Futures Commodities Prices and Media Coverage

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Outline

- Why?
- Previous studies
- What we do?
- How we do it
- Key results
- Conclusions

Why we did the study

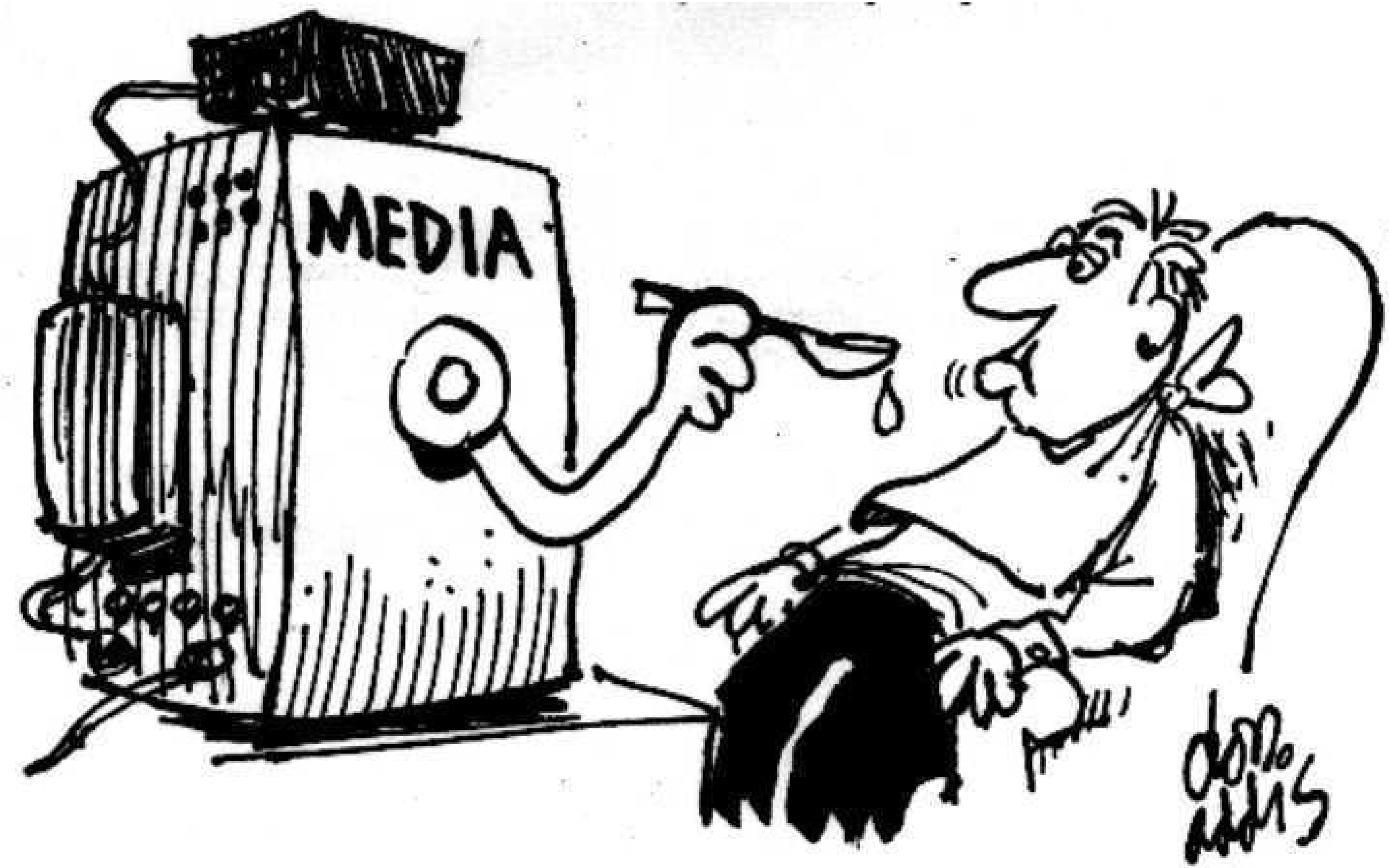
Real food prices have a high impact on consumers, especially the poor ones

Can perceptions on food price development in mass media impact the real prices?

