
Biofuels and Food Prices

Policy Challenges from a Latin American Perspective

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Outline

- The evolving policy discussion on biofuels
- Food price increases
 - Recent developments
 - Their impact on Latin America and the Caribbean (LAC)
 - What are the drivers?
 - The China factor
 - Crude oil prices
 - Speculation
 - Biofuels
- Back to the policy discussion

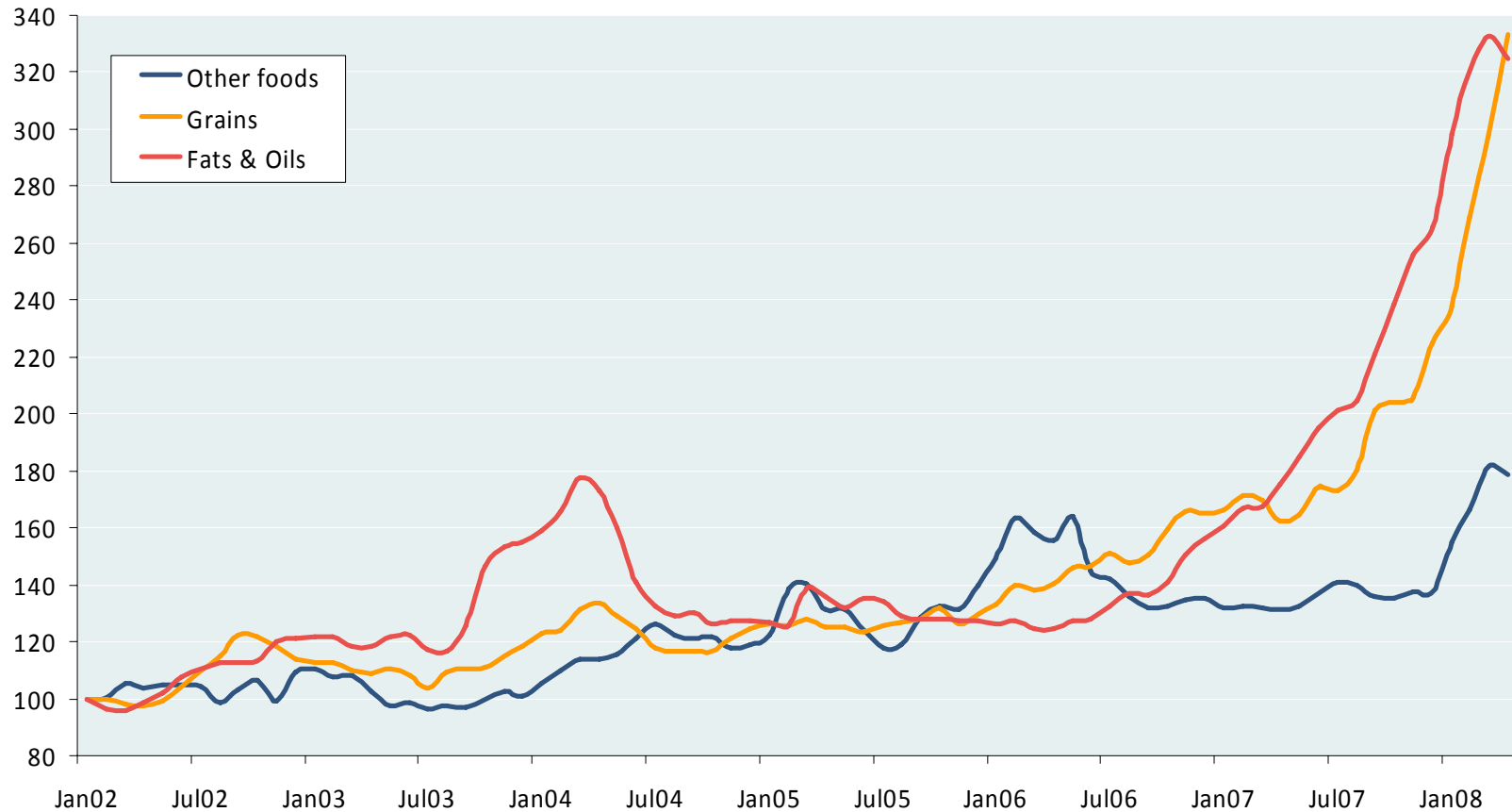
The evolving policy discussion on biofuels

- Until recently, policy concerns in biofuels included
 - Energy affordability/security
 - Climate change mitigation
 - Farm lobby
- The food crises introduces a new policy concern
 - Food affordability/security

Recent developments in food prices

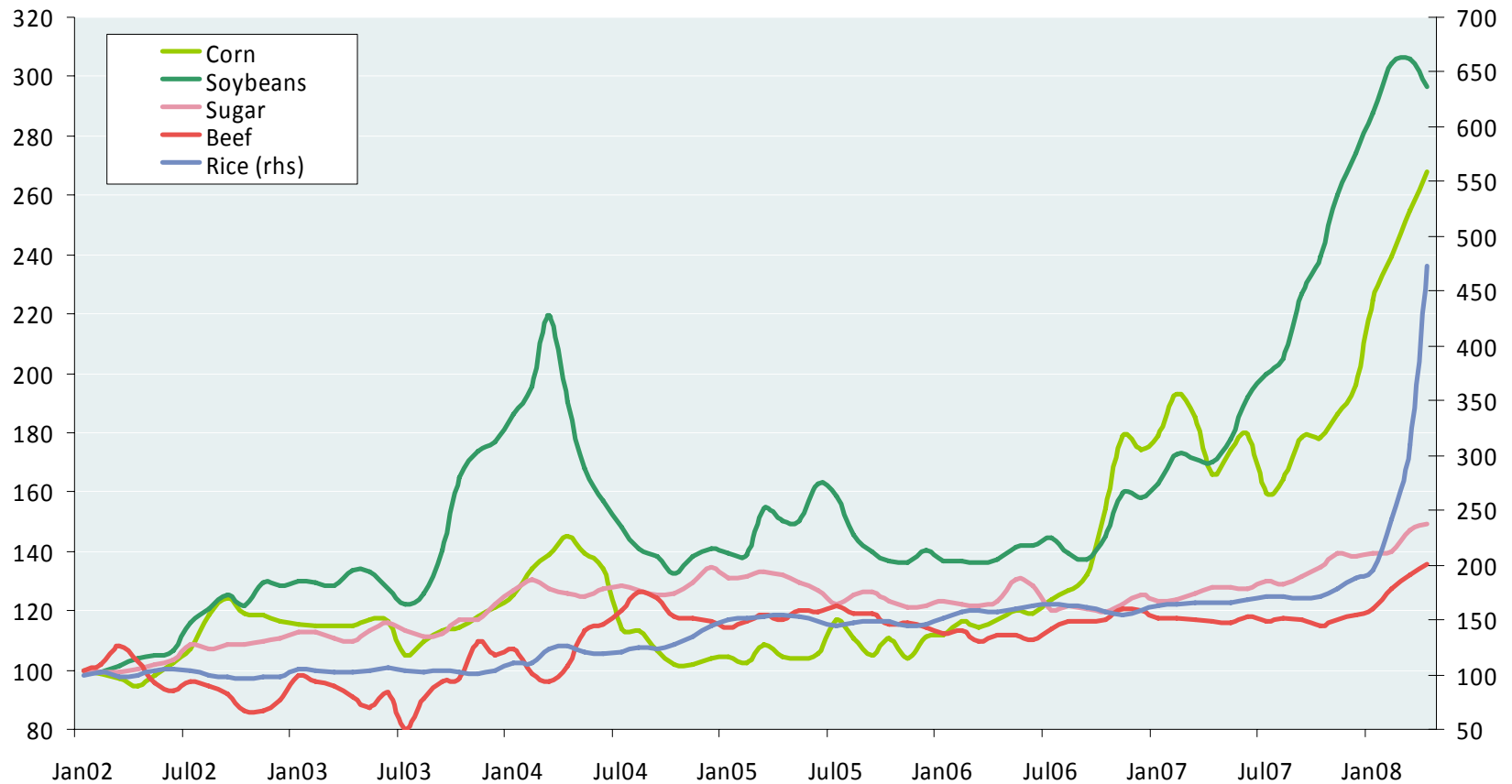
The recent increases in food prices have been steep, especially for grains and oils & fats

Short-run Commodity Price Performance
index Jan02=100 - prices in current US\$



The sharp increases in prices for corn, soybeans, and rice dwarf those for beef and sugar

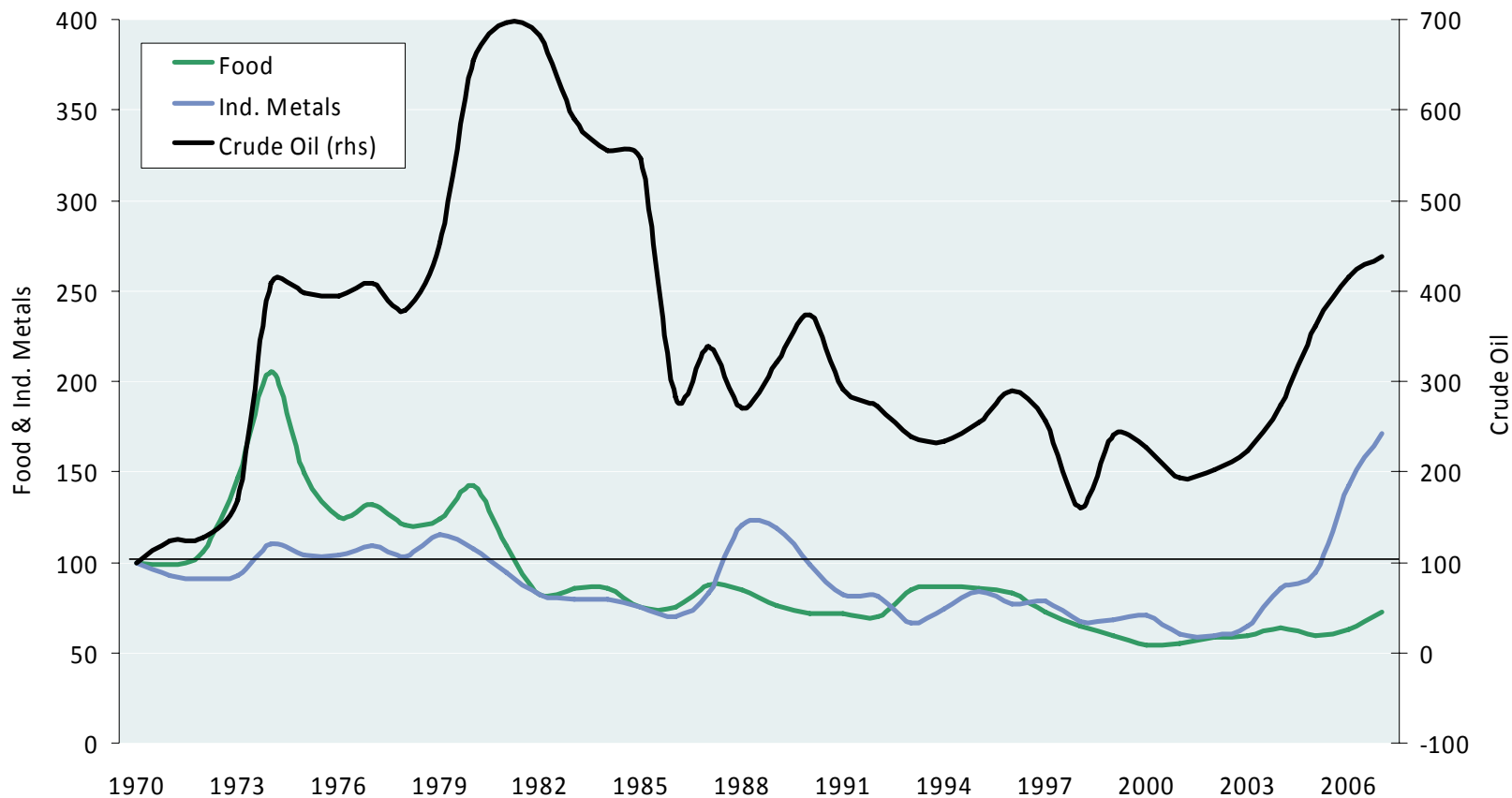
Short-run Commodity Price Performance
index Jan02=100 - prices in current US\$



Recent commodity price increases are less impressive in real terms and historical perspective

Long-run Commodity Prices Performance

index, 1970=100. Prices in current US\$ deflated by US Prod. Price Index



Source: World Bank staff (LCRCE) calculations - Data source: Oxford Latin America Economic History Database (OXLAD). WDI – World Bank. Industrial Metals: Aluminum, Copper, Iron Ore, Lead, Nickel, Tin & Zinc.

