The Food vs. Fuel Controversy

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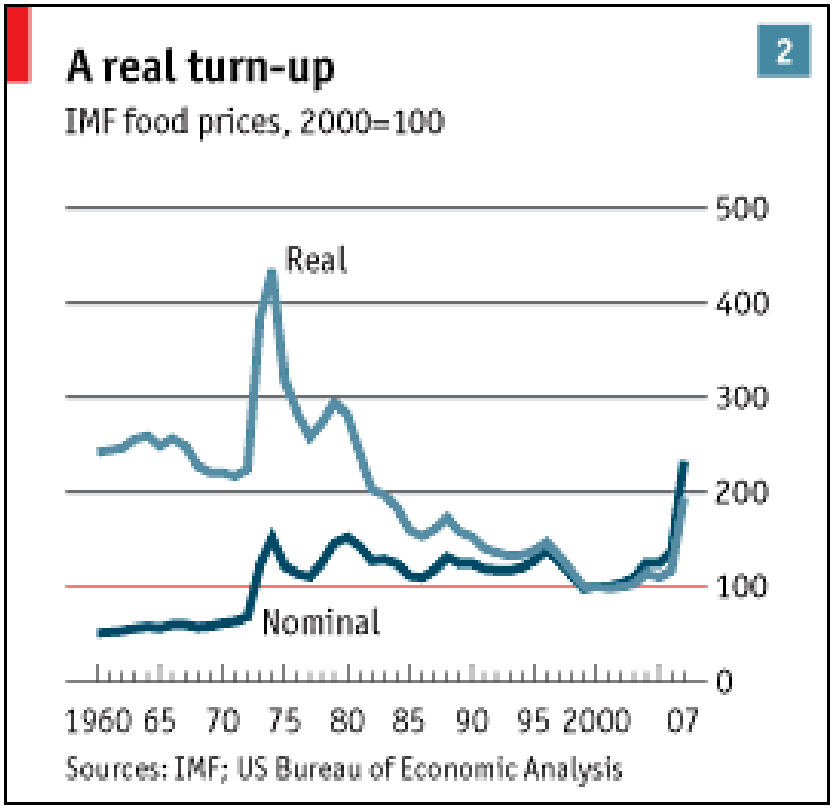
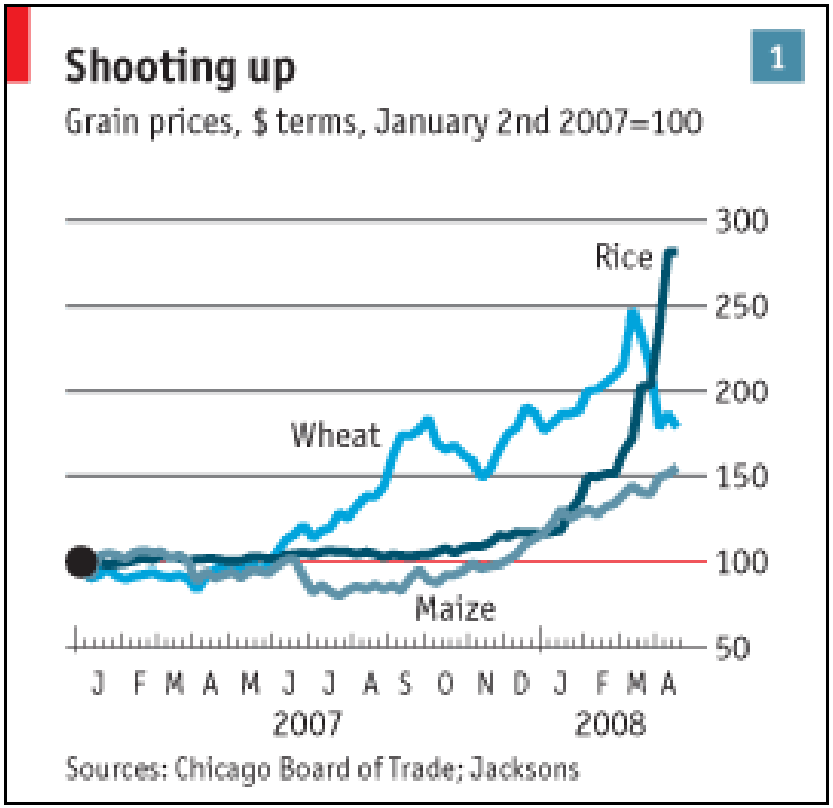
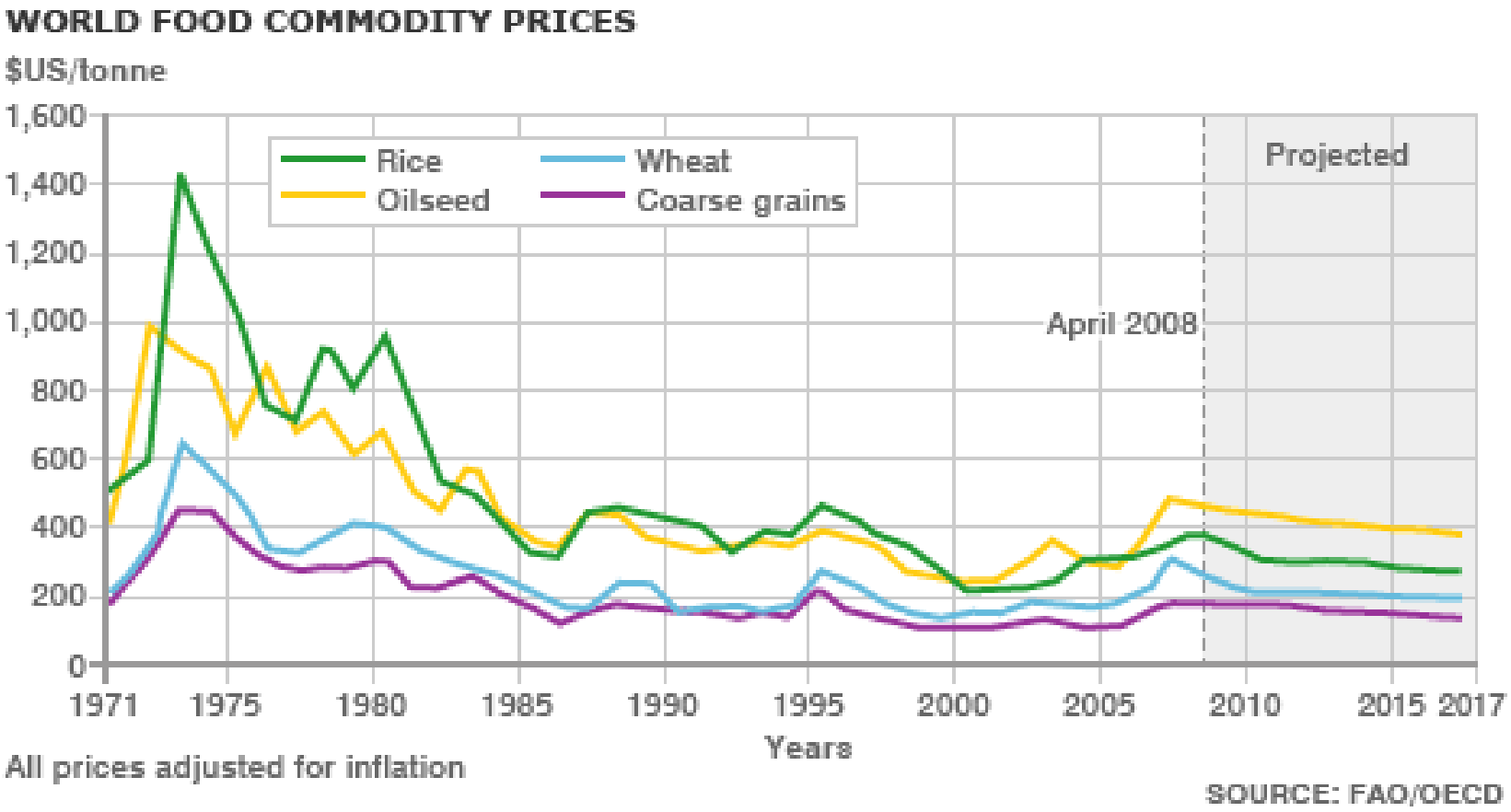
World Food Prices





