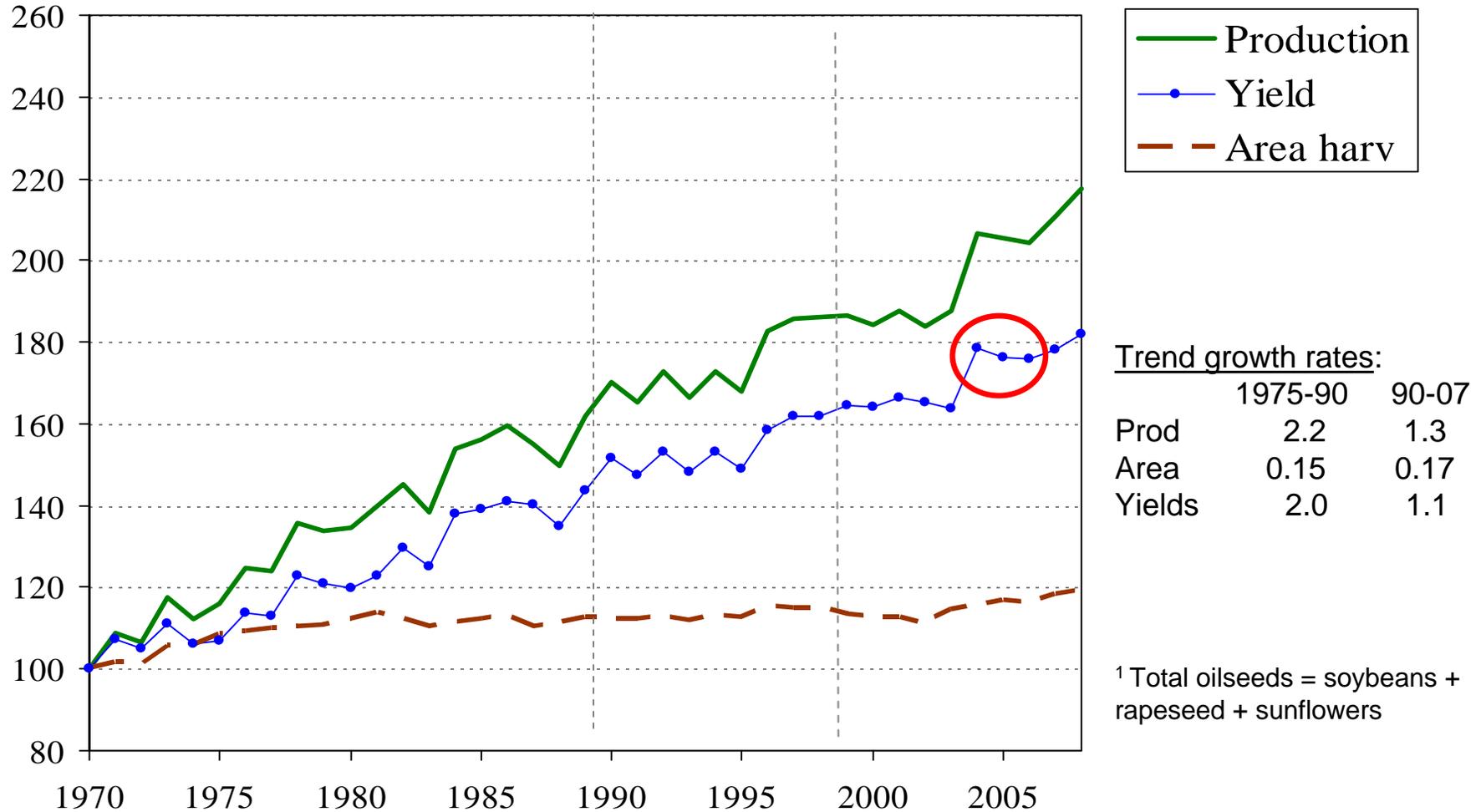
## ➤ and 2007

- Europe: dry spring; harvest floods
- SE Europe: drought
- Ukraine & Russia: drought (2nd year)
- USA: late spring freeze
- Canada: hot and dry
- Australia: 2nd year of severe drought
- NW Africa: drought
- Turkey: dry