The impact of rising food prices on LAC

Why the major reaction, if *real* agricultural commodity prices are not historically high?

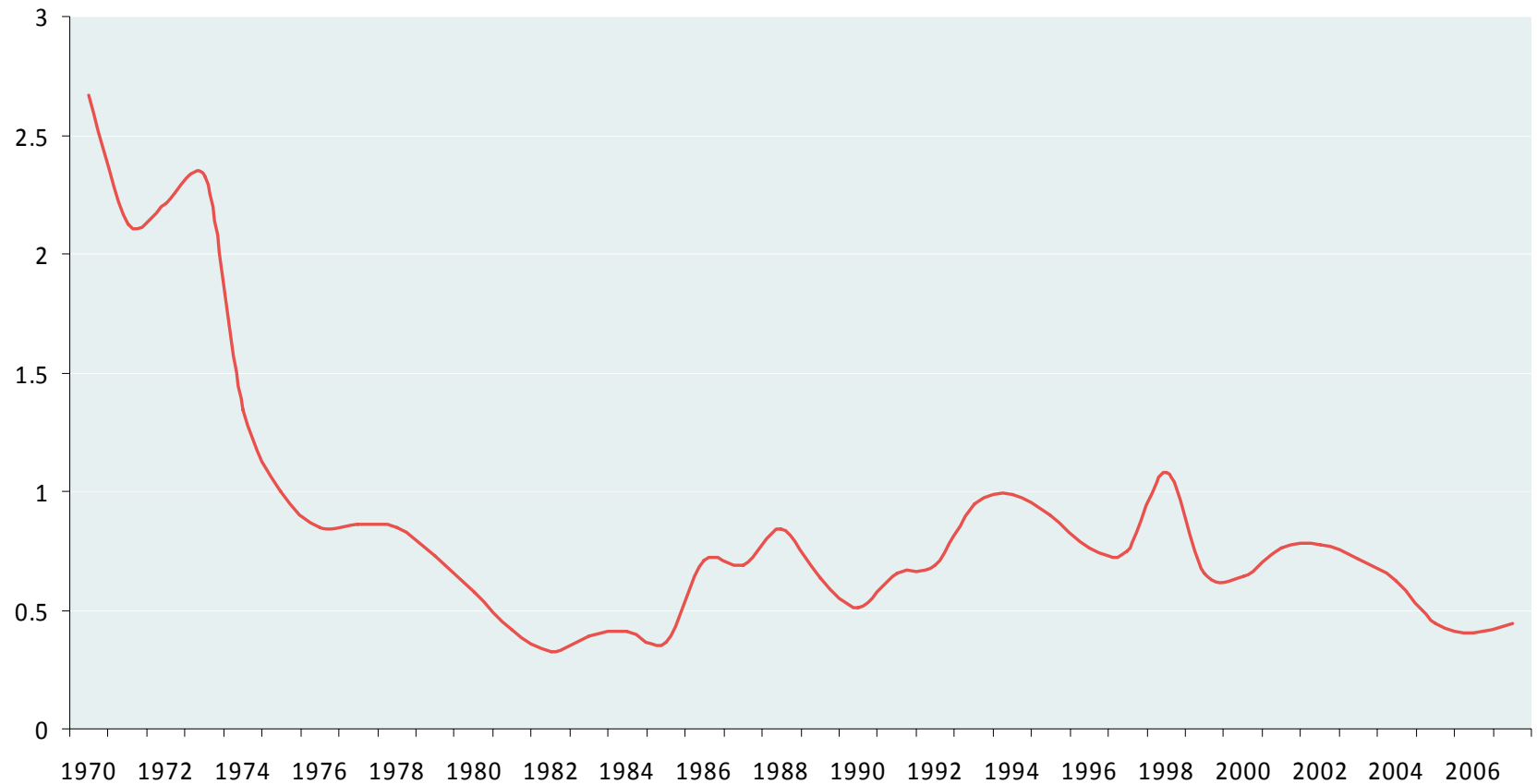
- Five grains account for 50% of world caloric intake
 - Wheat, corn, rice, barley, sorghum (Jared Diamond, *Guns, Germs and Steel*)
- Grains also a critical input for meat production

Feed-to-meat conversion rates	
Class of animal	Pounds of feed needed to produce 1 pound of
Chicken	2.6
Pork	6.5
Beef	7

- Food accounts for a higher share of expenditures in less developed countries and among the poor
- Several grains & oilseeds used as inputs to biofuels

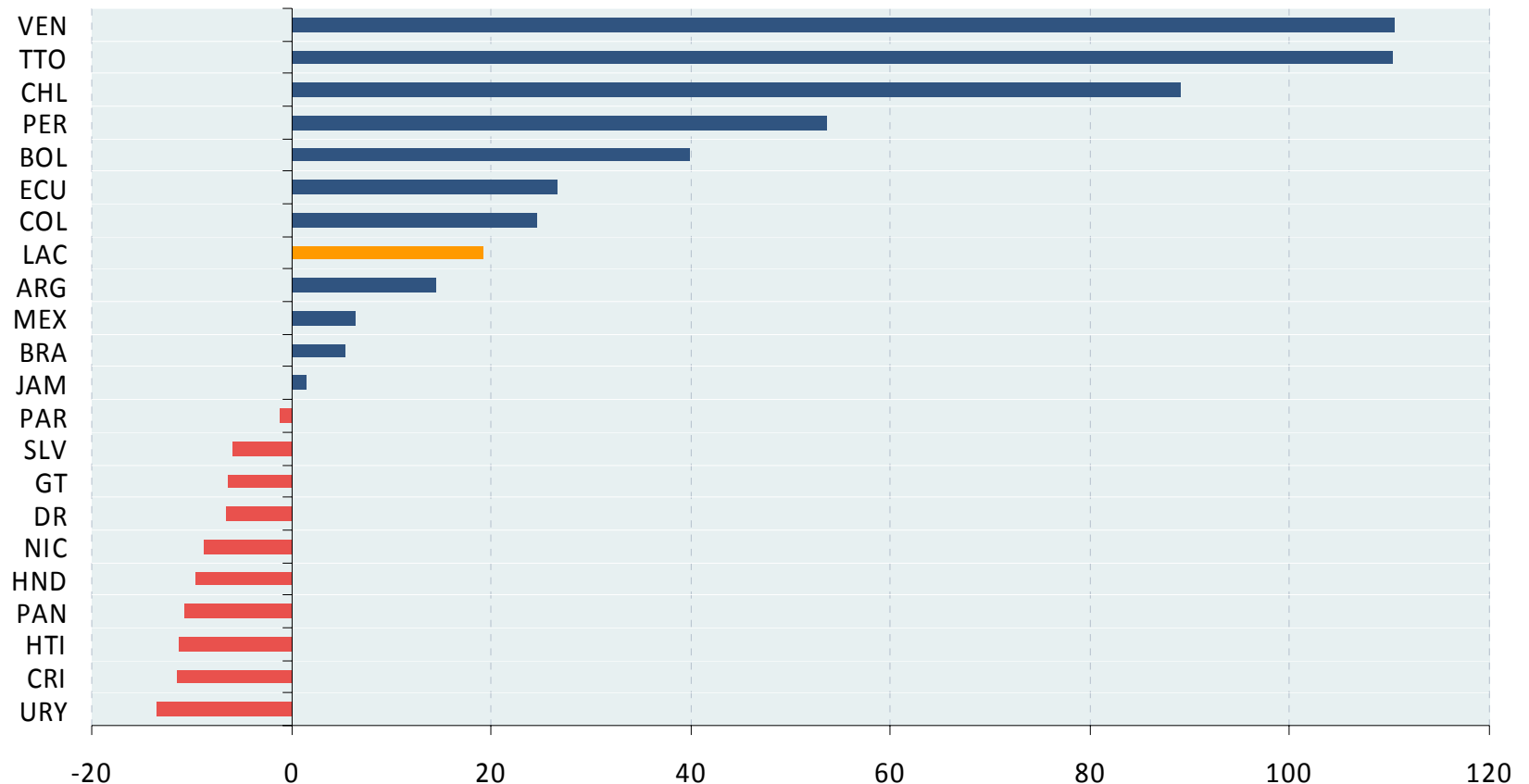
For Latin American commodity exporters, food price increases constitute a net gain

Food Prices Long-run Performance
relative to the Crude Oil Prices (index 1975=100)