World Food Prices



World Food Prices

Increases in Food and Oil Prices (%)

2002 to March 2008	Corn	Wheat	Rice	Soybeans	Oil
Nominal $	143	217	199	171	308
Real $	46	91	80	63	145
Real Euros	37	79	69	53	130

Source: Farm Foundation, 2008

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World Food Prices

Food Price Inflation 2007-08

Country	Food Price Inflation	Expenditure Share on Food
US	5.1	10
China	23.3	28
India	5.8	33
Egypt	13.5	42
Haiti	11.8	50
Sri Lanka	25.6	62
Bangladesh	14.2	65

Source: OECD and FAO, 2008

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World Food Prices

- Food crisis occurring in many countries simultaneously – political protests in 30
- May reduce purchasing power of urban and rural poor by 20%
- 1.5 billion on 1-2$/day – World Bank estimates food price increases will push at least another 100 million in poverty

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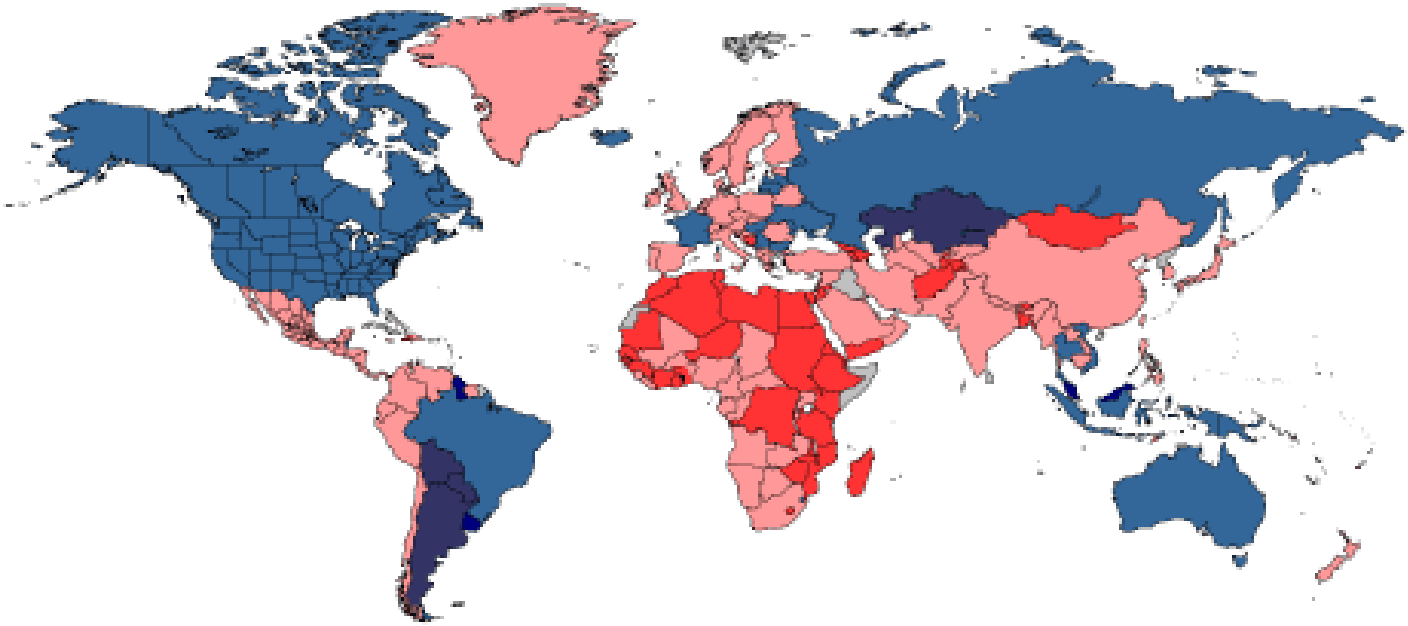
World Food Prices

2007 - 2008 IMPACT OF PROJECTED FOOD PRICE INCREASES ON TRADE BALANCES



- Large losers (trade balance worsening > 1% 2005 GDP)
- Moderate losers (trade balance worsening < 1% 2005 GDP)
- Moderate gainers (trade balance improving < 1% 2005 GDP)
- Large gainers (trade balance improving > 1% 2005 GDP)
- No data

SOURCE: The World Bank

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Key Drivers of Food Prices

- Complex set of forces combined to push up prices:
  - Global changes in demand and supply
  - Depreciation of US $
  - Growth in production of biofuels

Demand and Supply

- Rapid growth in developing countries – shift from cereals to animal protein
- Slowdown in agricultural productivity growth – change from surplus to shortage, stocks tight
- Weather shocks (Australia) in 2006/07 exacerbated price impact of low stocks
- Export policies have also made situation worse (Argentina, China, India, Ukraine, Vietnam)

