

Price Transmission on Markets for Agricultural Commodities

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Causes and Effects of Food Price Crises

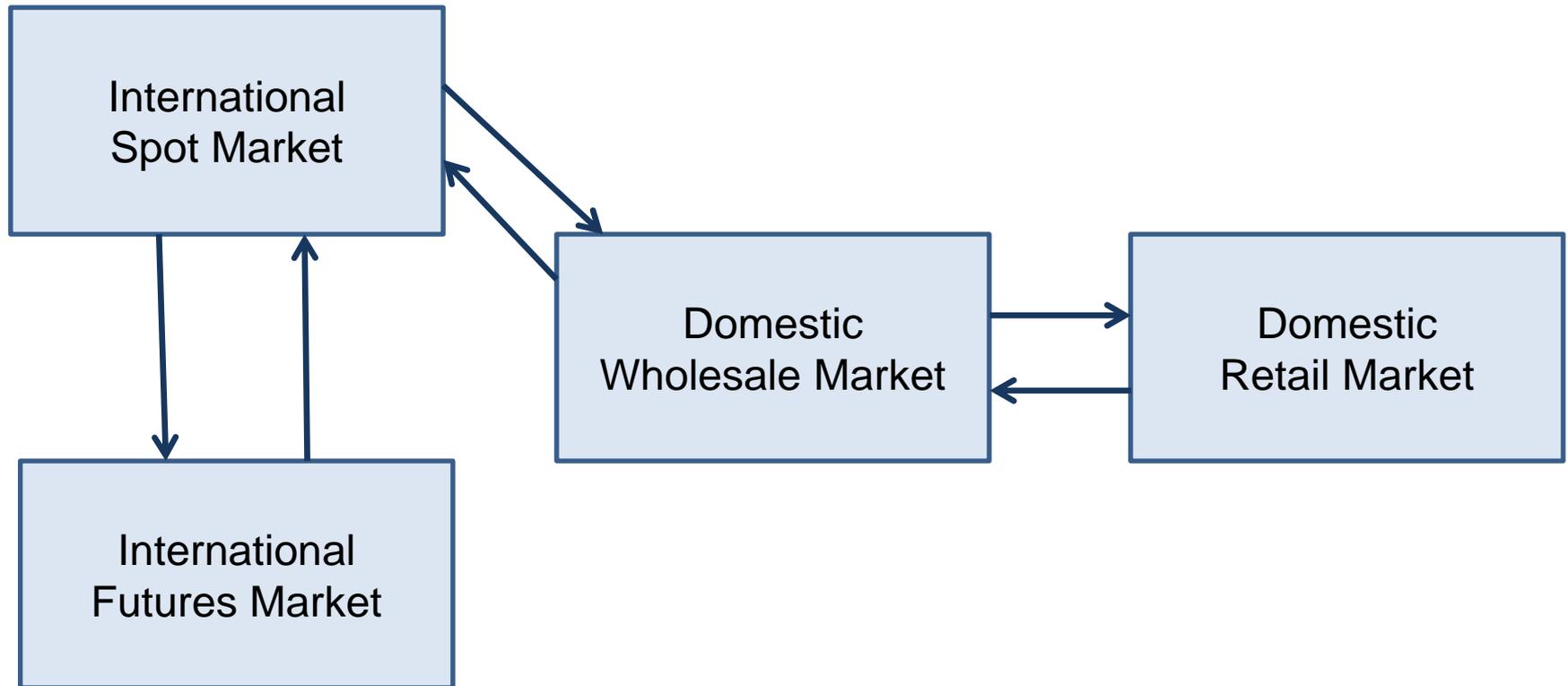
- What causes food price crises?
- Is financialization of commodity markets to blame?
- How are food prices and volatilities transmitted between markets?