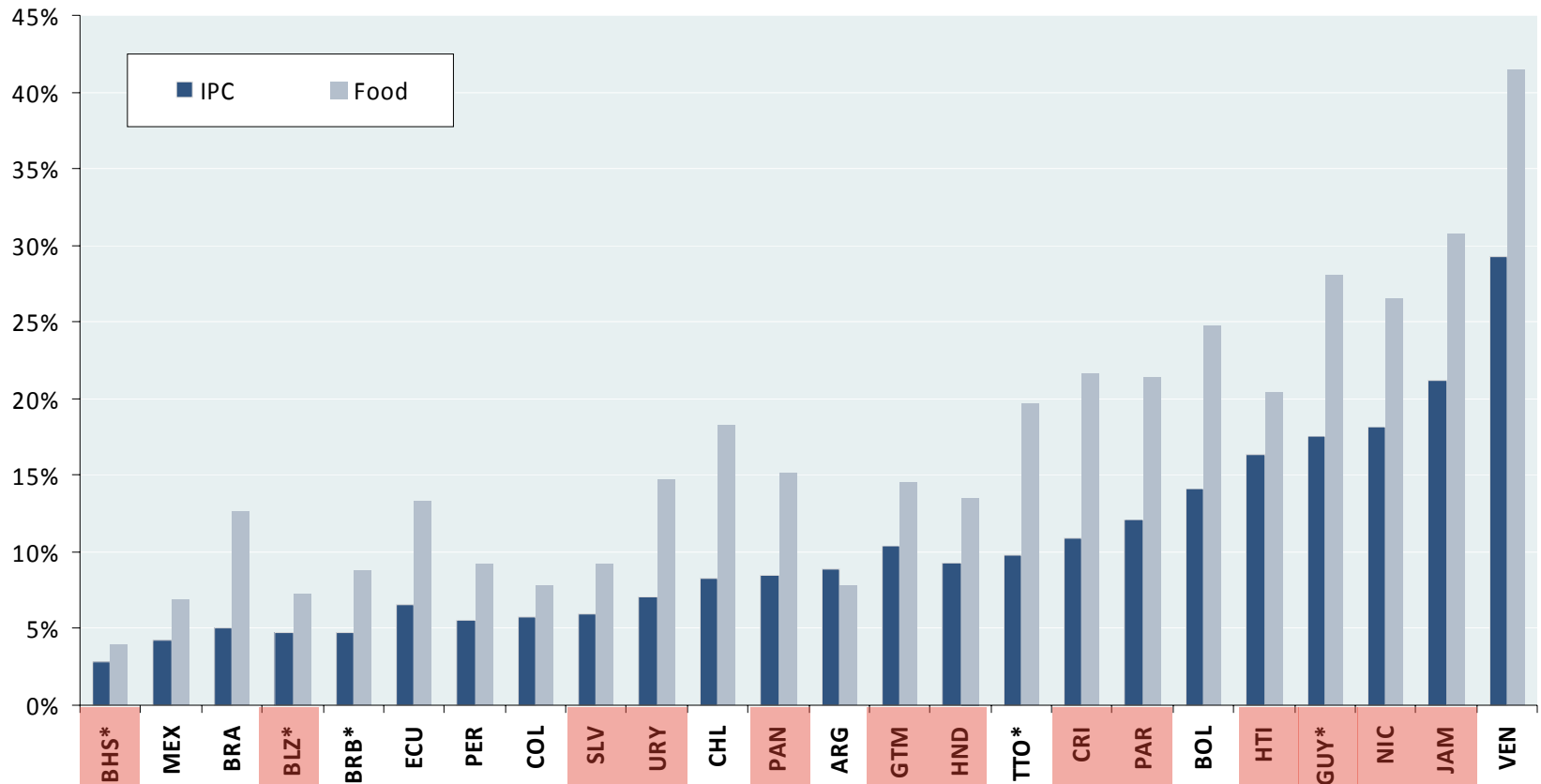
In effect, the terms of trade effects are sharply contrasting across the Latin American countries

Terms of Trade for Selected LAC countries
change between 2002-2006 - in %



To be sure, inflationary & distributional pressures affect commodity exporters & importers alike

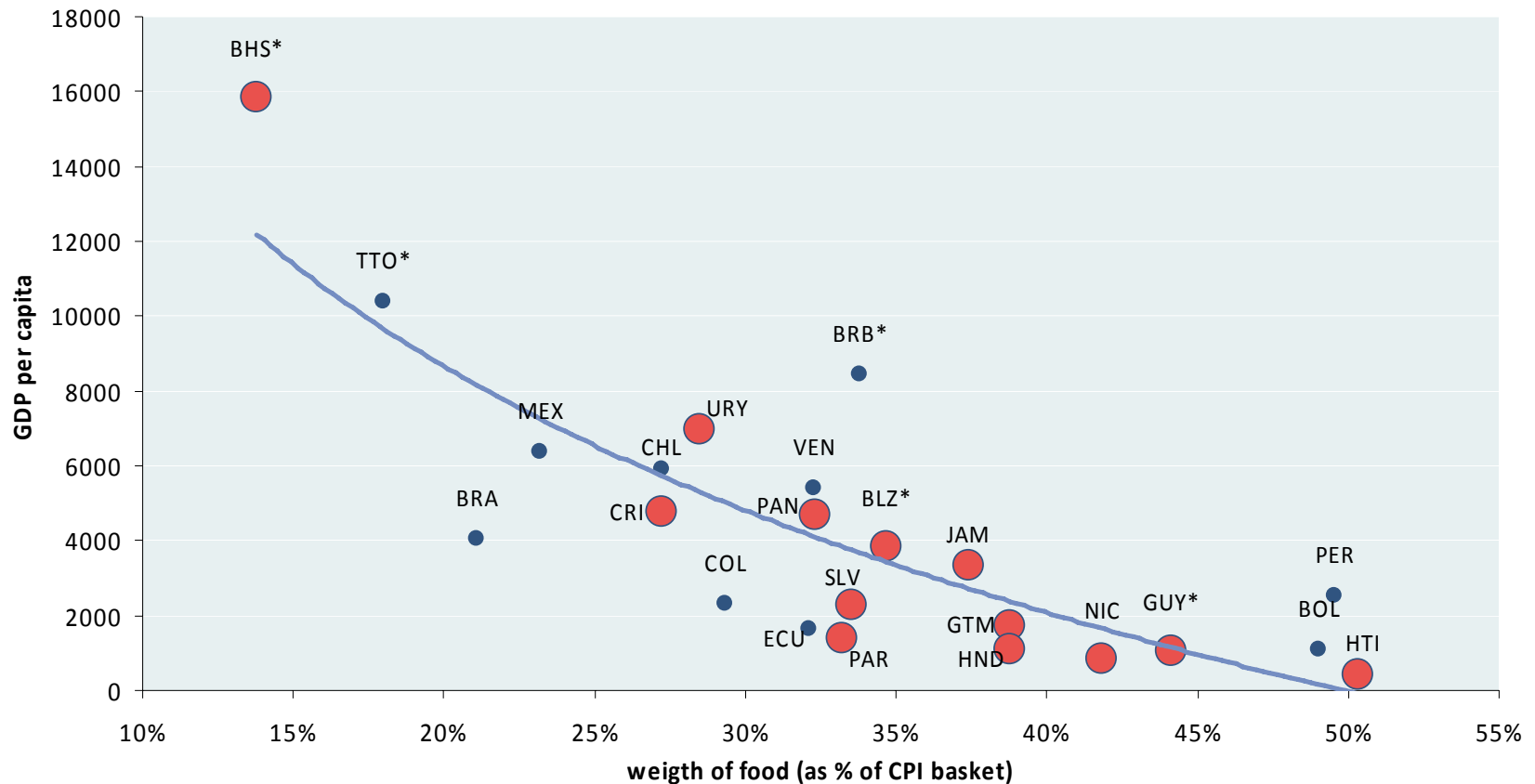
Consumer & Food Prices in Latin America
annual variation, in % - as of March 2008



Source: World Bank staff (LCRCE) calculations - National data sources. *countries where the inflation index is available only up to December 2007. Countries highlighted in red have had negative terms of trade changes in 2002-2006.

But the poorer Latin countries that import food and fuels are most vulnerable and suffer the most

Weight of Food on the CPI basket
against GDP per capita as of 2006, at 2000 US\$



Source: World Bank staff (LCRCE) calculations - National data sources. *countries where the inflation index is available only up to December 2007. Countries highlighted in red have had negative terms of trade changes in 2002-2006.

What is driving the increase in food prices?

Simple correlations reveal the main suspects

Bivariate correlates of selected commodity prices:

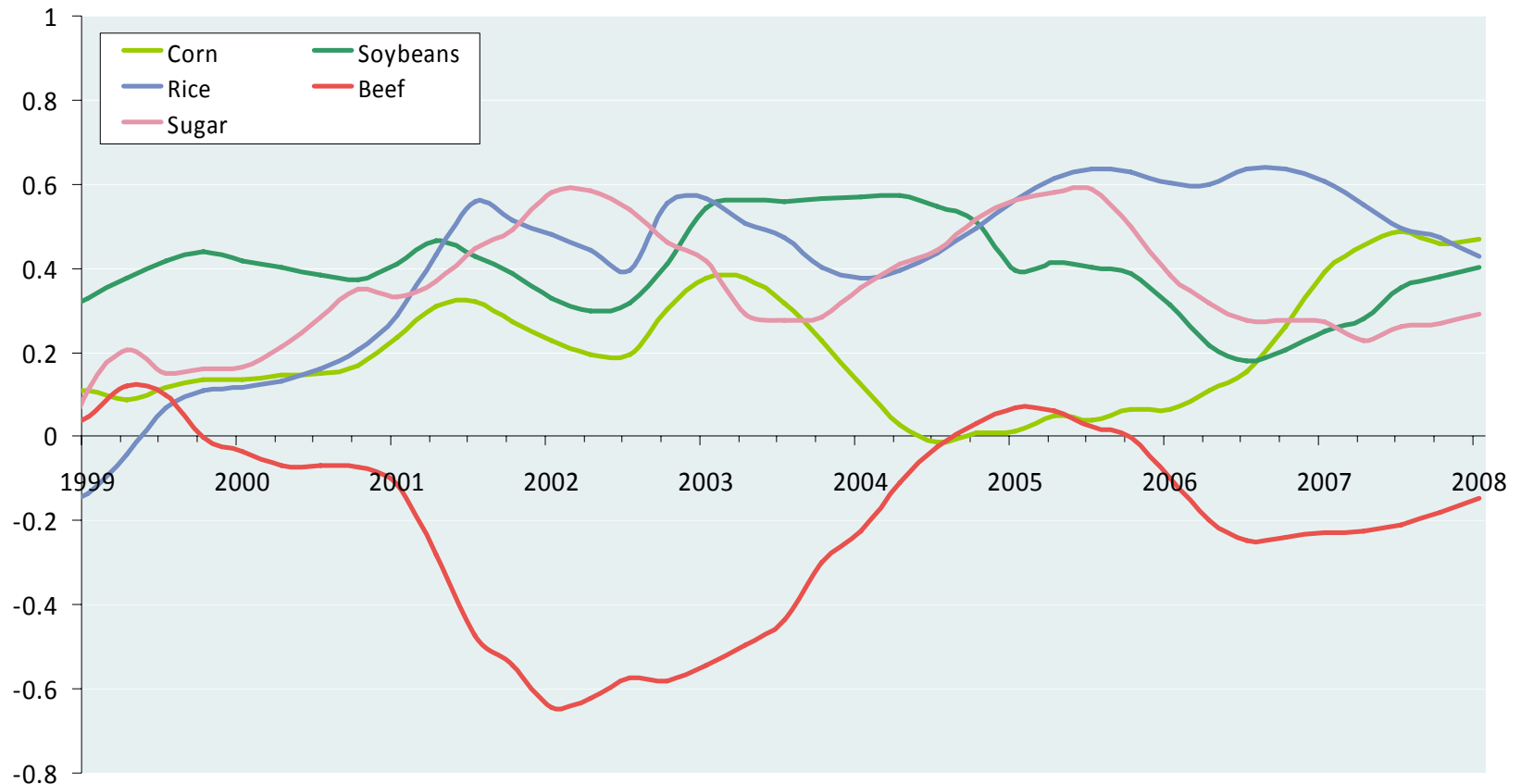
China's per capita GDP, crude oil prices, volume of food derivatives trading, Euro/US\$ exchange rate, and U.S. ethanol production