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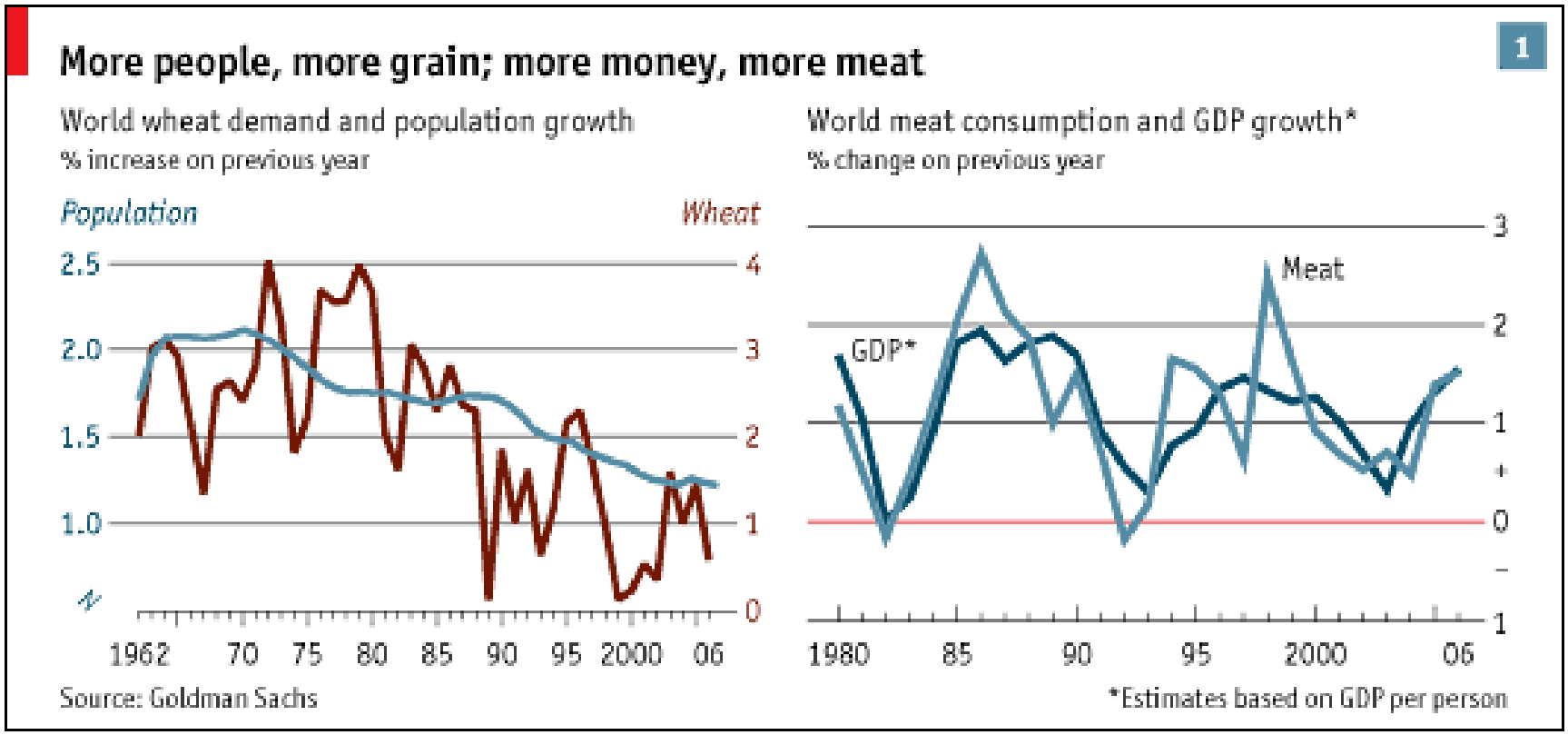
Changing food demand



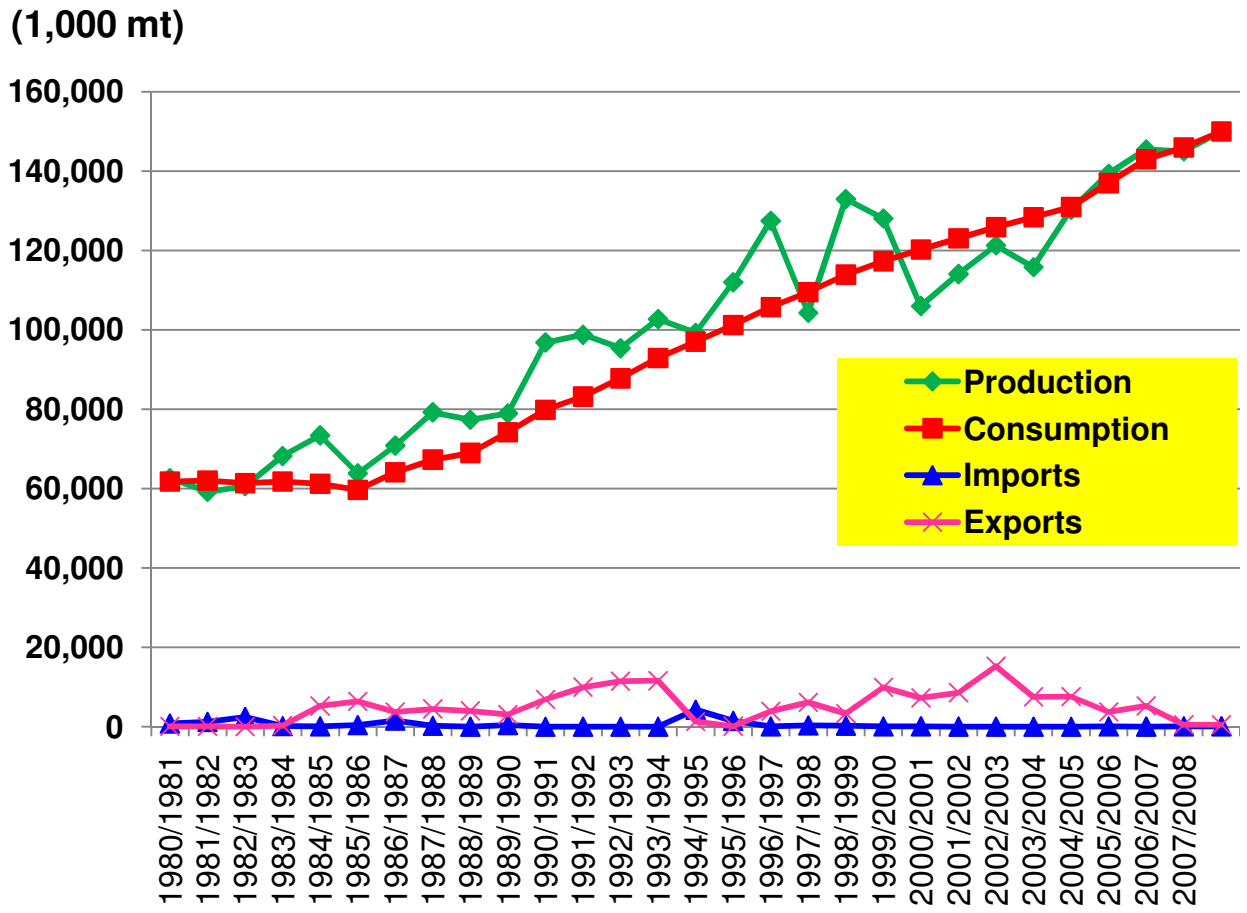
Demand

- In developing countries, real GDP grew on average by 7.3% over period 2003-07
- High income elasticities for food contributed to strong demand for meats and grains
- China and India *not* impacting world food prices as much as might be expected:

  -both following policies to be self-sufficient

  -neither are major traders of *most* commodities

China: Corn Market



Source: Farm Foundation, 2008

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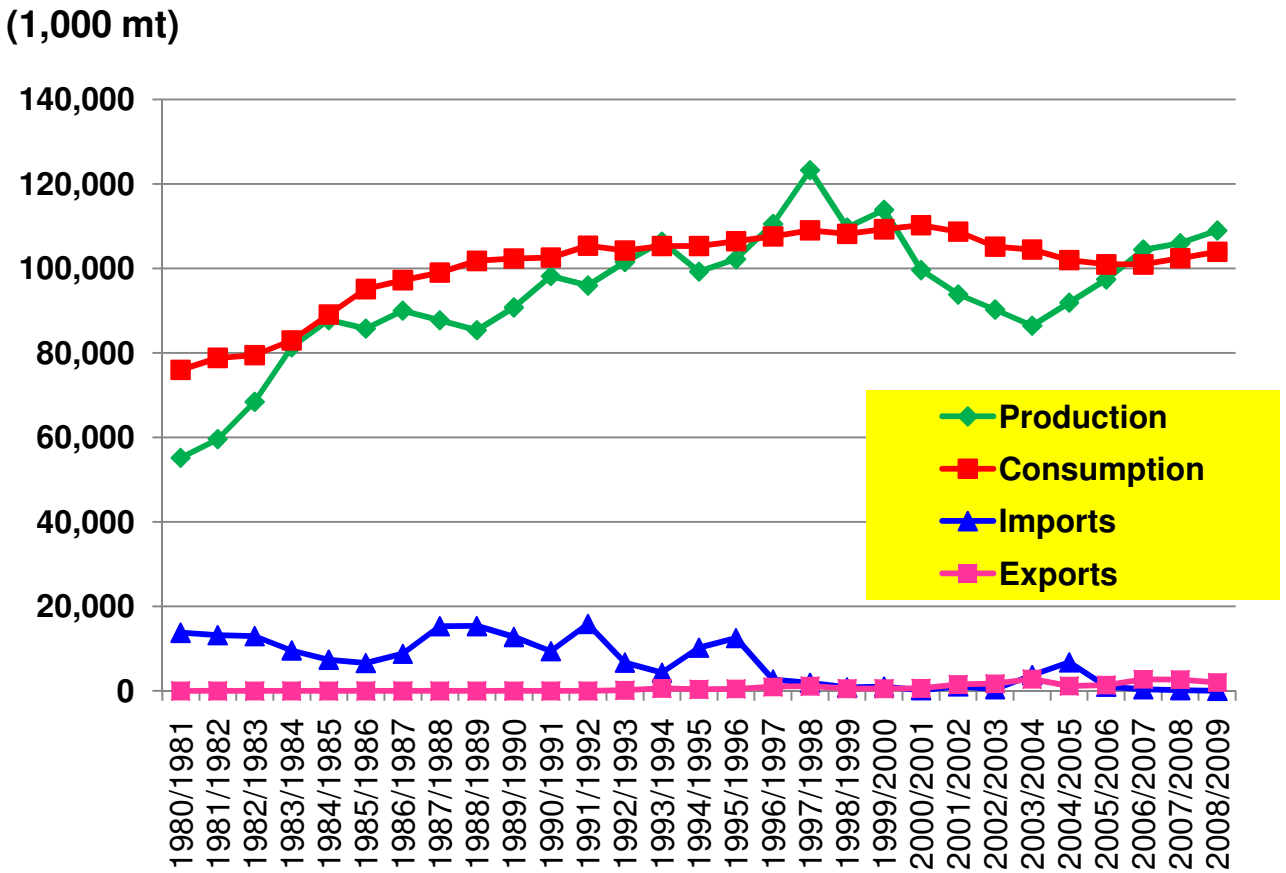
China: Wheat Market



Source: Farm Foundation, 2008

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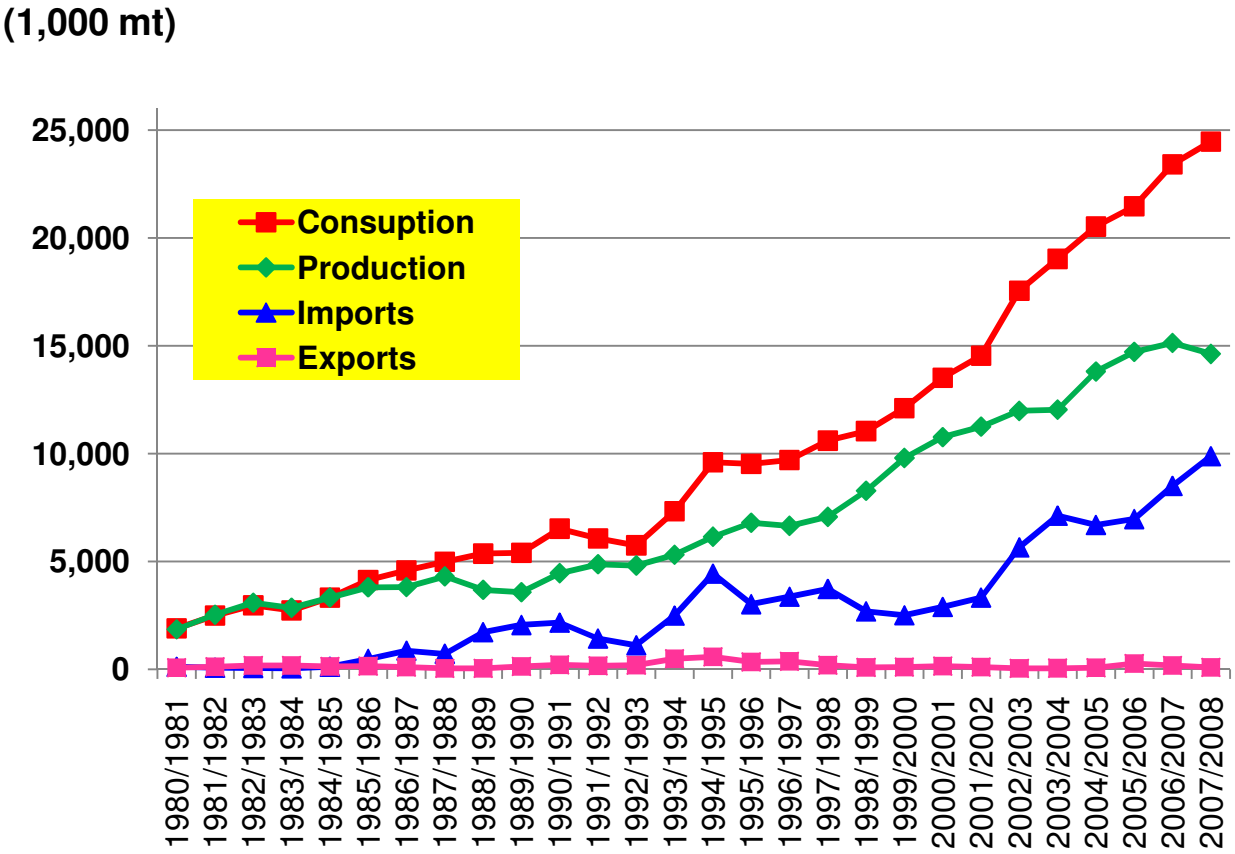
China: All Oils