# Total world grain & oilseeds<sup>1</sup>

## Production, yield, & area harvested

Index: 1970 = 100

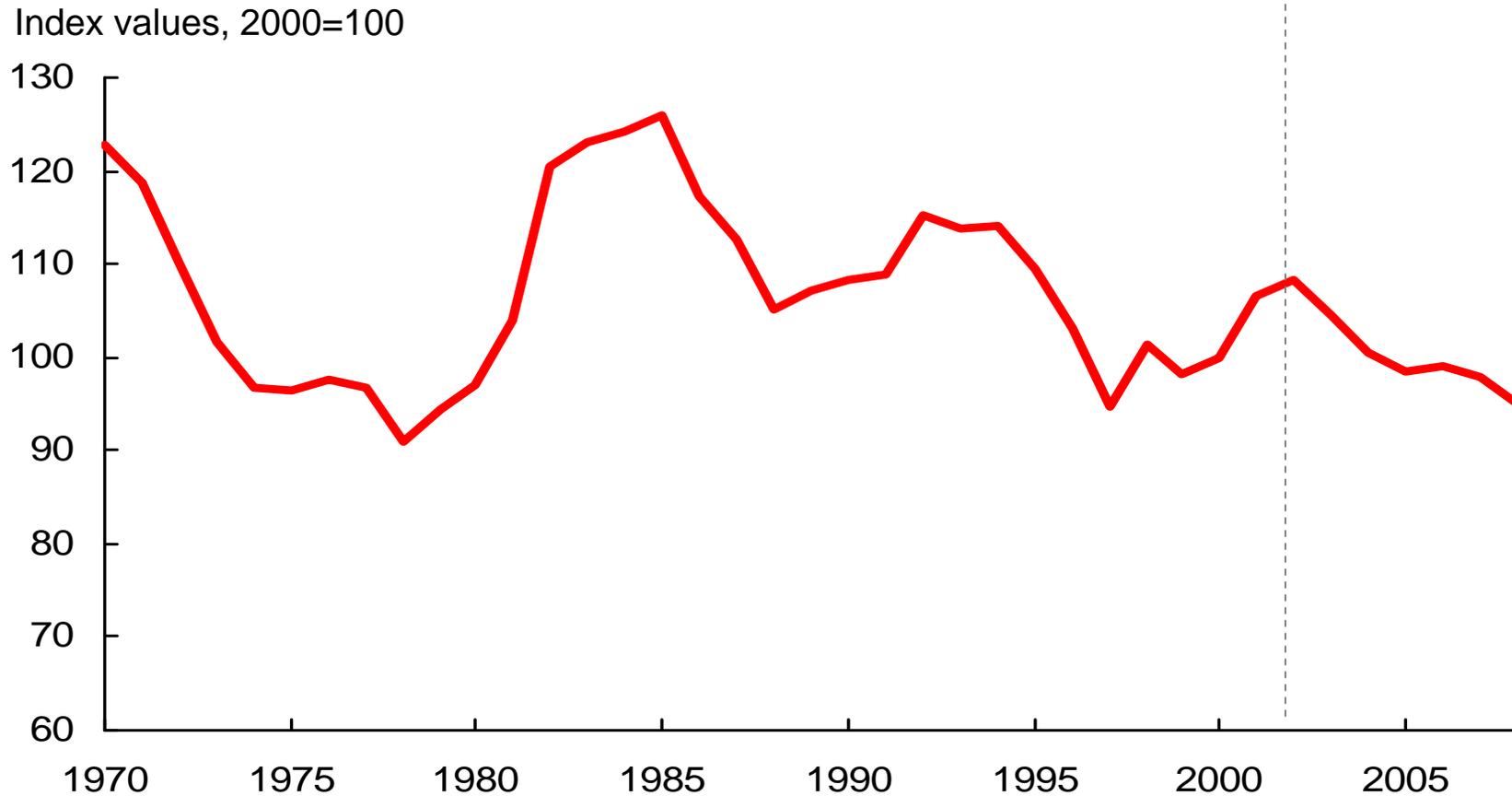


<sup>1</sup> Total oilseeds = soybeans + rapeseed + sunflowers

## Other contributing factors:

- Devaluation of U.S. dollar