If this is the case

- how strong is the impact?
- what can be done to influence the perceptions

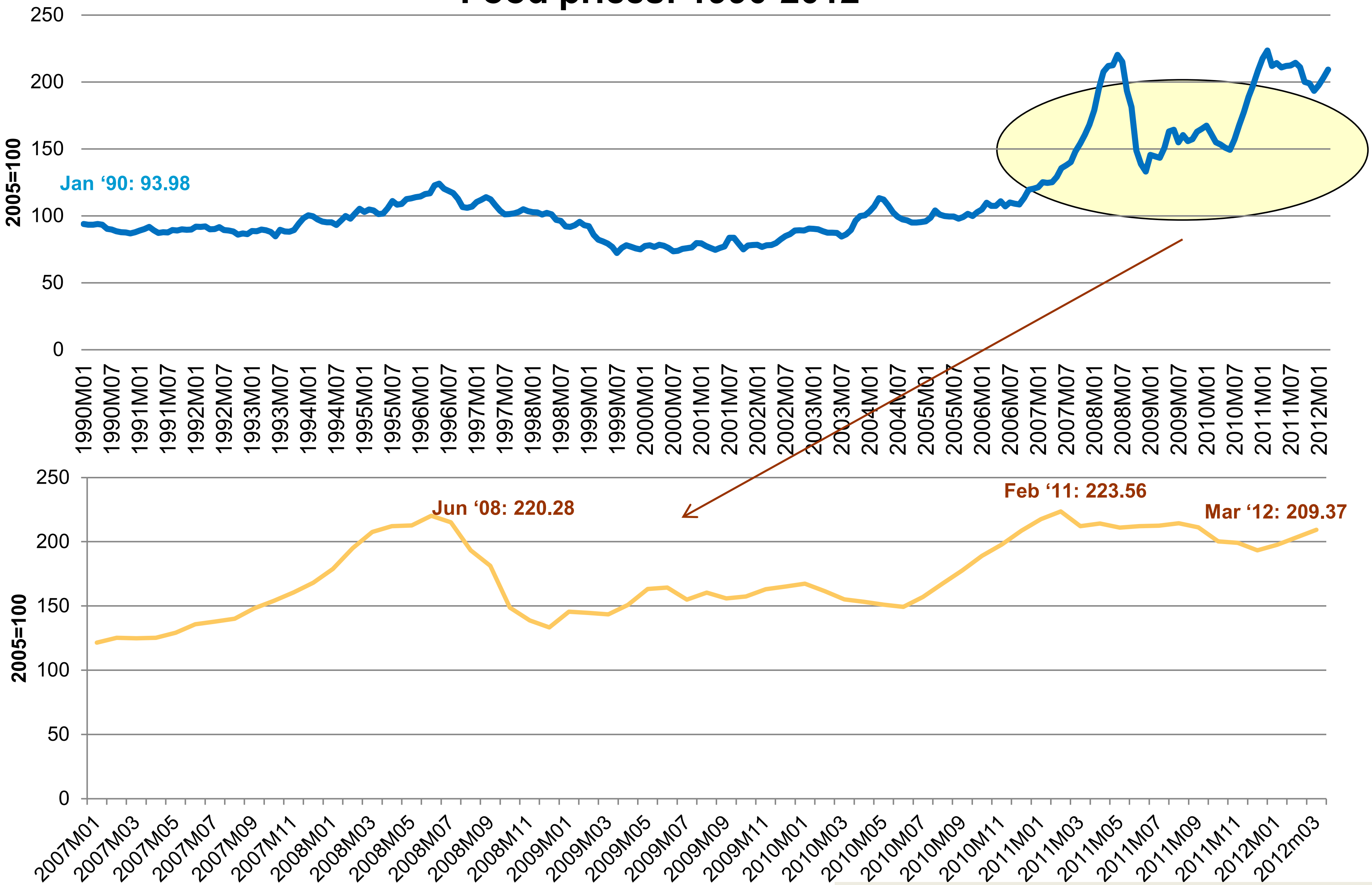
Why?



Why?

A trend reversal, plus a new normal?