Source: Farm Foundation, 2008

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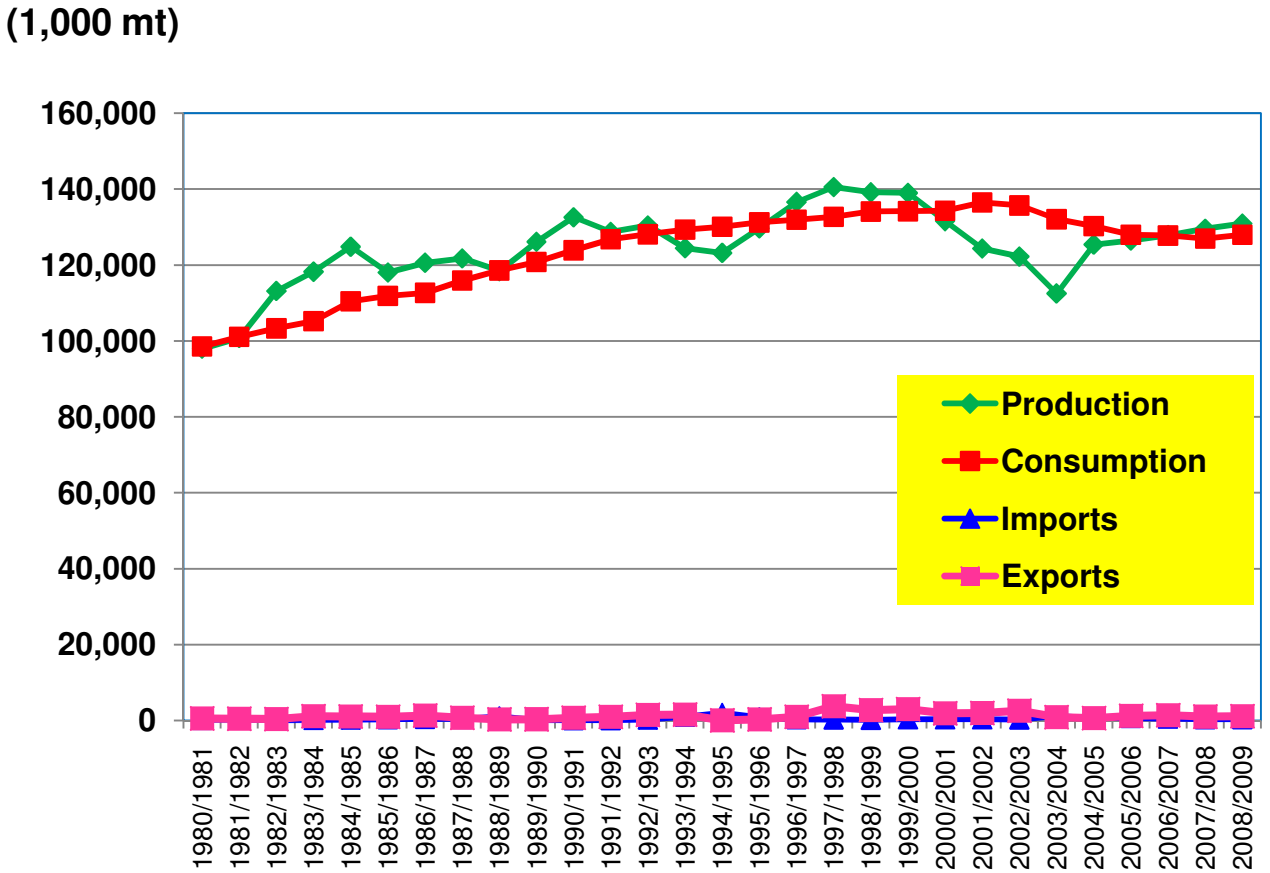
China: Rice



Source: Farm Foundation, 2008

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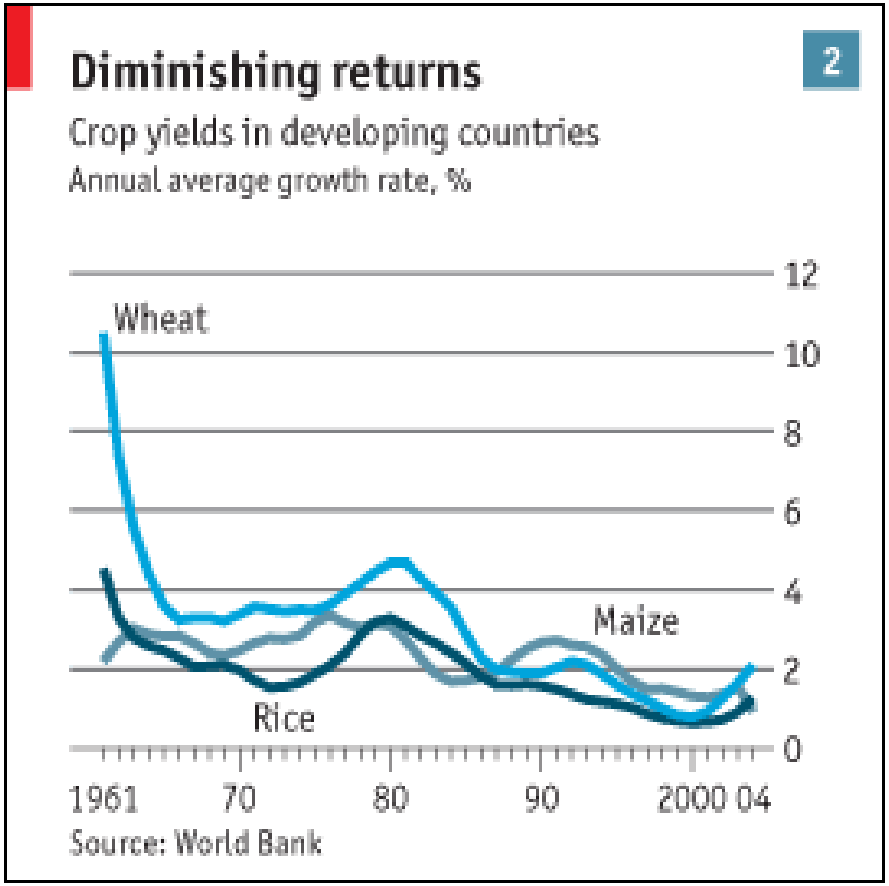
China: Food vs. Non-Food

Agricultural productivity



- **Investment in agricultural research in developing countries has fallen since 1980s**
- **New investment will only generate payoffs through higher yields after 5-10 years**
- **Policies to allow adoption of existing technologies may have a more rapid payoff**

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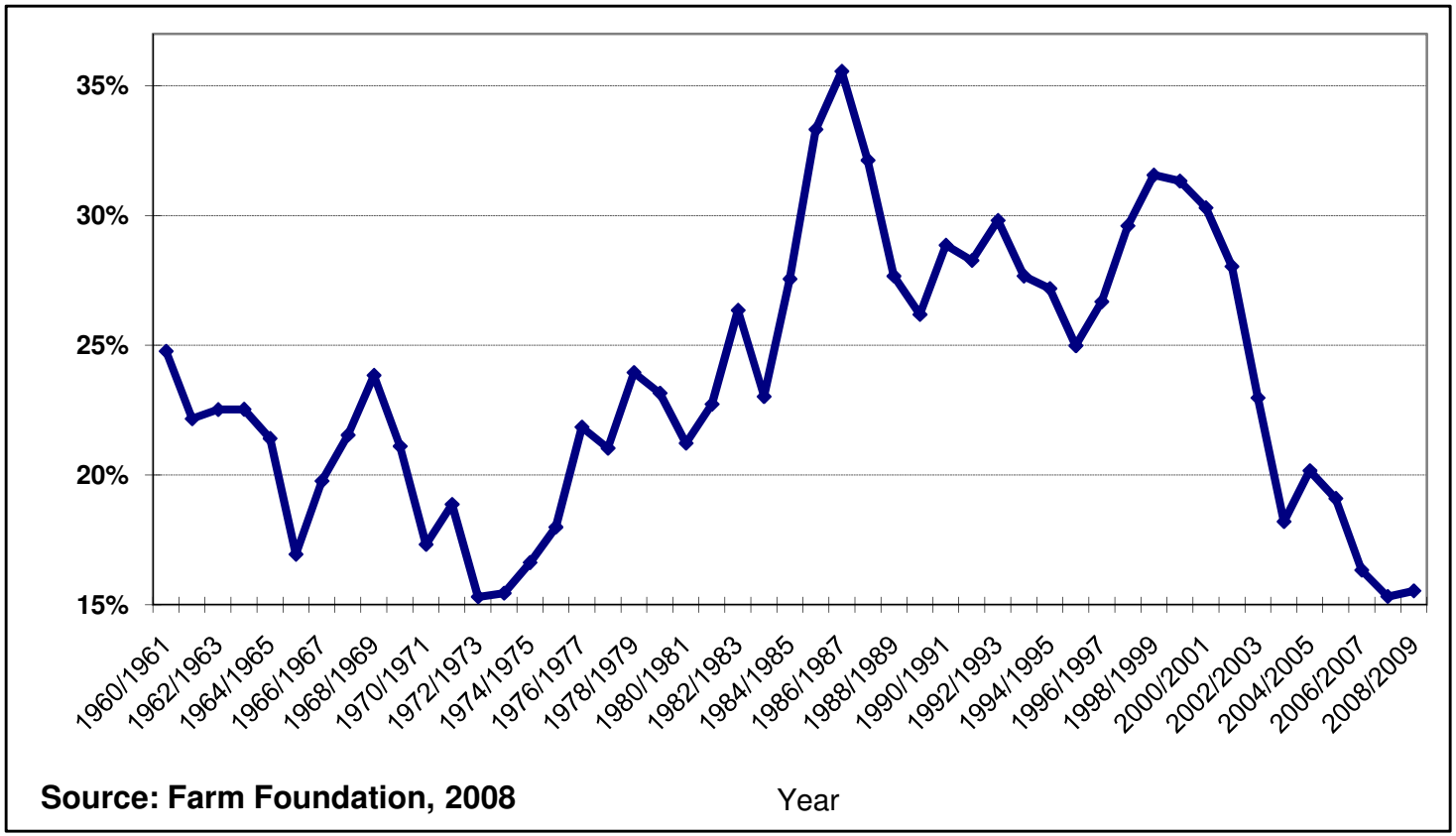
Declining Stocks