- Increasing foreign exchange reserves held by importers
- Role of hedge funds, index funds, & sovereign wealth funds:  
(affect demand and/or volatility?)

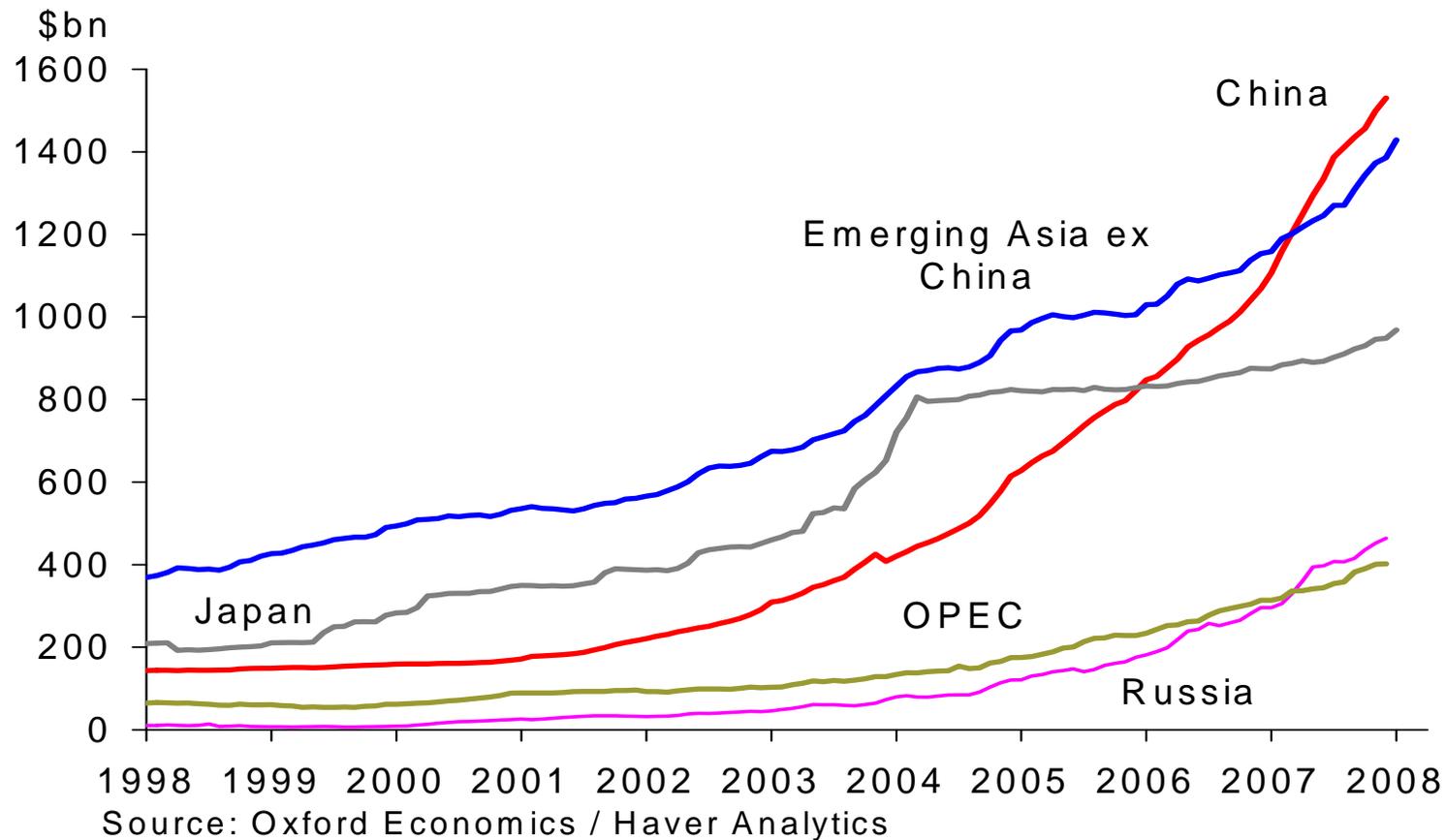
# Value of U.S. dollar declines after 2002 1/