Price and Volatility Transmissions between

- Spot and futures market
- International (US) and national market
- Wholesale and retail markets (commodity and processed food)

Commodities: Maize, Wheat, Rice and Soybeans

Transmission of prices for agricultural commodities and food



International Food Prices Since 1960



Data source: World Bank

Financialization of Commodity Markets

In the 1990s financial investors started to move funds on a massive scale into commodity markets (futures and OTC).

Increase from \$ 15 billion (2003) to \$ 200 billion (2008)

Benefits:

- Gains from diversification (negative correlation of commodities with stock and bond returns)
→ reduction of portfolio risk
- Expected price increases
- Inflation hedge

Commodity index investors

Invest in a portfolio of commodities often via swap dealers who hedge their positions on the futures market

Passive, long term investment with long positions

Goldman Sachs Commodity Index (May 2004)

Energy		Livestock		Agriculture		Metals	
Crude Oil	26.1	Live Cattle	3.8	Wheat	4.8	Gold	1.9
Heating Oil	6.9	Lean Hogs	2.3	Corn	4.3	Silver	0.2
Gas	8.9	Feeder Cattle	0.8	Soybeans	2.7	Aluminium	3.0
Brent	12.0			Cotton	1.5	Copper	2.4
Gasoil	3.7			Sugar	1.2	Zinc	0.6
Natural Gas	11.0			Coffee	0.7	Nickel	0.8
				Cocoa	0.3	Lead	0.3
Total	68.6	Total	6.9	Total	15.5	Total	9.0

Granger Causality Test (Wheat)

Sample Jan. 2006 – Dec. 2016 (574 weekly observations)

Correlation between

P_{fut} and Positions_{CIT}^{long} = 0.413 (0.000)

P_{fut} and Percentage Positions_{CIT}^{long} = 0.157 (0.000)

Pairwise Granger Causality Tests

Sample: 1/03/2006 2/28/2017

Lags: 7

Null Hypothesis:	Obs	F-Statistic	Prob.
CHANGE_CIT_LONG_ALL does not Granger Cause DLP_FUT	566	2.14842	0.0372
DLP_FUT does not Granger Cause CHANGE_CIT_LONG_ALL		1.15175	0.3291