Stocks-to-Use Ratio for Total Grains* in World (1960-2009)

*Feed grains + wheat + rice



Source: Farm Foundation, 2008

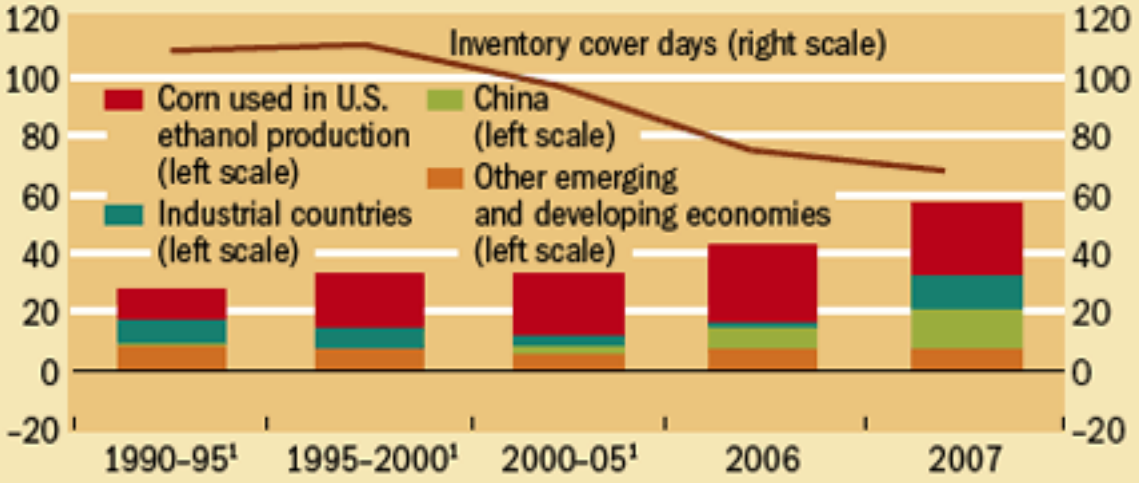
Declining Stocks

Chart 4

Falling inventories

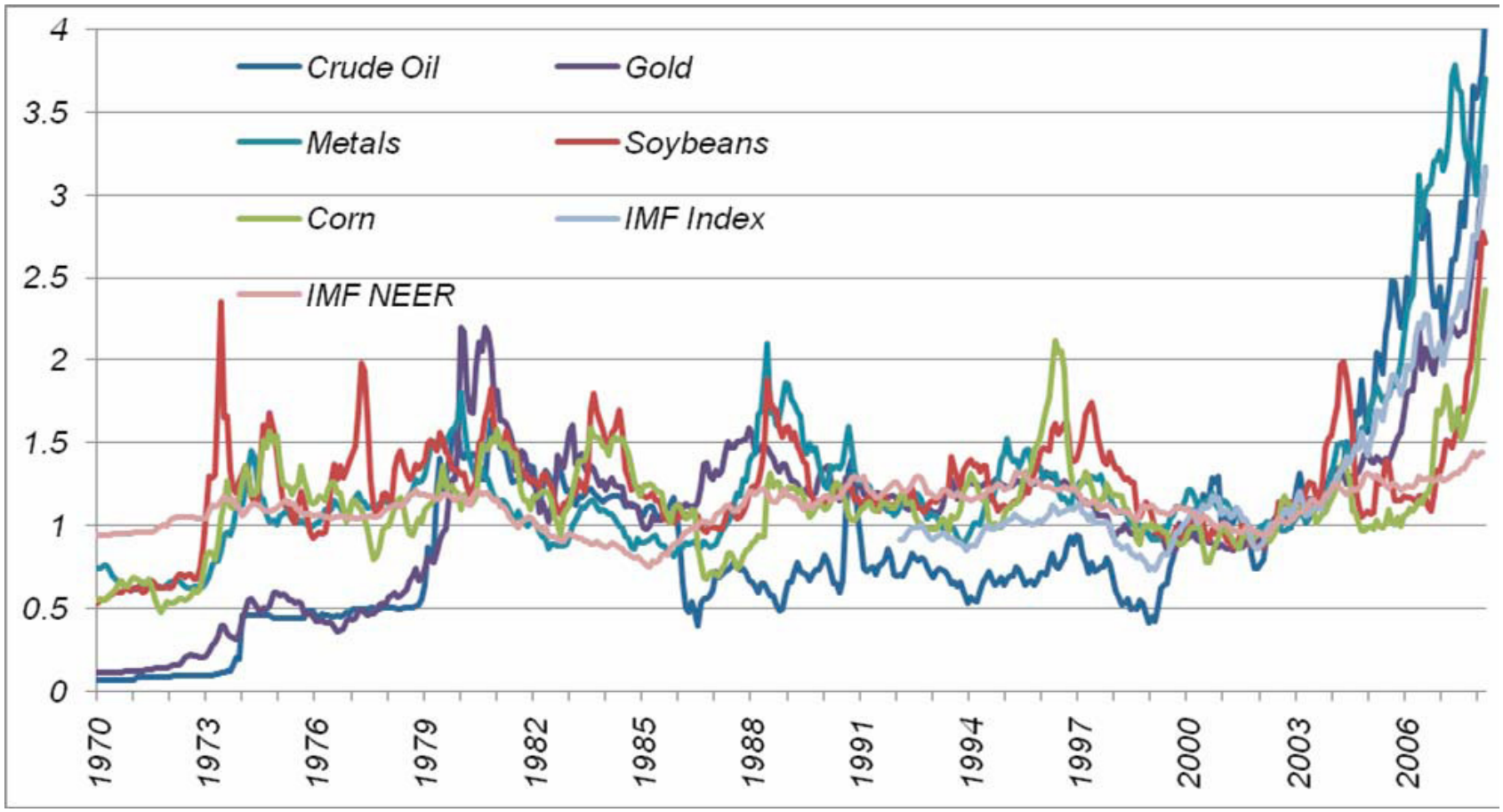
Strong demand has been a key factor underlying dwindling inventories of major food crops.