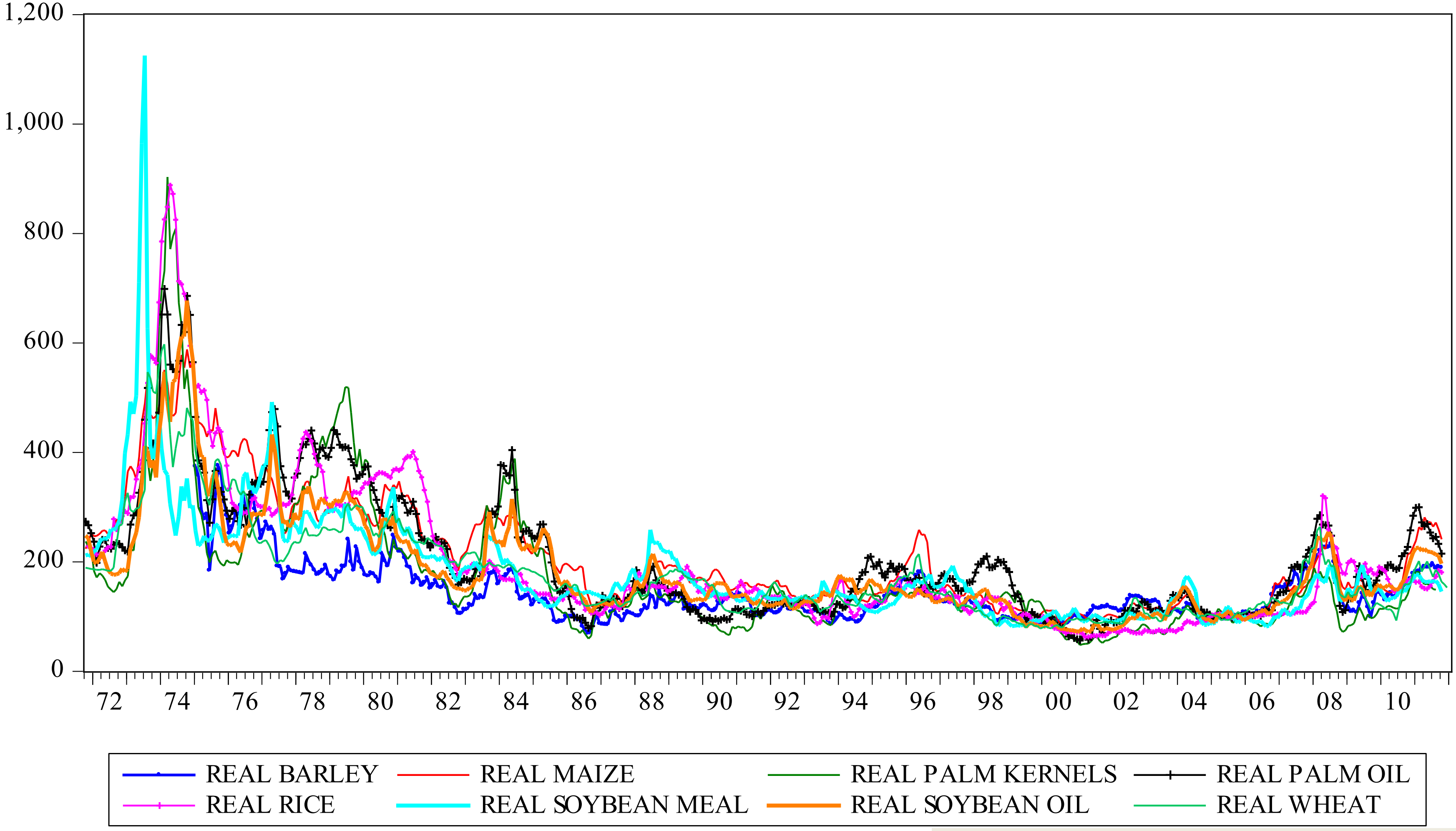
Food prices: 1990-2012



Source: World Bank

Why?