Grains	Fats & Oils	Corn	Soy	Rice	Beef	Sugar	Ind. Metals	Fertil.					
0.53	0.49	0.47	0.40	0.43	-0.15	0.29	0.61	0.41	China				
0.21	0.13	-0.22	0.19	0.36	-0.06	0.21	0.12	0.37	0.27	Crude Oil			
0.22	-0.05	0.36	-0.06	0.13	-0.13	-0.03	0.89	-0.11	0.44	0.08	Specul.		
0.43	0.55	0.31	0.52	0.51	-0.01	0.87	0.03	0.33	0.37	0.01	-0.03	EURO	
0.62	0.66	0.56	0.61	0.34	-0.29	0.55	0.19	0.49	0.47	0.28	0.10	0.62	US Ethanol

The China factor

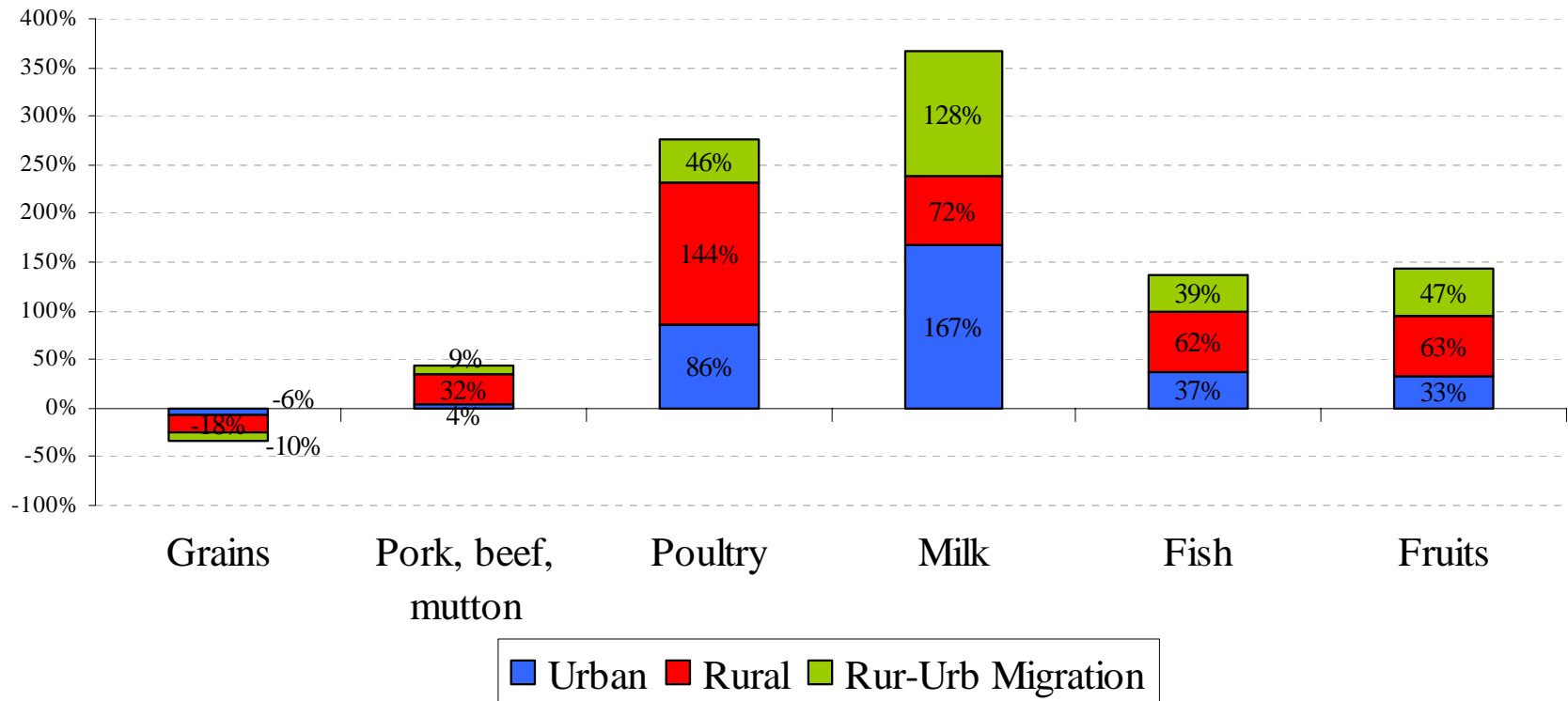
Prices of grains and fats & oils show a high and significant correlation with China's growth

Rolling Correlations with China per capita growth
8 years rolling correlations, based on quarterly data



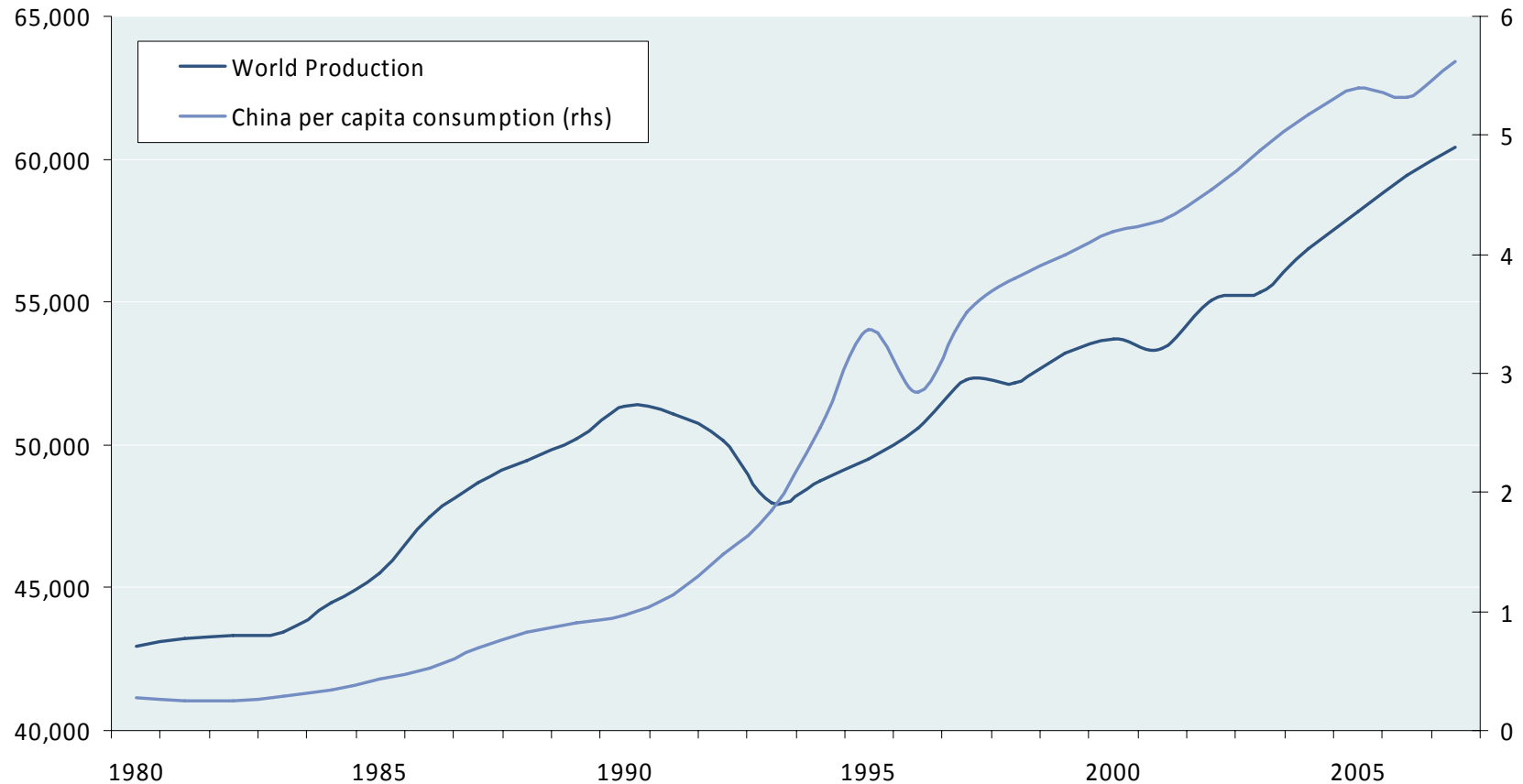
China affects food prices via its growth and diet change driven by higher income and urbanization...

China: change in per capita food consumption (1990-2006)



... and it seems to have a considerable indirect (feed the beef & poultry) effect on grain prices

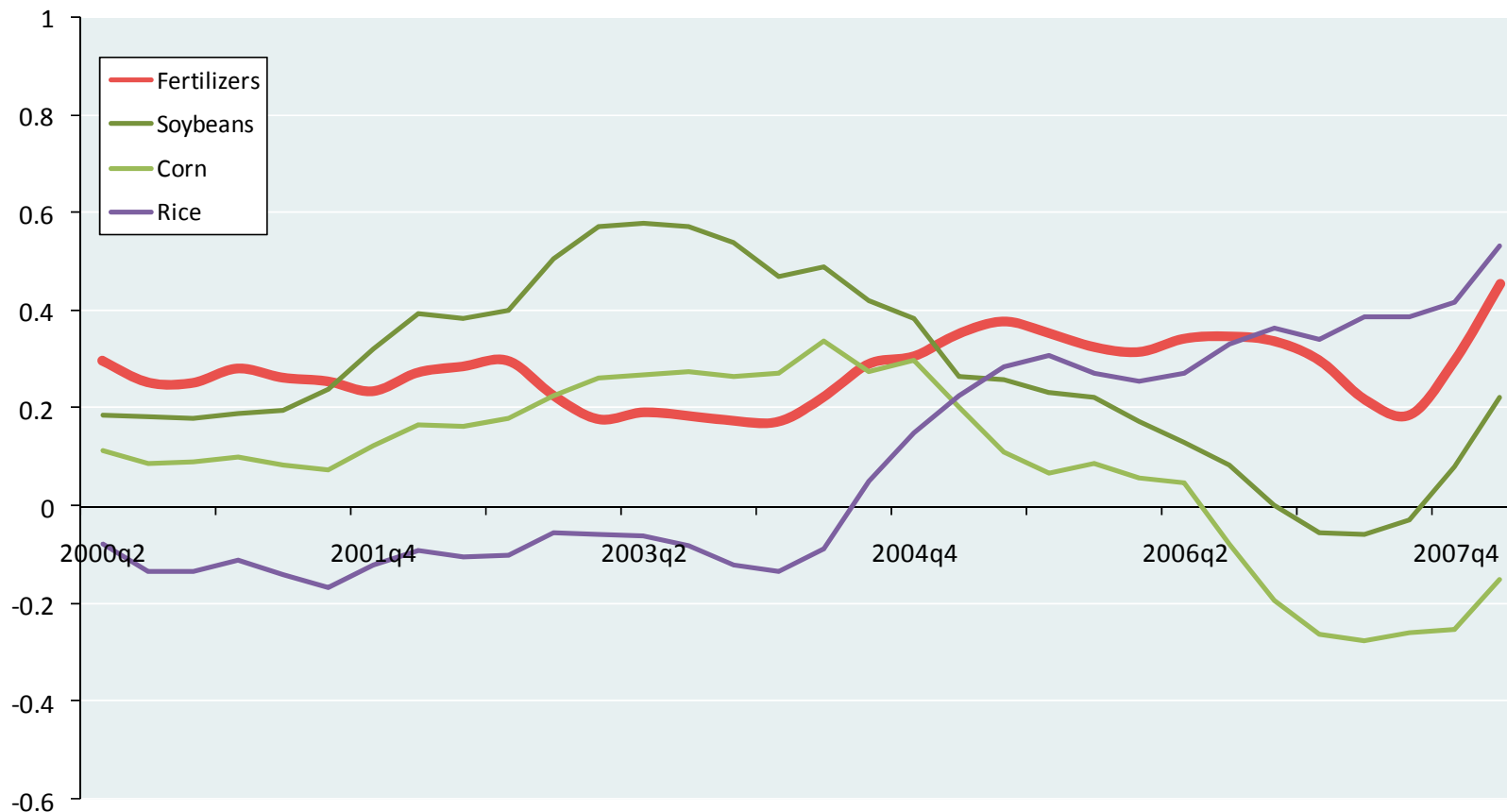
World Meat Production and China Consumption
100 MT CWE