(demand for major food crops; year-on-year changes; million metric tons)



Source: U.S. Department of Agriculture.
¹Period average.

US $ and Commodity Prices



Source: Farm Foundation, 2008

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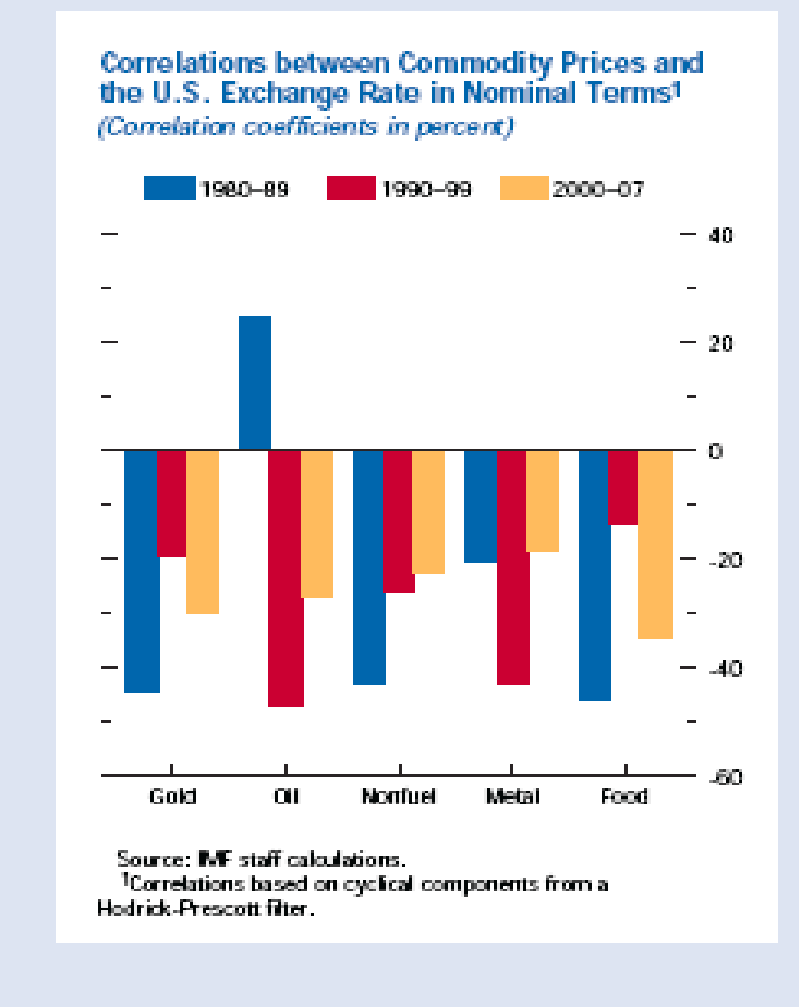
US $ and Commodity Prices



- **Movements in commodity prices and US $ exchange rate negatively correlated**
- **Partly accounting – if US $ falls, US$ price must rise for overall price to remain stable in terms of currency basket**
- **However, commodity prices have risen even when priced in non-US $ currencies**

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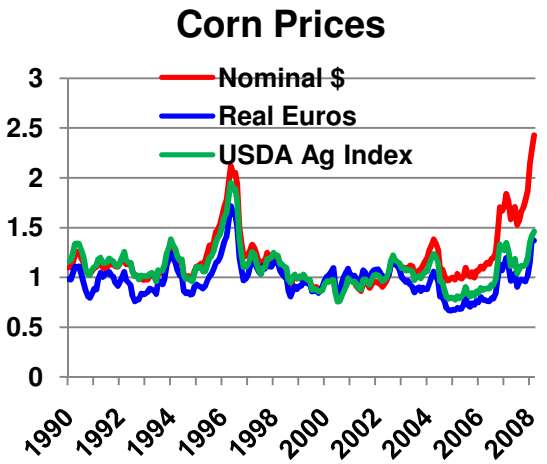
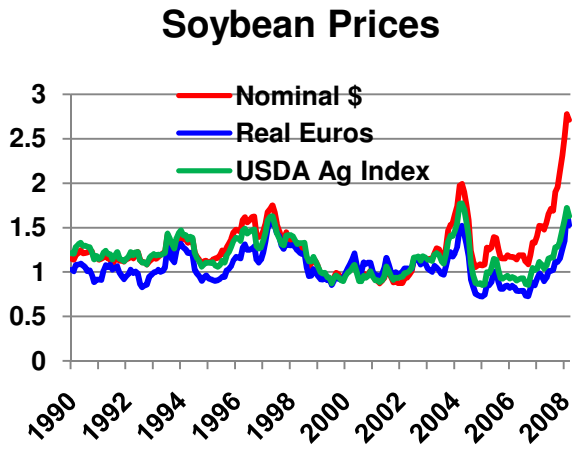
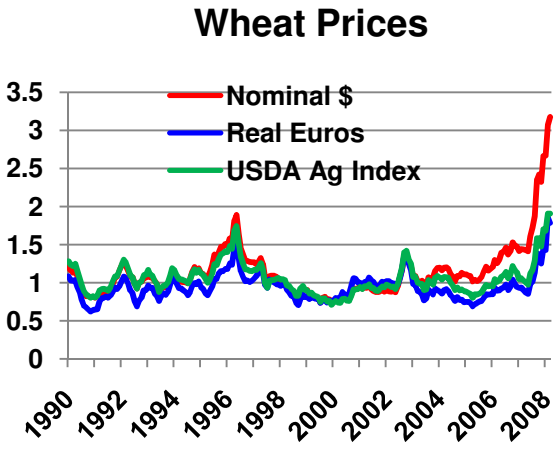
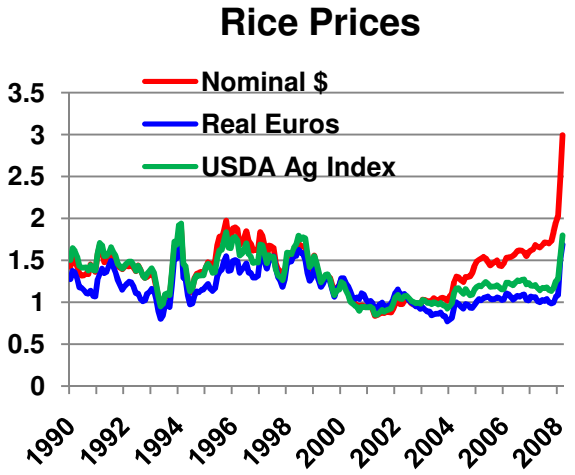
US $ and Commodity Prices









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US $ and Commodity Prices

- What is causation – does low US $ drive up commodity prices, or do high commodity prices drive US $ down?
- Some analysts argue high oil prices drive US $ down:
  - oil exporters import more from Europe than US, and hold less oil revenues in US $
  - US Federal Reserve targets *core* (excludes oil and food prices) not *overall* inflation, pushing down US $ due to "looser" monetary policy
- However, there are channels through which a fall in nominal US $ can raise commodity prices in US $

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US $ and Commodity Prices

- **Purchasing power and cost channel:**
  - most commodities priced in US $, so depreciation makes commodities less expensive
  - price pressures due to declining profits in local currency for producers outside US $ area
- **Asset channel:**
  - falling US $ reduces returns on US $-denominated assets in foreign currencies, making commodities more attractive asset
  - US $ depreciation risks US inflation, prompting move to commodities as hedge against inflation