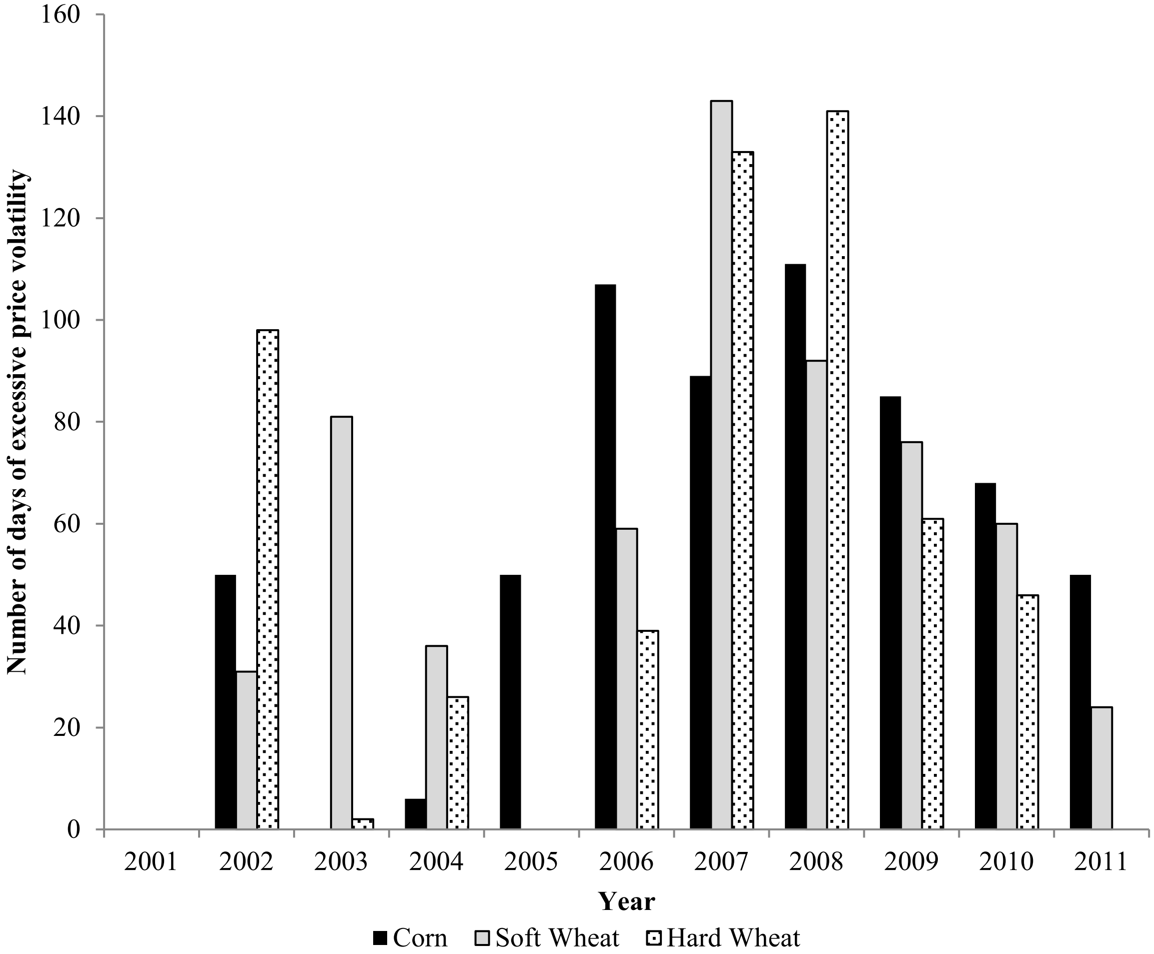
Historical Evolution of Corn Prices



Source: Datastream data.

Why?

Periods of Excessive Volatility



Note: This figure shows the results of a model of the dynamic evolution of daily returns based on historical data going back to 1954 (known as the Nonparametric Extreme Quantile (NEXQ) Model). This model is then combined with extreme value theory to estimate higher-order quantiles of the return series, allowing for classification of any particular realized return (that is, effective return in the futures market) as extremely high or not. A period of time characterized by extreme price variation (volatility) is a period of time in which we observe a large number of extreme positive returns. An extreme positive return is defined to be a return that exceeds a certain preestablished threshold. This threshold is taken to be a high order (95%) conditional quantile, (i.e. a value of return that is exceeded with low probability: 5 %). One or two such returns do not necessarily indicate a period of excessive volatility. Periods of excessive volatility are identified based a statistical test applied to the number of times the extreme value occurs in a window of consecutive 60 days.

Source: Martins-Filho, Torero, and Yao 2010. See details at http://www.foodsecurityportal.org/soft-wheat-price-volatility-alert-mechanism

Why?

Importance of information

Wheat Prices Soar After Russia Bans Exports

Steve Baragona | Washington06 August 2010

The Washington Post

Russia bans grain exports because of fire and drought, sending prices soaring

FINANCIAL TIMES All times are London time

ft.com/beyondbrics

Egypt in a fix over Russian wheat ban

August 6, 2010 4:46pm by Barney Jopson |

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October 15

August 6, 2010

No Wheat Shortage, but Prices May Rise

By GRAHAM BOWLEY and ANDREW MARTIN

hindustantimes

Ariana Eunjung Cha & Janine Zacharia
Email Author
Moscow, August 07, 2010

First Published: 00:11 IST(7/8/2010)
Last Updated: 00:12 IST(7/8/2010)