1/ Real U.S. agricultural trade-weighted dollar exchange rate, using U.S. agricultural export weights, based on 192 countries.

# Foreign Exchange Reserves

## Emerging Asia: Foreign exchange reserves



# Policy responses to food price inflation

# Policy responses to rising prices by selected countries

Country	<u>Exports</u>			<u>Imports</u>	<u>Domestic policies</u>	
	Raised export taxes	Export volume restrictions	Export bans	Reduced import tariffs	Increased consumer subsidies	Imposed price caps
<b><u>Export policies:</u></b>						
Argentina	x	x				
Cambodia			x			
Egypt			x			
Kazakhstan		x				
Russia	x					
Ukraine			x			
Vietnam	x		x			
<b><u>Import policies:</u></b>						
Bangladesh				x	x	x
EU				x		
Mexico				x		
Morocco				x		
Mongolia					x	
Philippines					x	
Thailand				x		

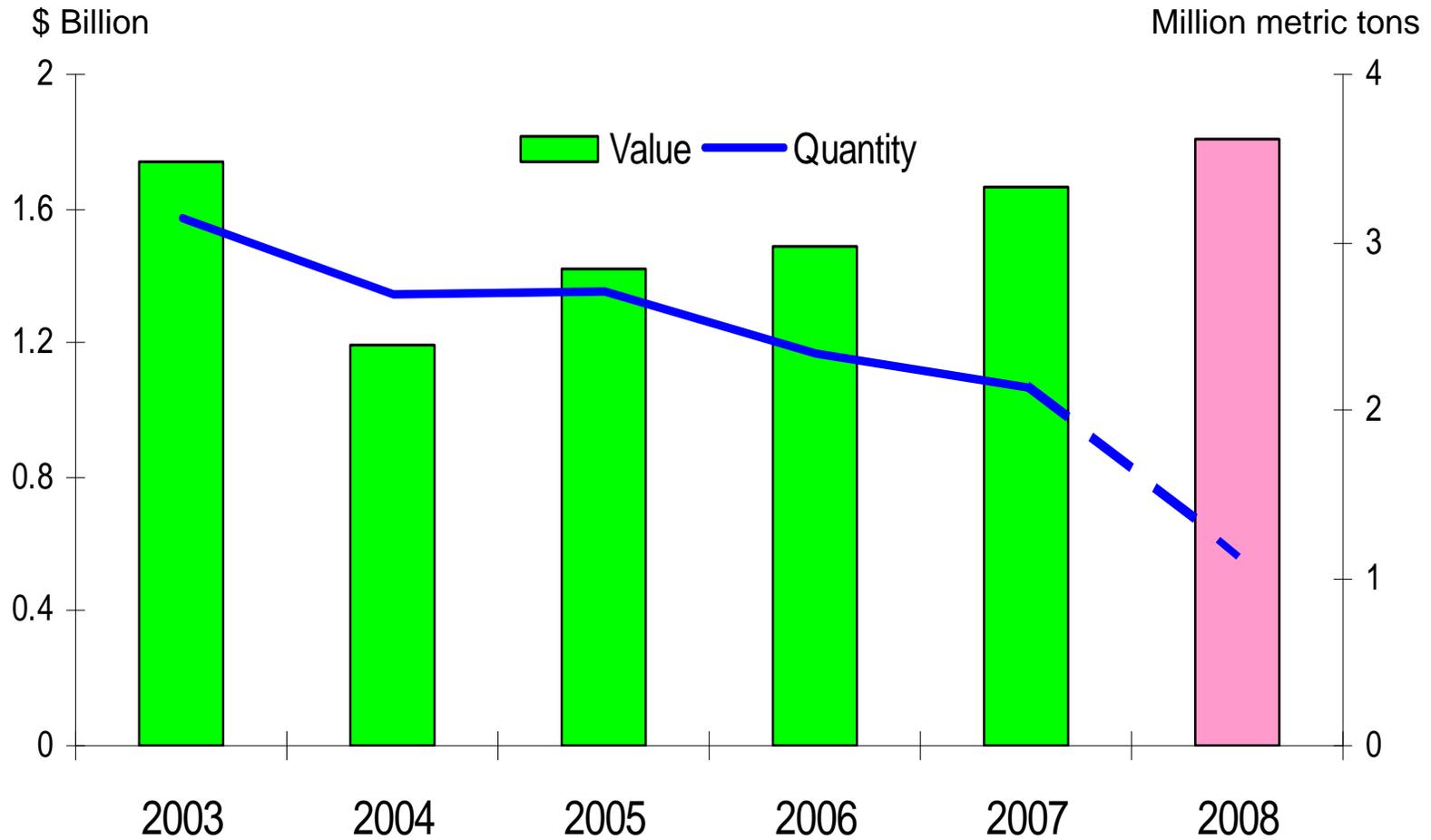
# Policy responses to rising prices by selected countries