Testing the Masters Hypothesis

Dependent Variable: P_FUT

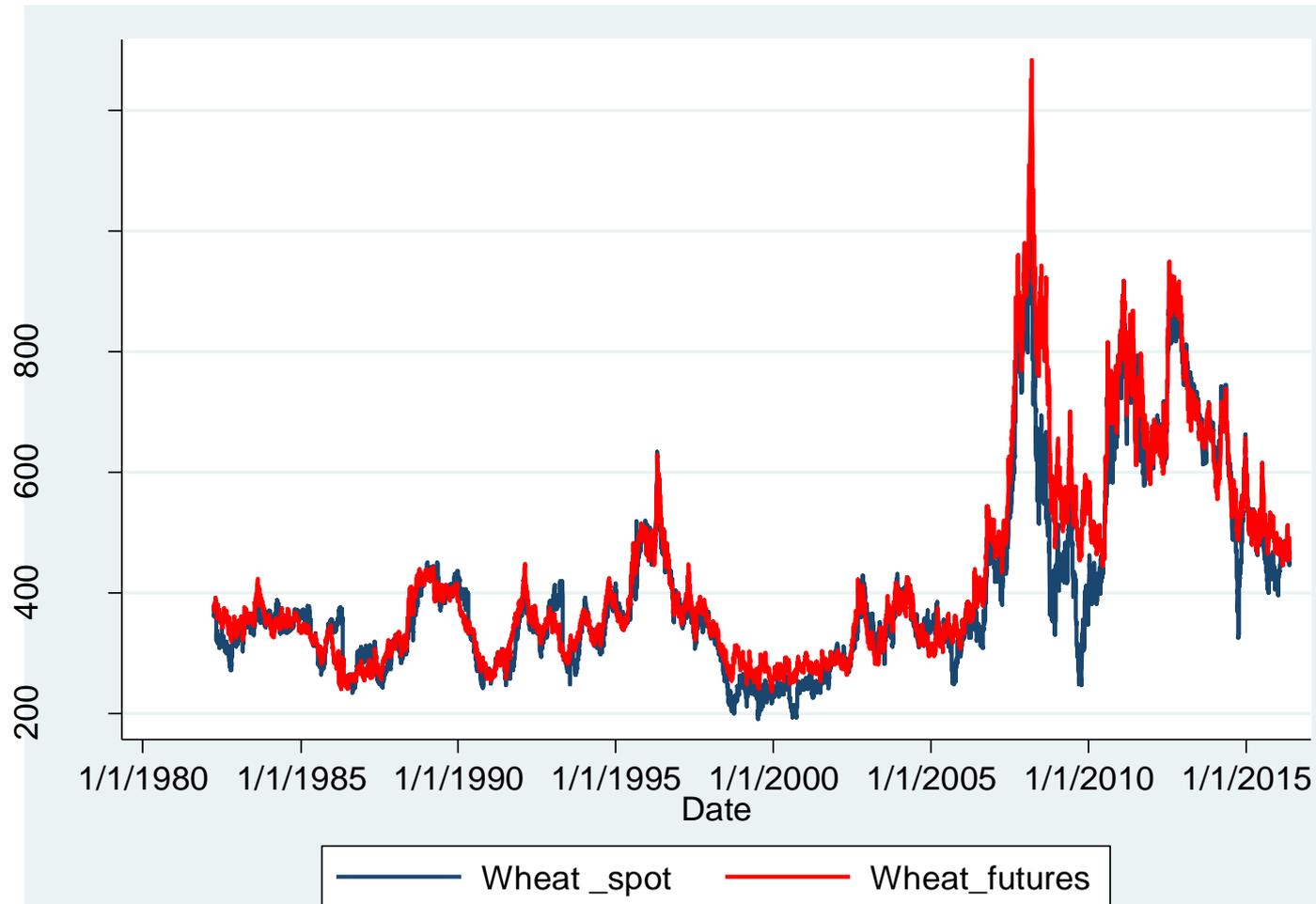
Sample (adjusted): 1/10/2006 12/27/2016

Included observations: 573 after adjustments

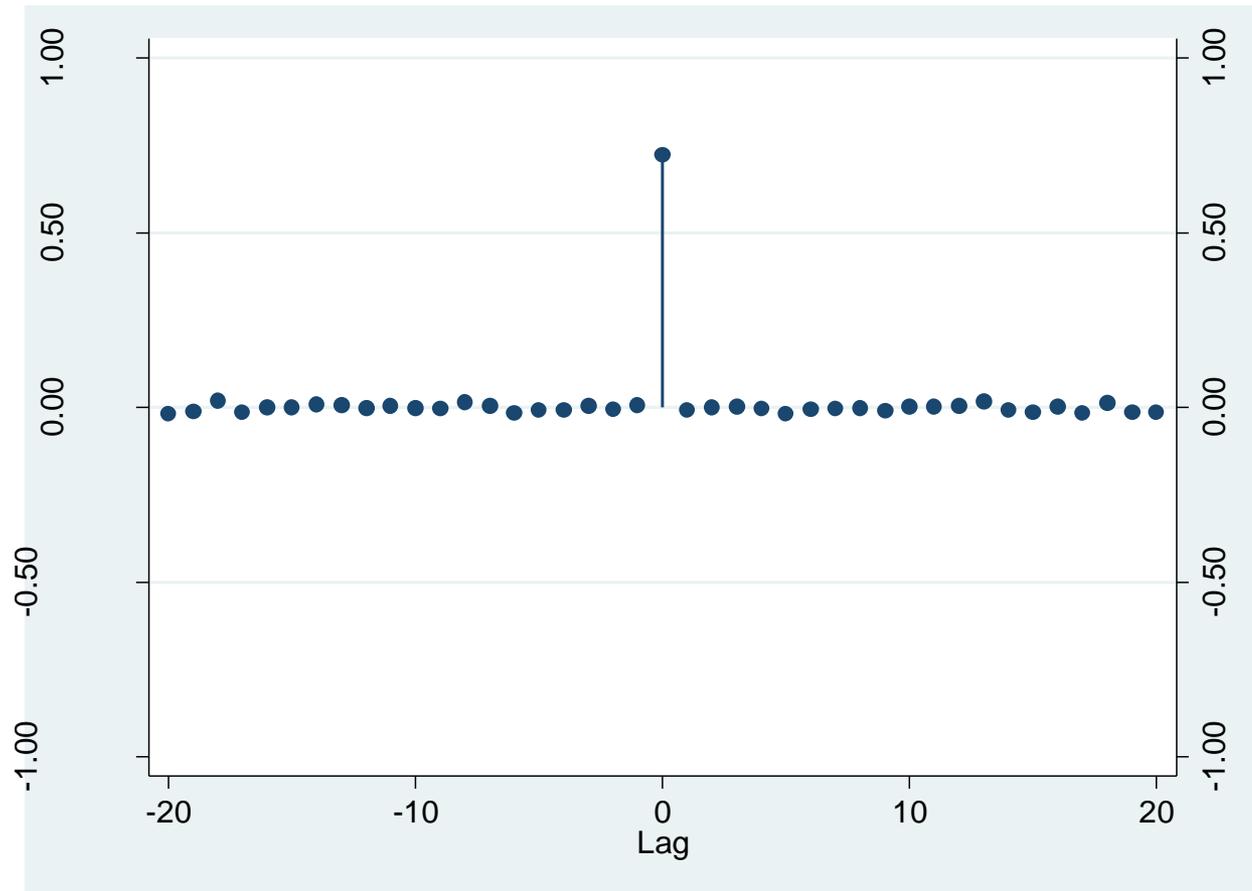
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.048042	0.177260	-0.271024	0.7865
P_FUT(-1)	0.967074	0.009457	102.2566	0.0000
CRIT_35	0.608485	0.264626	2.299414	0.0218
PCT_OI_CIT_LONG_ALL	0.007423	0.006349	1.169236	0.2428
CRIT_35*PCT_OI_CIT_LONG_ALL	-0.015660	0.007798	-2.008185	0.0451
Adjusted R-squared	0.960633	Durbin-Watson stat		2.059186
F-statistic	3490.500	Prob(F-statistic)		0.000000

- When CITs hold more than 35% of long positions, futures prices will be higher by 61.85 cents
- Significant interaction term but with unexpected sign