Russia ban sends wheat prices soaring

New York Times
"No Wheat Shortage, but Prices May Rise"

Financial Times
Russia grain export ban sparks price fears
Published: August 5 2010 10:50

Voice of America
"Wheat Prices Soar after Russia Bans Exports"

WSJ
Wheat Prices Hit 2-Year Highs Following Russian Ban
Aug 5, 2010

Economic Times (India)
"Russian Crisis Won't Impact Global Wheat Supplies, Prices"

The Diane Rehm Show (USA)
"World Wheat Supplies"

Radio France Internationale, English to Africa service
"Russia Wheat Ban Raises Food Security Fears"

Radio France Internationale, Latin America Service

Asia Sentinel
"Is Another Food Crisis Coming?"

BBC World News America
"From Farmers to Bakers: What the Wheat Shortfall Means"

Financial Times
Prospect of Russian grain imports lifts wheat
Published: August 19 20

Bloomberg
Wheat Prices Jump Most in Week as Argentina, Russia Crops Hurt by Drought

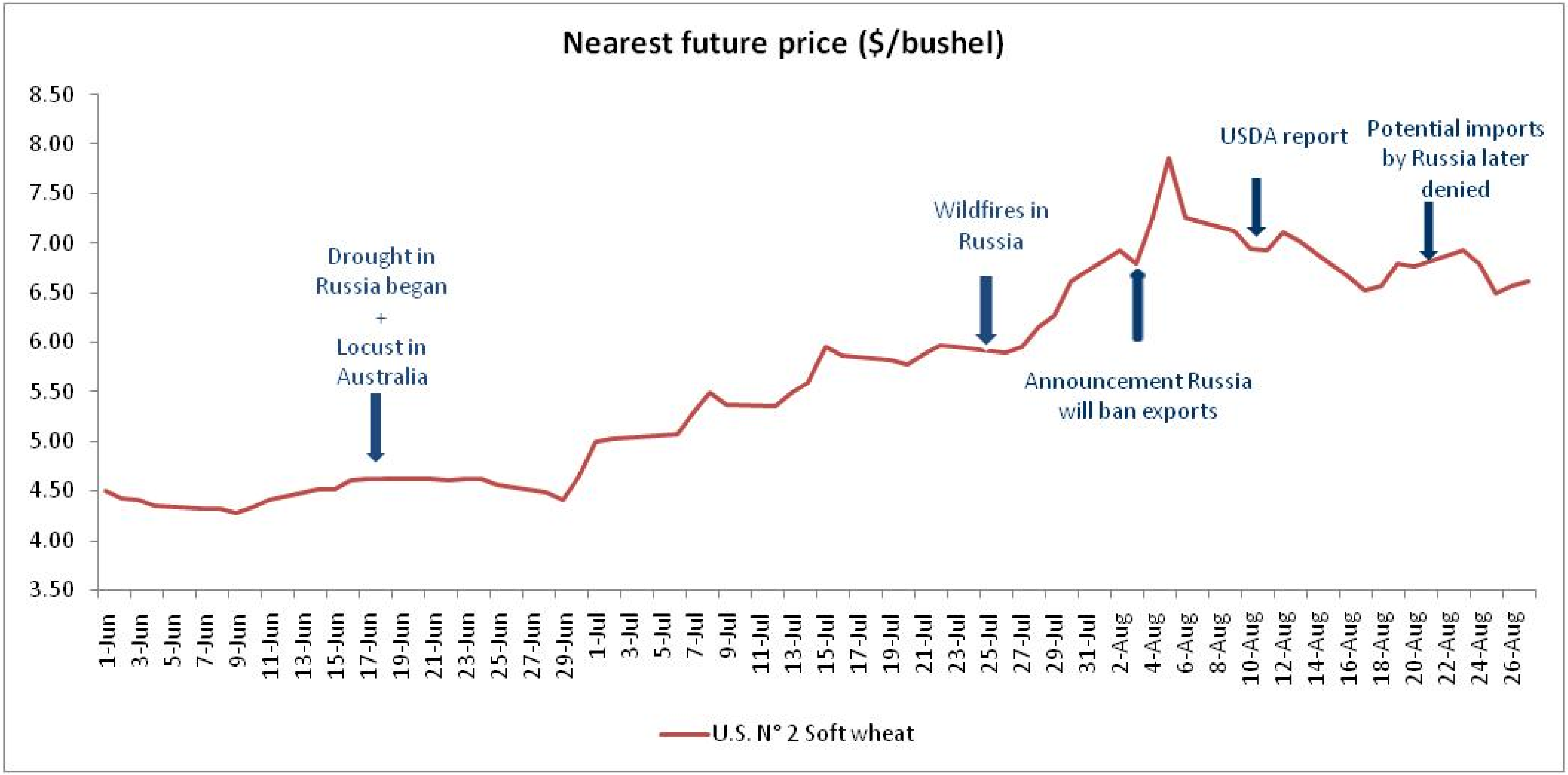
Why?