Crude oil prices

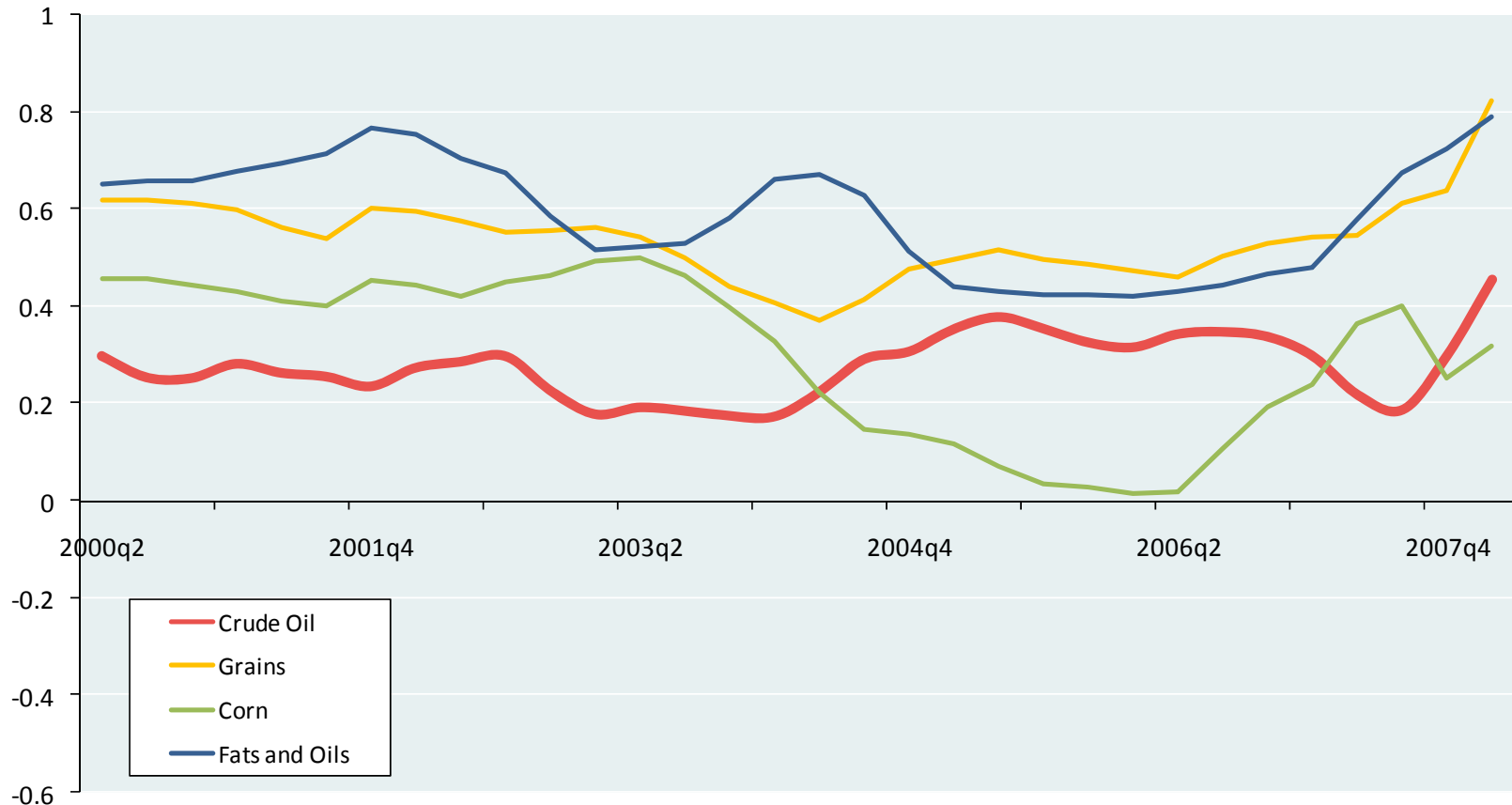
Prices of grains and fats & oils show a low and not significant correlation with crude oil prices

Rolling Correlations with the Price of Crude Oil (annual variations)
8 years rolling correlations based on quarterly data



But the correlations with the price of fertilizers are higher and significant

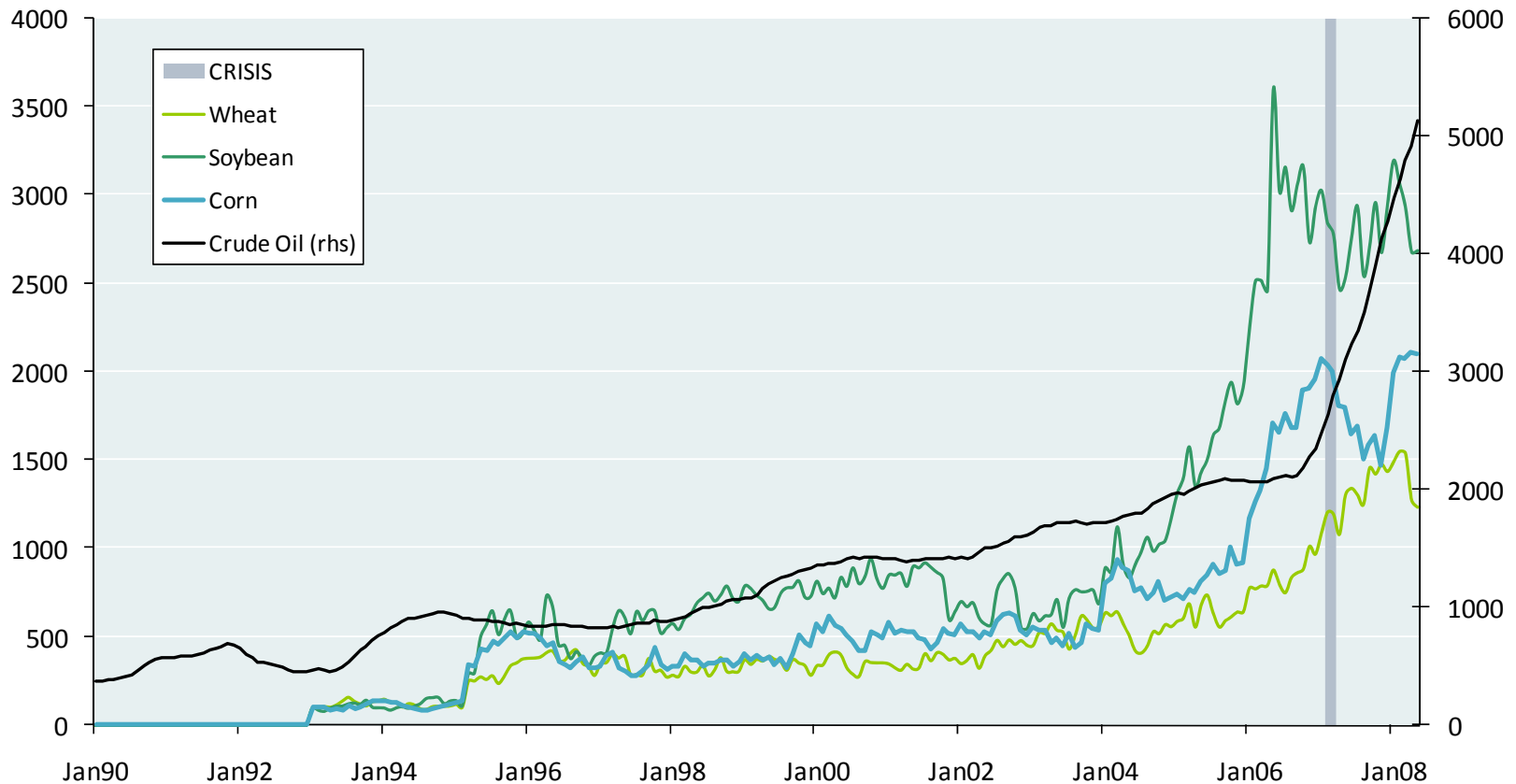
Rolling Correlations with the Price of Fertilizers (annual variations)
8 years rolling correlations based on quarterly data



Speculation

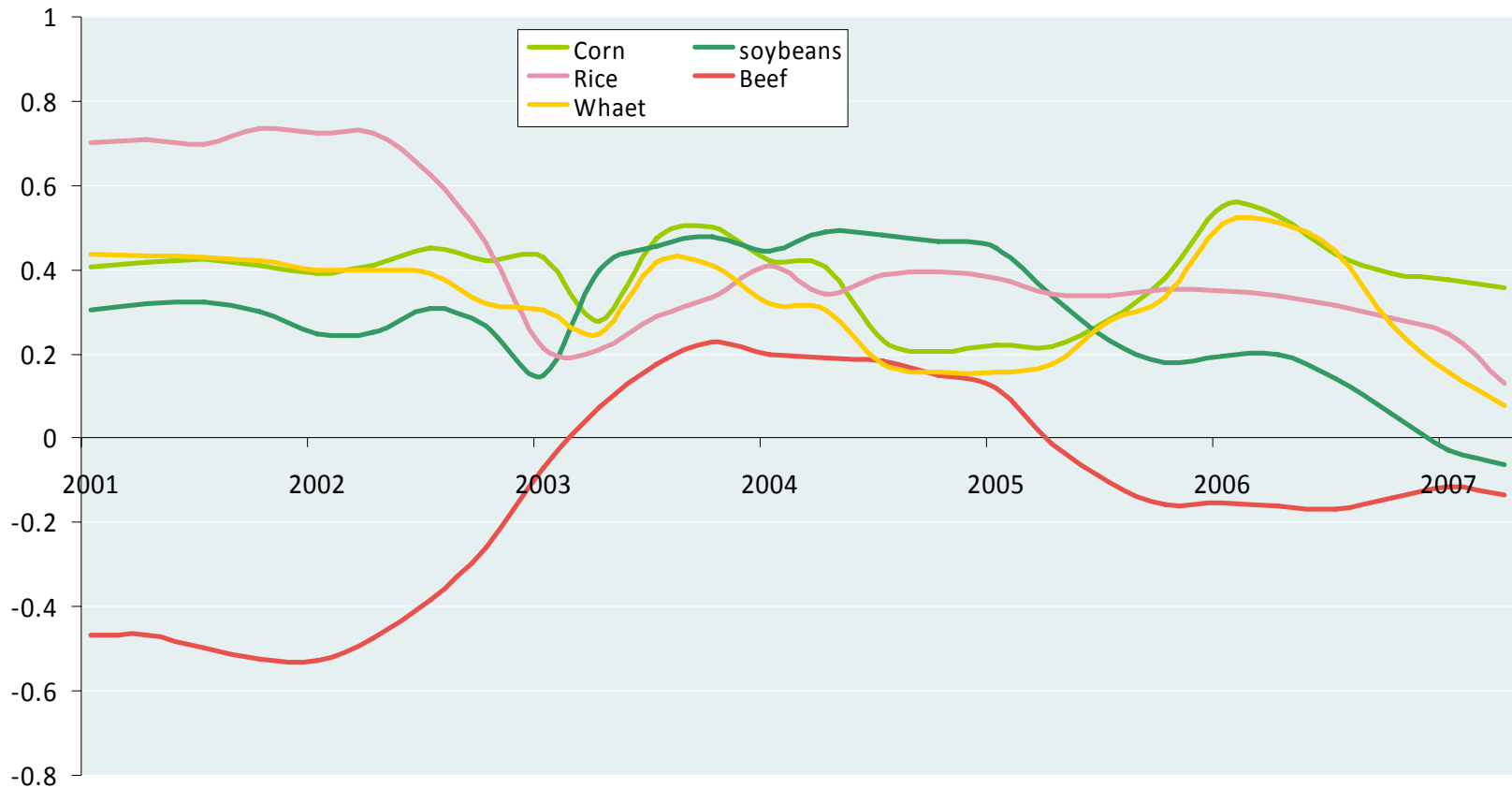
Trading in commodity derivatives has risen sharply in the last three years