Wheat Prices: Spot and Futures



Cross-Correlogram: Price Change in the Spot and Future Markets



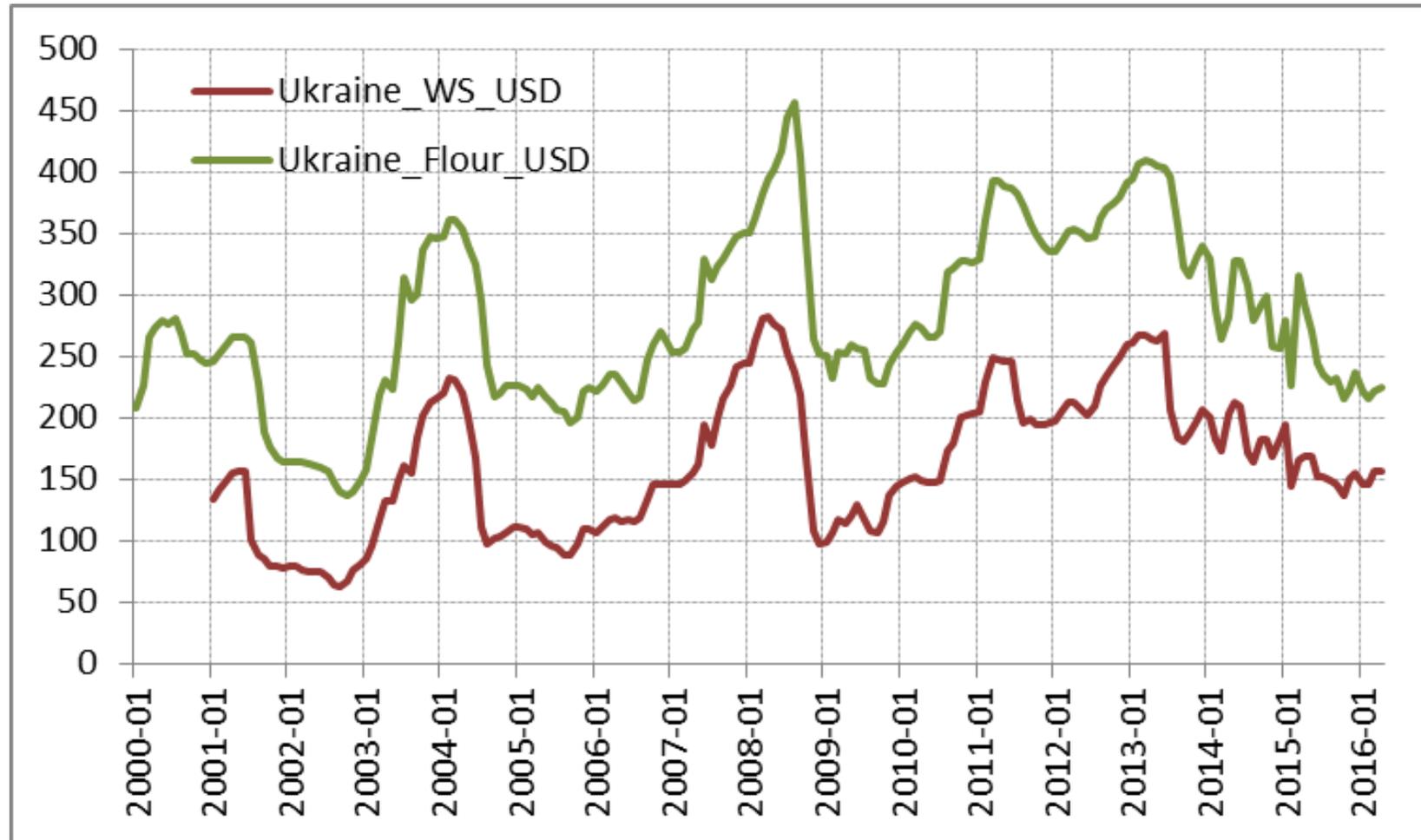
International and Ukrainian Wheat Prices



Steps in the Analysis

- International and Ukrainian wheat prices have unit roots
- Both prices are cointegrated
- Results for vector error-correction model:
- 95% confidence interval for slope of cointegration equation: [-2.064631 -1.115394]
- International prices Granger-cause Ukrainian prices but not *vice versa*.
- Low speed of adjustment to disequilibrium on Ukrainian market (6.0 percent)

Ukraine: Wheat and Flour Prices



Empirical Evidence for Ukrainian Wheat and Flour Markets

- Strong co-movement
- Price difference increased from 600 to 1700 UAH; relative price differential decreased from 80 to 40 percent (both with much short-run variation)
- No lead or lag relationship

Conclusions

- No strong and stable lead-lag relationships between wheat spot and futures markets
- Price shocks on international markets cause price shocks on the Ukrainian market
- Price shocks on different segments of the Ukrainian market are contemporaneous
- Strong “distortions” from the exchange rate
- It is unclear whether volatility has increased in recent years
- It is also unclear what to do about uncertainty and volatility in the wheat market

Thank you for your attention!