Analysis of media articles referencing wheat prices

Reason given for price increase	References to wheat prices going up		
	1998–2011 [a]	2010 [b]	Aug.–Oct. 2010 [c]
Financial	78	42	10
Inventories	222	99	40
Policies	84	37	12
Disasters and civil effects	377	159	101
Total references to wheat price increases	761	337	163
Total number of articles on wheat prices	1,238	585	288

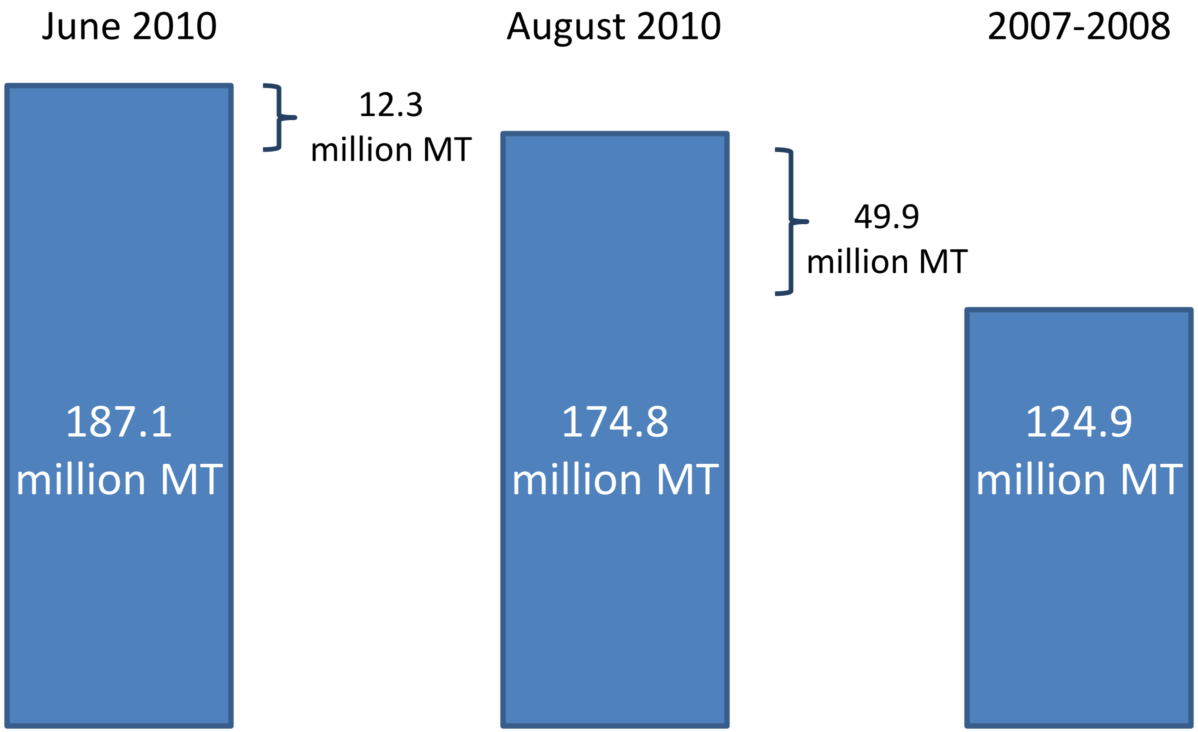
Why?

CBOT wheat prices



Why?