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	Raised export taxes	Export volume restrictions	Export bans	Reduced import tariffs	Increased consumer subsidies	Imposed price caps
<b><u>Both export and import policies:</u></b>						
China	x	x			x	x
India	x	x	x	x	x	
Indonesia	x			x	x	
Malaysia	x					x
Serbia			x	x		

## Impact of high food commodity prices on consumers food budgets

	High-income countries	Low-income food-deficit countries
<b>I. Base Scenario</b>		
Income	40,000	800
Food expenditure	4,000	400
Food as % of income	<u>10.0%</u>	<u>50%</u>
 <b>Disaggregate retail food spending (staples vs. non-staples)</b>		
Staples as % of total food spending	20%	70%
Expenditures on staples	800	280
Expenditures on non-staples	3,200	120
 <b>II. Scenario: 50% Price increase in staples Partial pass through on staples</b>		
Assumed % pass through	60%	60%
Increase in cost of staples	<u>240</u>	<u>84</u>
New cost of staples	1040	364
New total food costs	4,240	484
Food as % of income	<u>10.6%</u>	<u>61%</u>

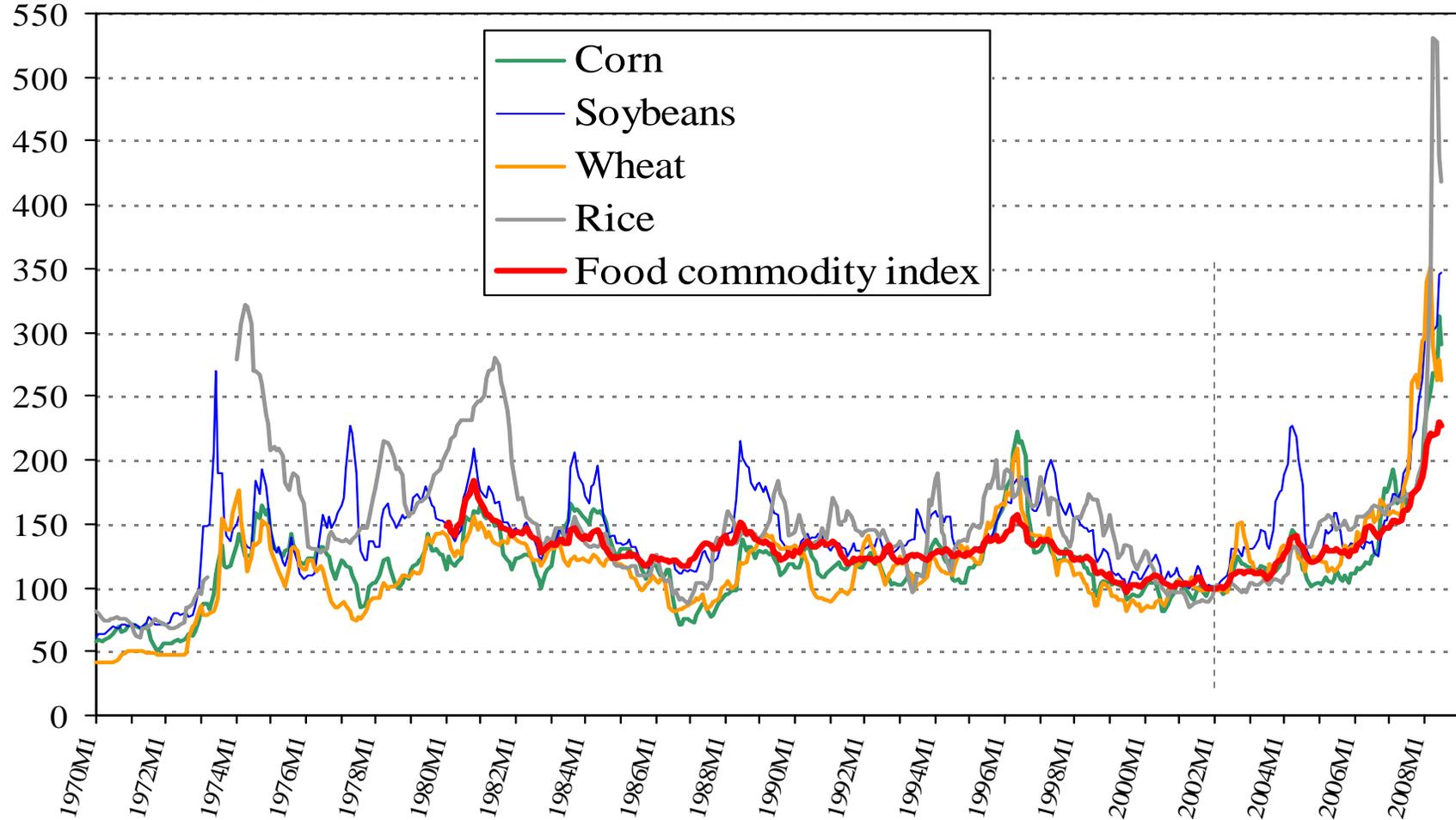
# U.S. Title II Food Aid Allocations



\*2008 is an forecast

# Spikes in food commodity prices: Will this time be any different?

Index: January 2002 = 100



# Categories of factors contributing to higher food commodity prices

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## Temporary factors:

- Adverse weather
- Trade policies by exporters and importers
- Aggressive buying by importers

## Structural changes:

- High oil prices
- Biofuels production
- High ag production costs

## Continuation of long-term trends:

- Rapid economic growth in many developing countries
- Population growth in developing countries
- Increasing per capita meat consumption

## Questionable future impact:

- Further dollar depreciation
- Slower growth in ag productivity
- Role of large foreign exchange reserves held by importers