Volume in Derivatives on Commodities
Futures and Options

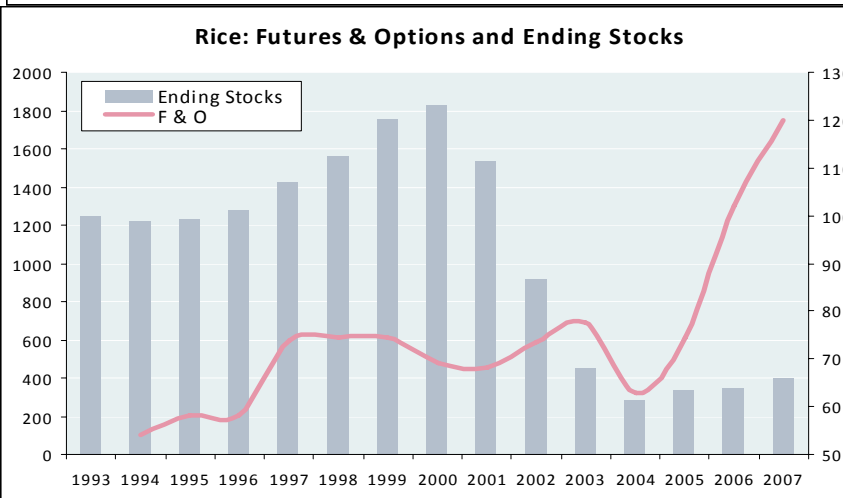
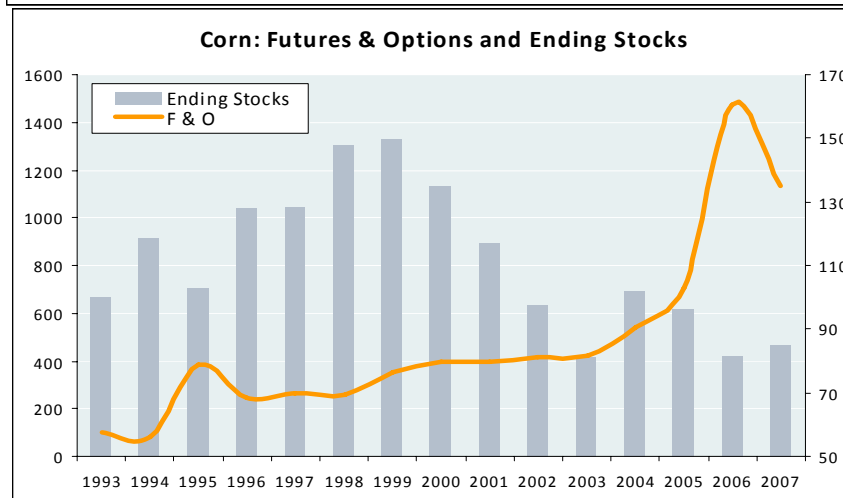
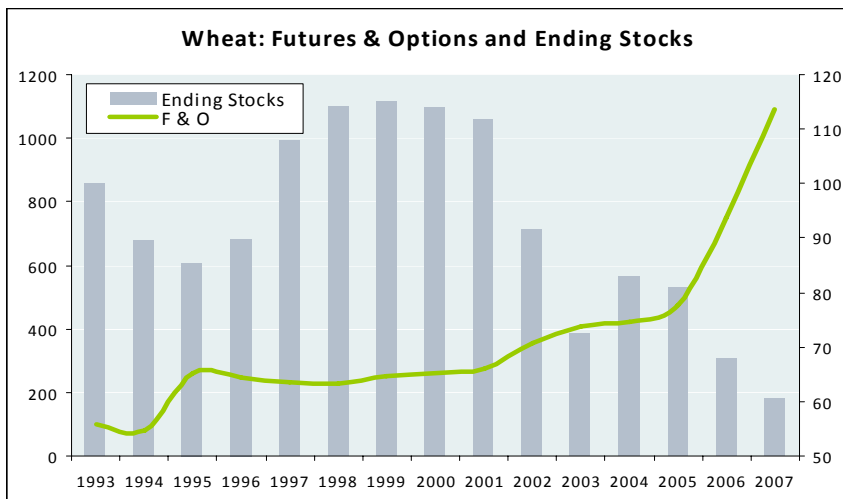
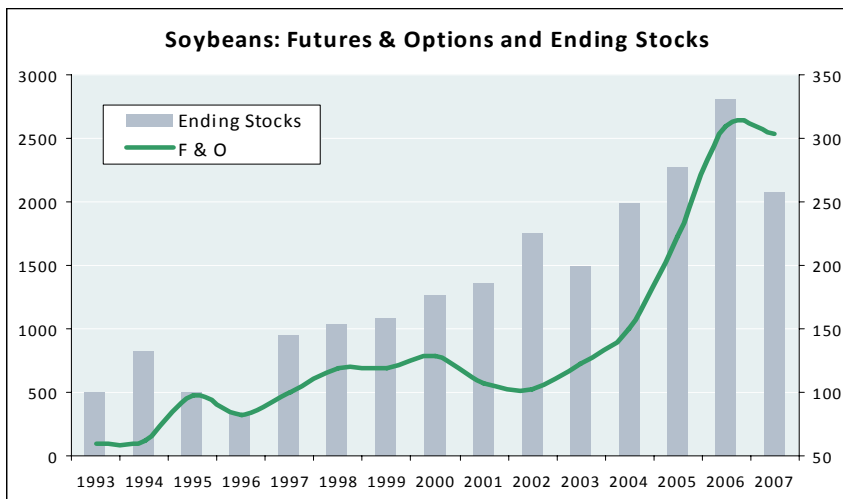


Speculation tends to show a positive correlation with prices of corn, wheat, rice, and soybean

Rolling Correlations with the Volume of Options on Commodities
8 years rolling correlations based on quarterly data



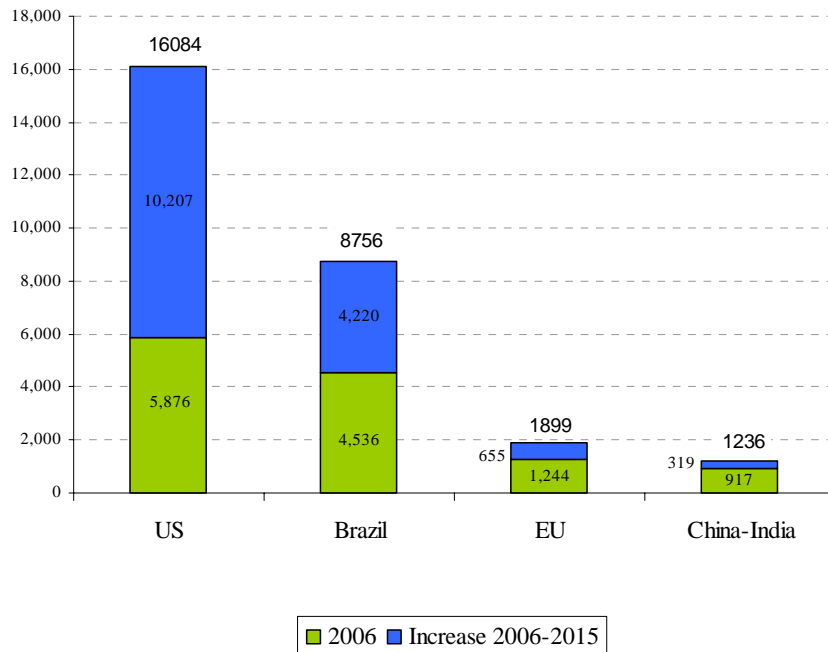
However, grain inventories have been flat or falling, except in the case of soybean



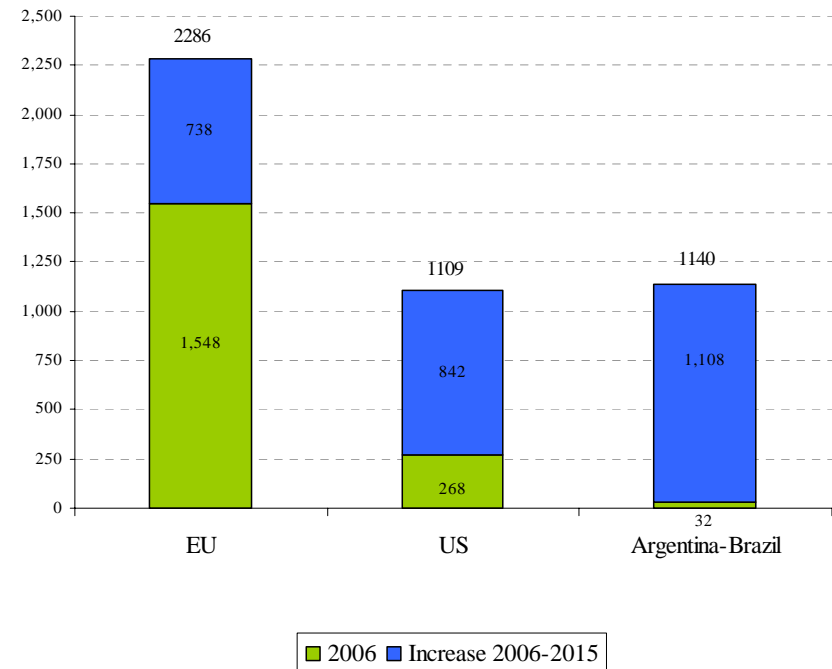
Biofuels

Are Biofuels here to stay? A sharp rise in production is projected under current policies

Ethanol Production, 2006-2015 (billion gallons)