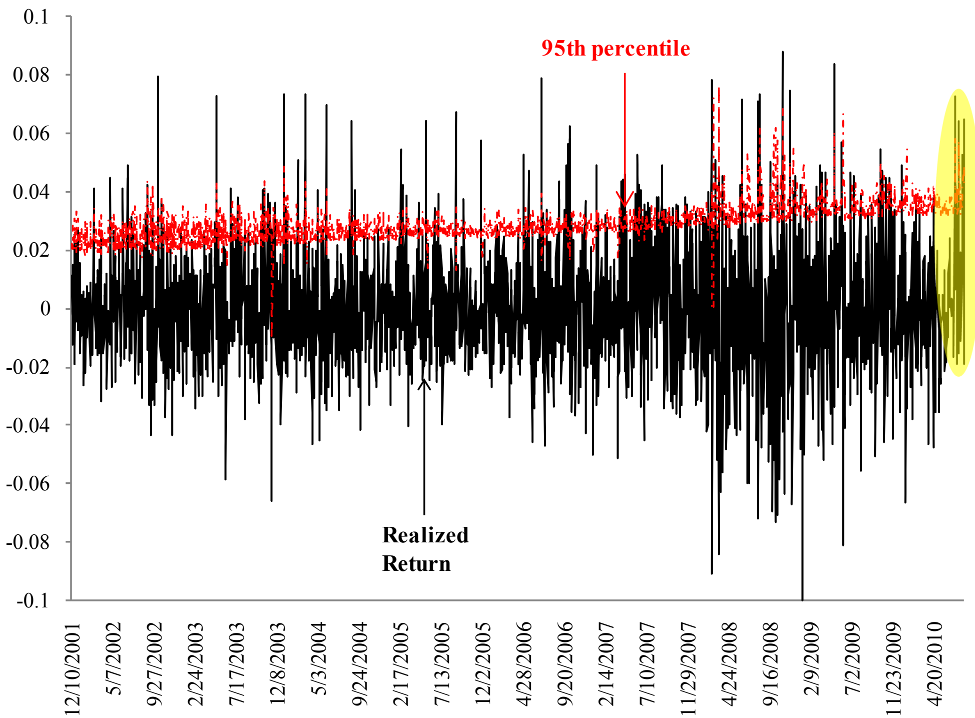
Global stocks of wheat



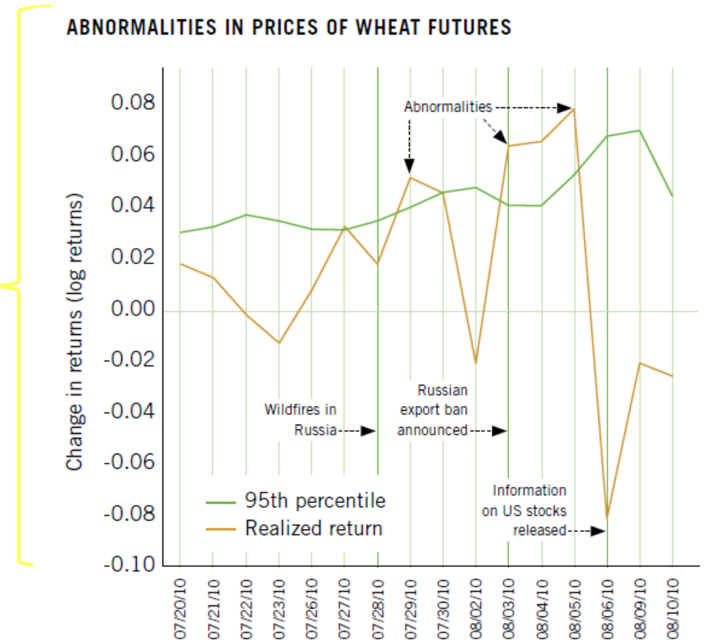
Source: World Agricultural Outlook Board (August 12, 2010).

Why?

CBOT wheat prices – IFPRI model to detect abnormal spikes



ABNORMALITIES IN PRICES OF WHEAT FUTURES



Source: Martins-Filho, Torero, and Yao (2010).
Note: An abnormality occurs when an observed return exceeds a certain preestablished threshold. This threshold is normally taken to be a high order (95 percent) quantile – that is, a value of return that is exceeded with low probability (5 percent).

Source, Martins-Filho, Torero, Yao (2010)

Why?

Previous studies

- The effect of information shocks on markets has a long history in economics

- The efficient market hypothesis in its simplest form purports that markets prices should 'fully' reflect available information, Fama (1970).