Supply factors

Demand factors

# Prices have declined from their peaks

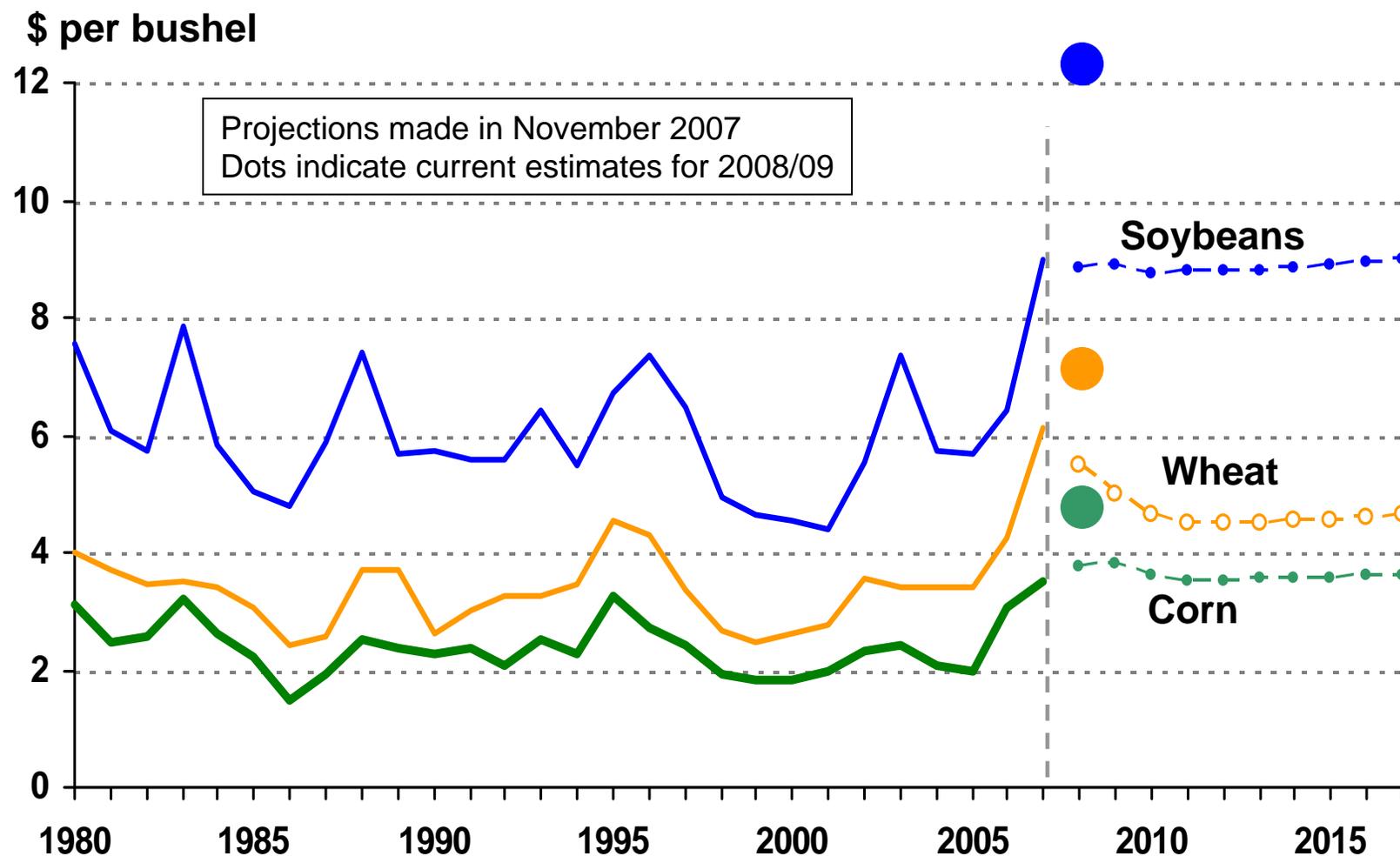
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(as of September 30, 2008)

Commodity	Down	Since peak in:
Wheat	51 %	Mid March
Corn	38 %	End of June
Soybeans	39 %	Early July

# U.S. Commodity Prices: History & Projections

## Soybeans, Wheat, & Corn



# Global Agricultural Supply and Demand: Factors Contributing to the Recent Increase in Food Commodity Prices

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The report is available at:

<http://www.ers.usda.gov/publications/WRS0801.pdf>

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