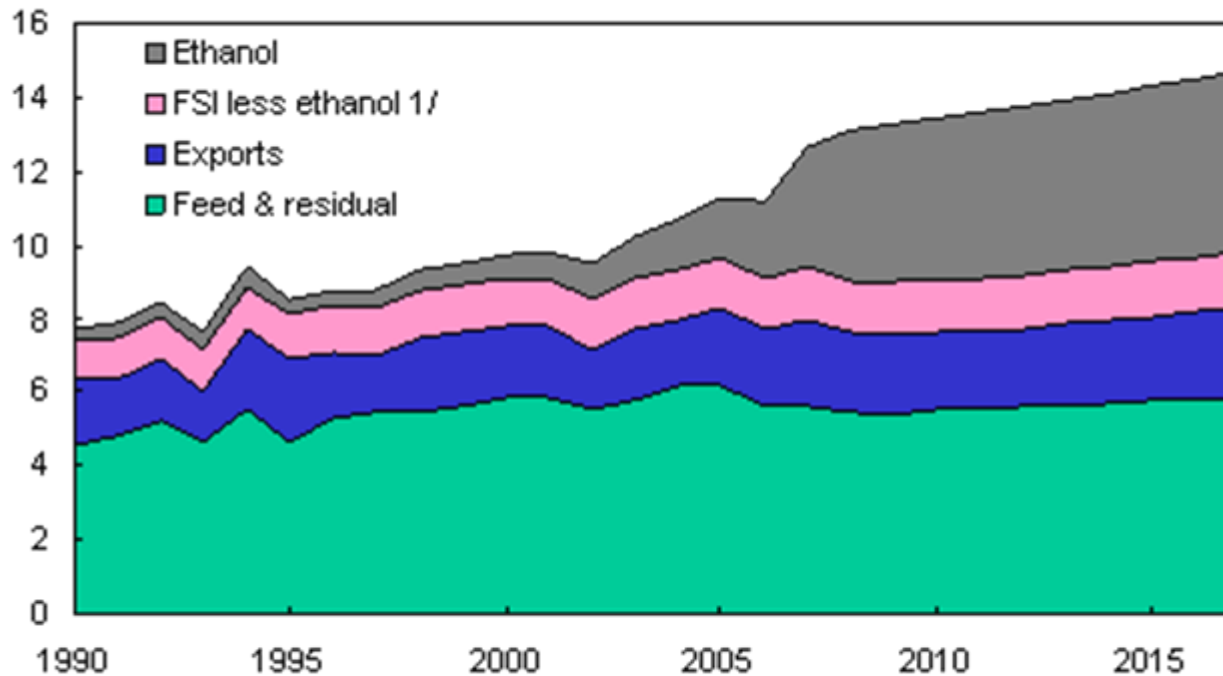
Biodiesel Production, 2006-2015 (billion gallons)



The share of corn production that goes to ethanol production in the U.S. is rising fast

U.S. corn use

Billion bushels

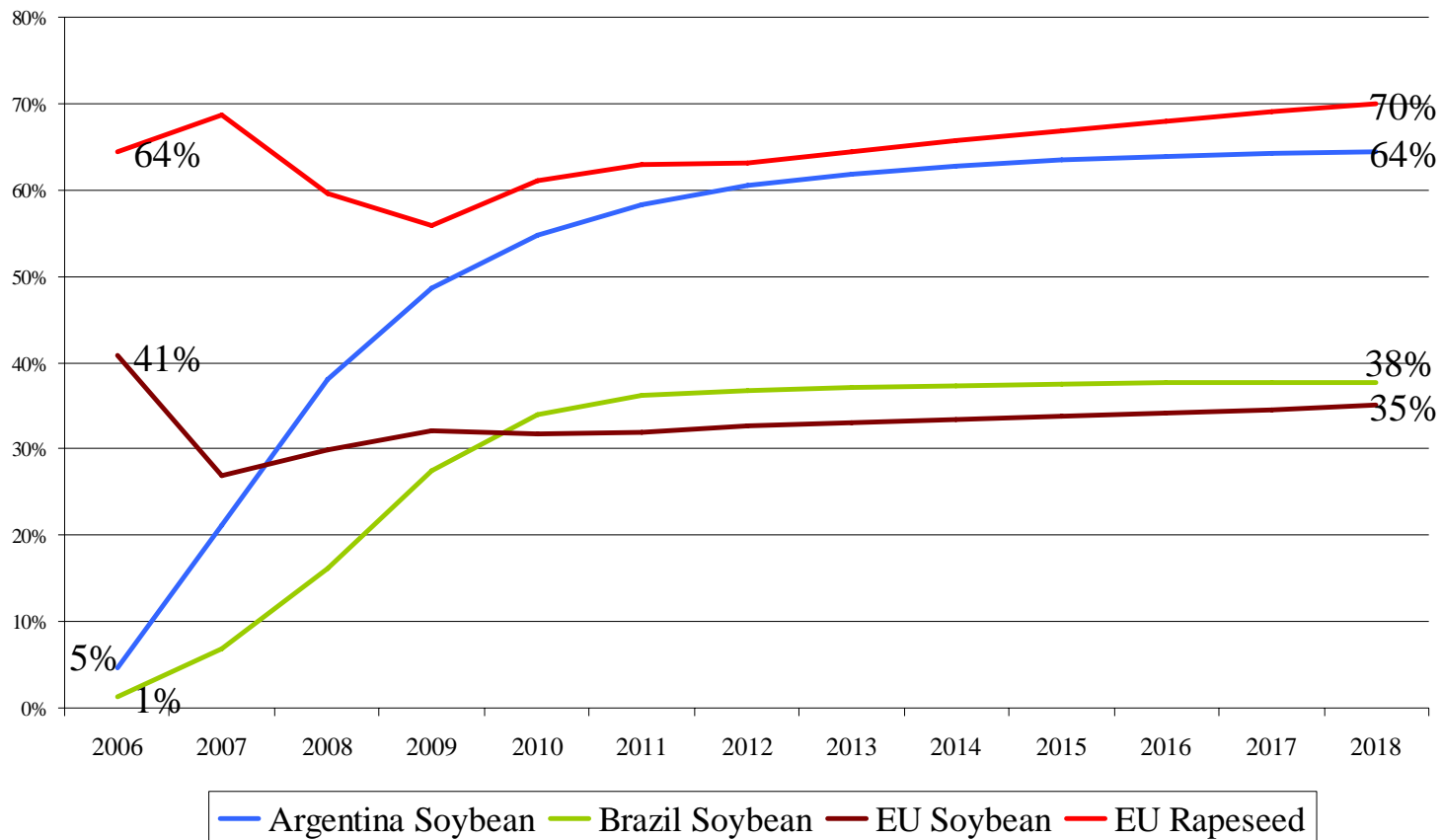


1/ Food, seed, and industrial less ethanol.

Source: *USDA Agricultural Projections to 2017*, February 2008.
USDA, Economic Research Service.

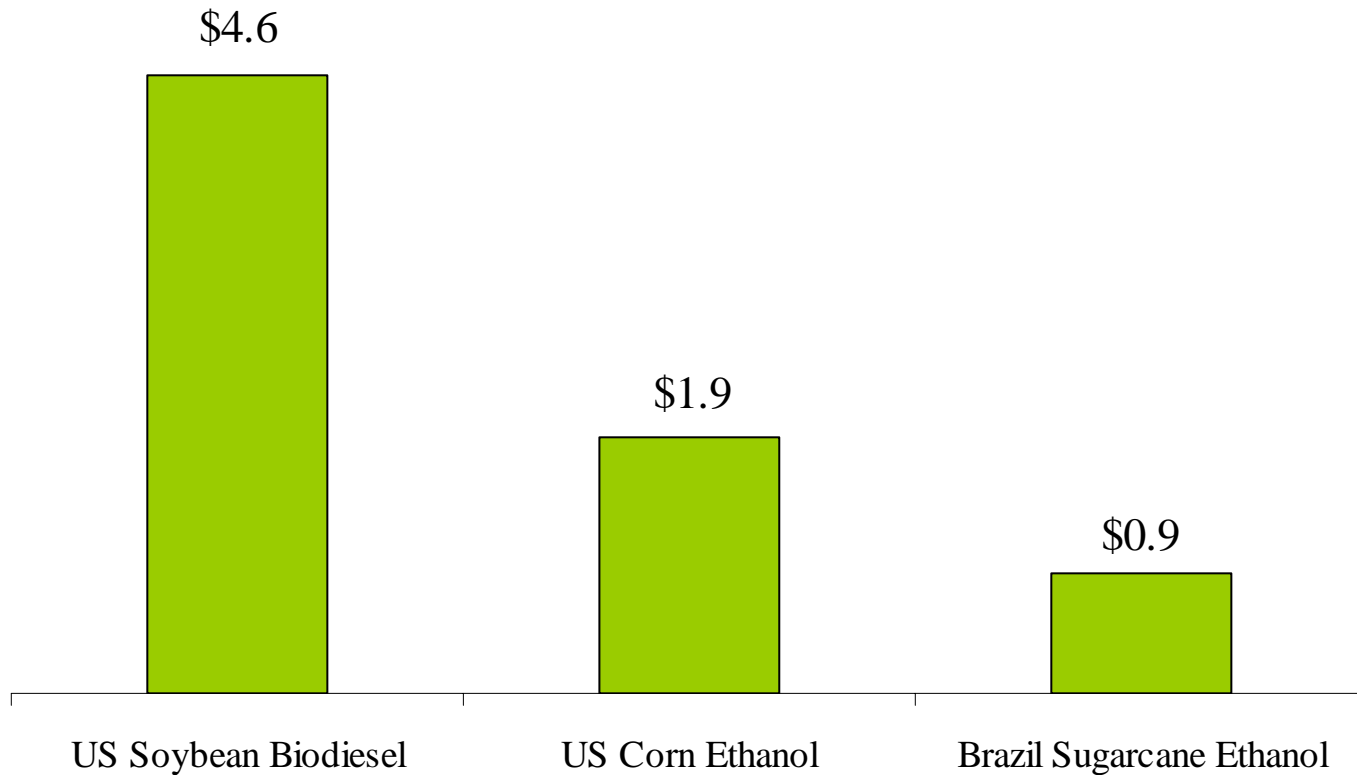
And the share of LAC soybean production that goes into biodiesel is also rising fast

Soybean and Rapeseed Used for Biofuel Production, 2005-2018 (%)