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US $ and Commodity Prices

- **Other Channels:**
  - US $ depreciation leads to easing of monetary policy in other economies, especially those pegged to US $
  - Results in lower interest rates and increased liquidity, stimulating demand for commodities

- **Empirical evidence (IMF, 2008):**
  - For gold, crude oil, aluminum, copper, corn and wheat, IMF (2008) test for relationship between price, and trade-weighted US $, as well as three other variables:

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US $ and Commodity Prices

- (i) World output: increases in output requires commodity inputs, i.e., should be positively correlated with prices
- (ii) Federal funds rate: lower interest rates may raise commodity prices through three channels (Frankel, 2006) – (a) lowers incentive for extraction today; (b) lowers cost of holding inventories; (c) induces shift from bonds to commodities
- (iii) Market balance: level of stocks can affect commodity prices; i.e., high (low) stocks lower (raise) prices
- Impact of exchange rate varies over commodities – strongest for gold and oil, weaker for grains

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IMF Empirical Results

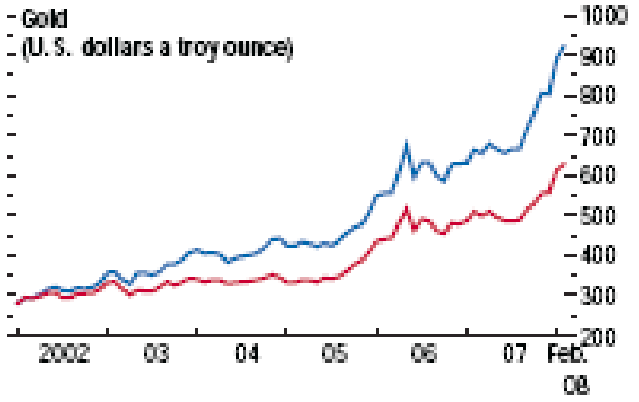
Impact of a 1 Percent Decline in the U.S. Dollar Exchange Rate on Commodity Prices[1]

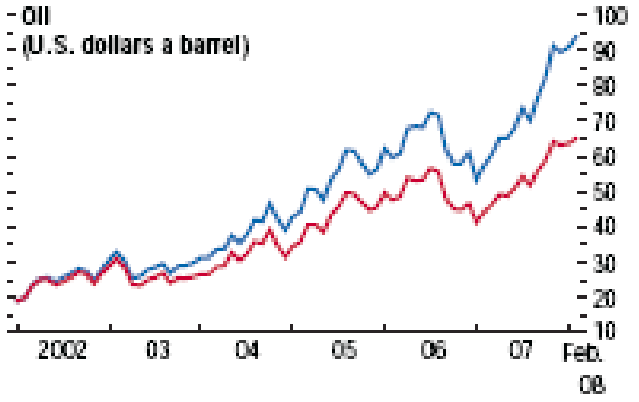
(in percent)

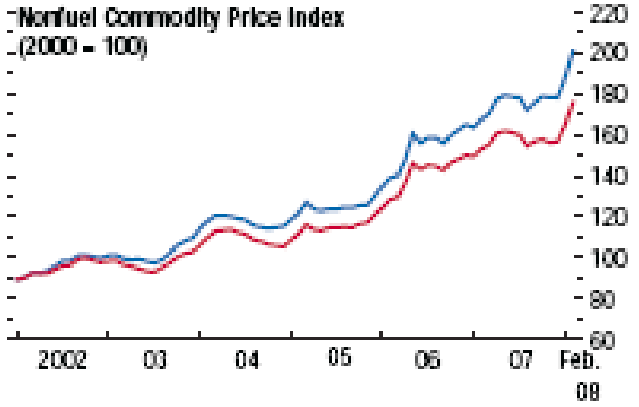
Months after the Shock	1	4	12	24	60
	In Current Dollars (based on U.S. NEER)				
Gold	1.17	1.22	1.30	1.36	1.39
Oil	0.89	0.97	1.13	1.27	1.43
Nonfuel commodity index	0.46	0.47	0.47	0.47	0.46
Aluminum	0.53	0.53	0.53	0.52	0.52
Copper	1.11	1.02	0.80	0.55	0.18
	In Constant Dollars (based on U.S. REER)				
Gold	1.12	1.12	1.13	1.14	1.17
Oil	0.48	0.58	0.81	1.06	1.58
Nonfuel commodity index	0.47	0.48	0.51	0.54	0.64
Aluminum	0.55	0.58	0.65	0.74	0.95
Copper	1.23	1.28	1.38	1.52	1.80

Source: IMF staff estimates.

[1]Dynamic multipliers implied by the error-correction equations for individual commodities. NEER: nominal effective exchange rate; REER: real effective exchange rate.







Source: IMF staff calculations.

Biofuels and Food Prices

- Brazil and US leading producers of ethanol
- Recent surge in US ethanol production set in context of Federal biofuels mandate, ethanol blending subsidy and import tariff
- 2004-07, most of increase in global corn production (55 million tons) went into US ethanol production (50 million tons)
- Growing demand for ethanol driven by high oil prices, which then affects corn prices: $2.26/ bushel at $40/barrel → $6.33/bushel at $120/barrel (Farm Foundation, 2008)

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Biofuels and Food Prices

Leading ethanol producing countries, 2004-2005

Country	2004			2005	
	(mil. gal. per year)	(percent)	Country	(mil. gal. per year)	(percent)
Brazil	**3,989**	**37**	**Brazil**	**4,227**	**35.8**
United States	**3,400**	**32.8**	**United States**	**3,904**	**33.1**
China	964	9	China	1,004	8.5
India	462	4.3	India	449	3.8
France	219	2	France	240	2
Russia	198	1.8	Russia	198	1.7
South Africa	110	1	Germany	114	1
United Kingdom	106	1	South Africa	103	0.9
Saudi Arabia	79	0.7	Spain	93	0.8
Spain	79	0.7	United Kingdom	92	0.8
Others	1,029	9.6	Others	1,366	11.6
Total	10,770	100	Total	11,790	100

Source: von Lampe (2006)

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Biofuels and Food Prices

- Various estimates of impact of biofuels on food prices: (i) USDA, 2-3%, (ii) IMF, 20-30%, (iii) World Bank, 65%
- Wide range of conclusions reflects different prices being measured (farm, wholesale, retail) and different time periods for data analyzed
- World Bank (2008) estimate: 140% increase in food price index (2002-08): 15% (energy/fertilizer prices), 20% (US$), 105% (biofuels *and* related effects of stocks, land-use, speculation, and export controls)
- While cause(s) of increase in food prices is complex, appears to be a connection between food and fuel

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Useful References:

- The Economist (2008), "The New Face of Hunger" - http://www.economist.com/world/international/displaystory.cfm?story_id=11049284
- Farm Foundation (2008), "What's Driving Food Prices?" - http://www.farmfoundation.org/news/templates/template.aspx?articleid=404&zoneid=26
- International Food Policy Research Institute (2008), "High Food Prices: The What, Who, and How of Proposed Policy Actions" – http://www.ifpri.org/pubs/ib/FoodPricesPolicyAction.pdf
- World Bank (2008), "A Note on Rising Food Prices" - http://image.guardian.co.uk/sys-files/Environment/documents/2008/07/10/Biofuels.PDF