Production costs for different types of biofuels differ widely

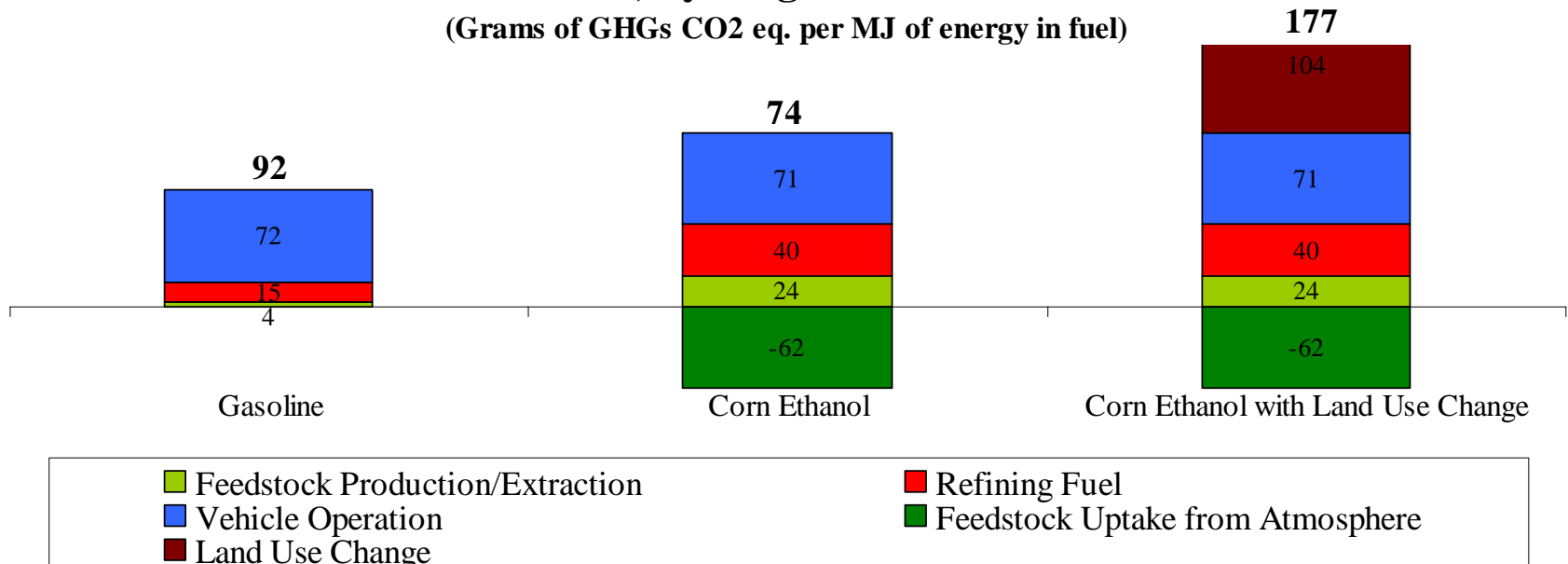
Biofuel Production Costs (US\$ per gallon)



All things considered, corn-based ethanol does not reduce emissions as compared to fossil fuels

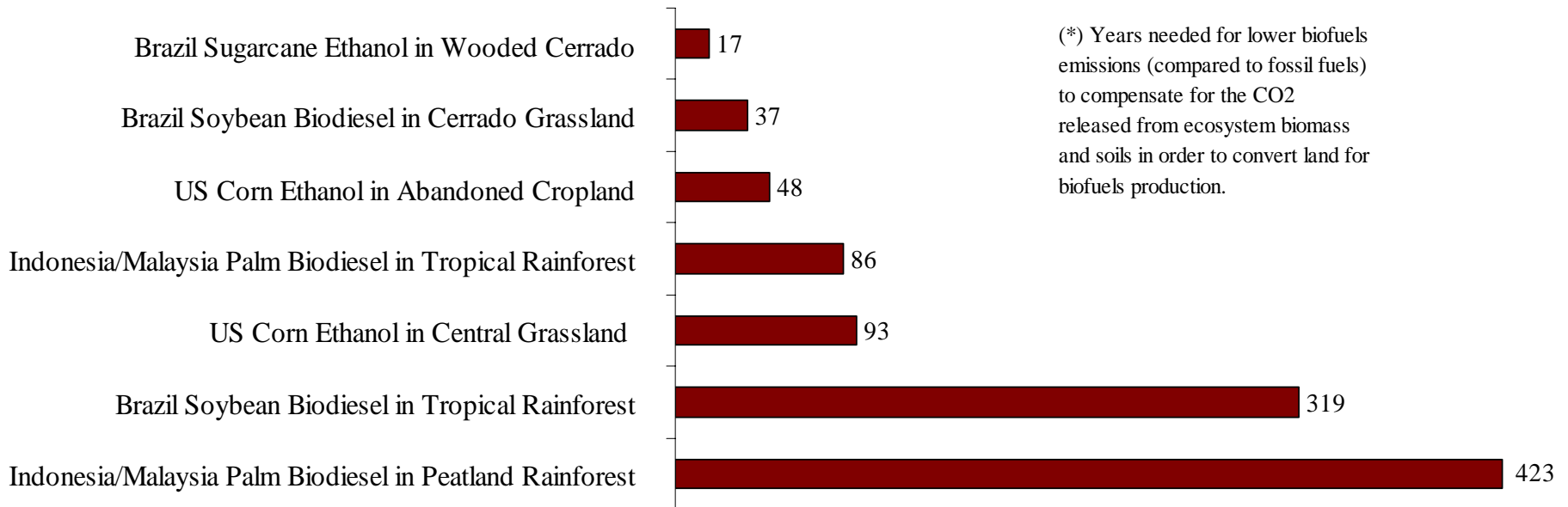
Emissions of Greenhouse Gasses from Gasoline and Corn Ethanol, by Stage of Production

(Grams of GHGs CO₂ eq. per MJ of energy in fuel)

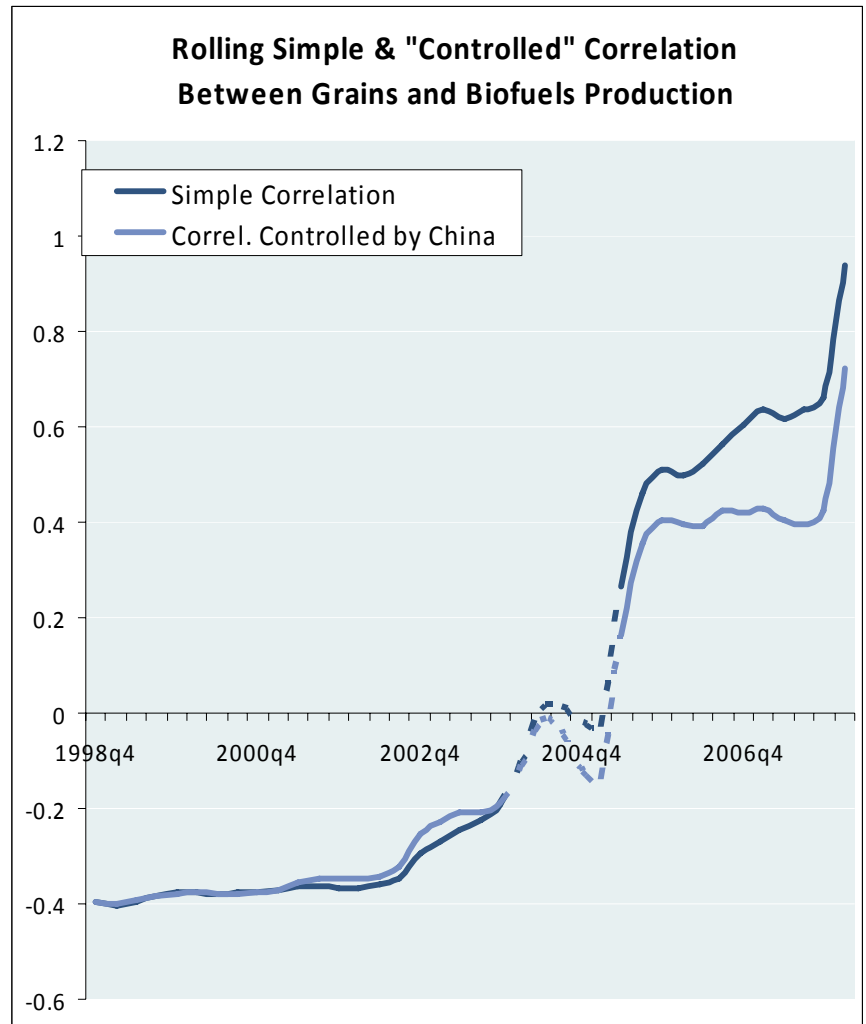
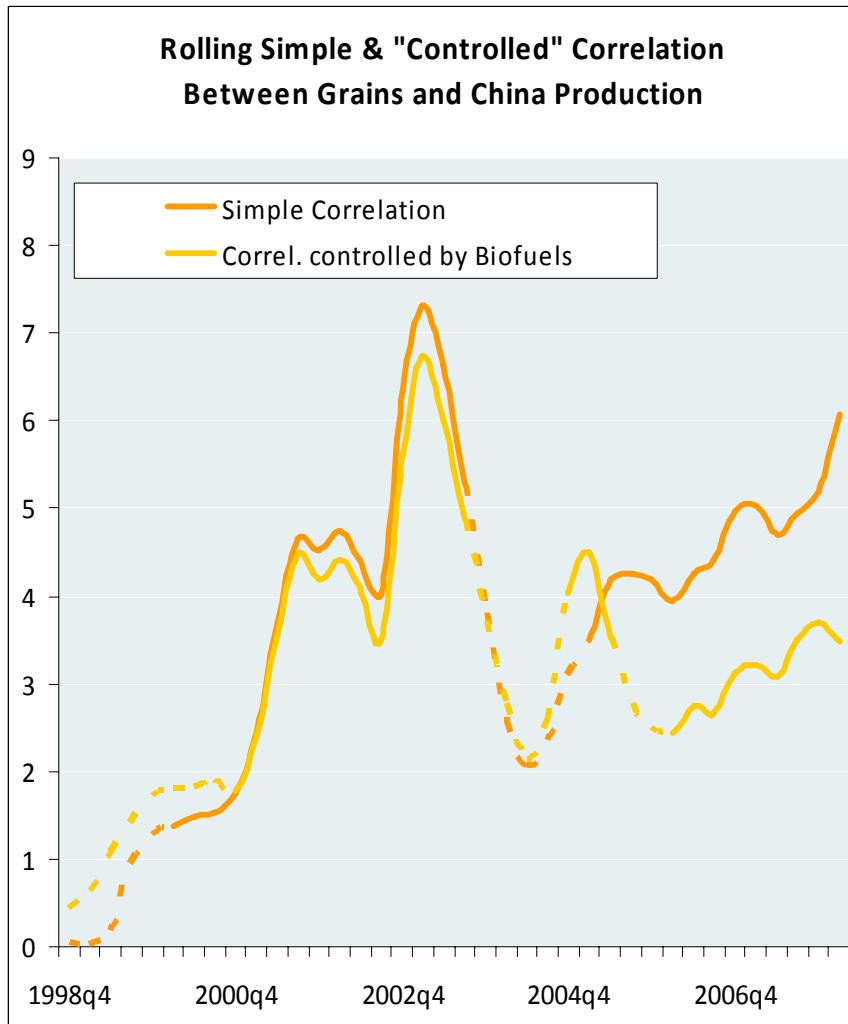


Carbon debts from land use change can be quite burdensome, particularly for some biofuel types

Years needed to repay Biofuel Carbon Debt from Land Conversion (*) (Ethanol from Corn or Sugarcane, Biodiesel from Soybean or Palm Oil)



In sum: China and corn-based biofuel production seem to be the main drivers of high food prices



Back to the policy discussion

Various policy concerns affect biofuel discussion, but food affordability must be now included

	Climate Mitigation	Energy Affordability	Food Affordability
Sugarcane Ethanol	+	++	?
Corn Ethanol	?	+	-
Biodiesel (vegetable oil)	?	?	-

- Policy makers in different countries place different weights on the various objectives, as determined via their political processes
 - Important role of farm lobbies and energy independence considerations
- The World Bank must take a global welfare perspective – sustainable development with a special concern for the poor

END