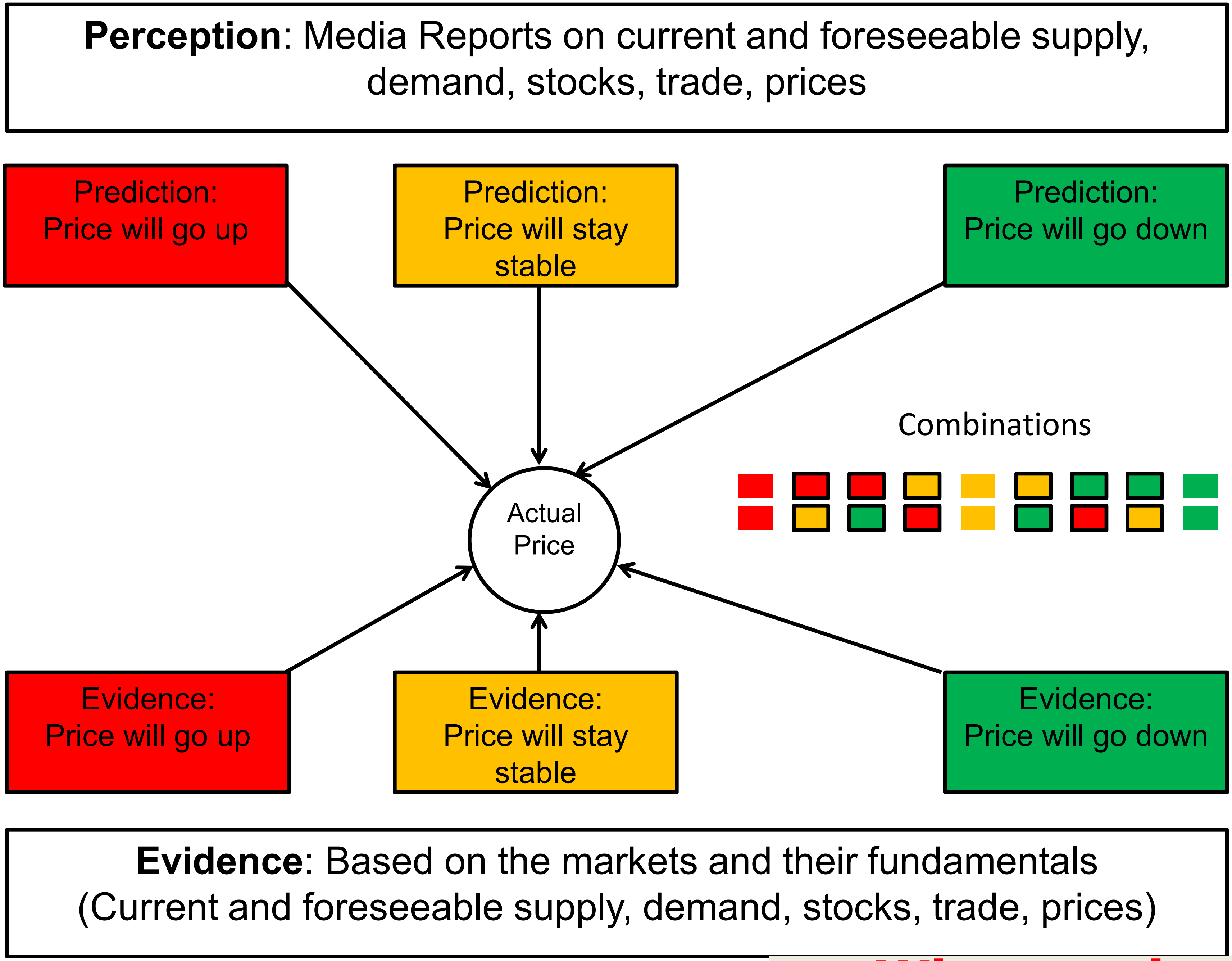
- **On the effects of news events of futures prices:**
  - Rucker et al. (2005) estimate the effect on lumber futures prices to help shed light on the volatility of lumber prices
  - Pruit(1987) studies the effects of the Chernobyl nuclear accident of the ag.
  - Carter and Smith (2007) estimate the effect of news concerning the contamination of the corn supply on the price of corn

- **On the effects of news on recalls and food safety on the prices of the products:**
  - McKenzie and Thomsen (2001), find that red meat recalls due to contamination, food safety information, negatively affects beef prices but that the transmission is not across all margins
  - Schlenker and Villas-Boas (2009) explore the effects of information on mad cow disease had on purchases and futures prices
  - Smith, van Ravenswaay and Thompson (1988) study the impact of contamination of milk on consumer demand

Previous studies

Outline

- Why?
- Previous studies
- What we do?
- How we do it
- Key results
- Conclusions


Perception: Media Reports on current and foreseeable supply, demand, stocks, trade, prices
Prediction: Price will go up
Prediction: Price will stay stable
Prediction: Price will go down
Combinations
Actual Price
Evidence: Price will go up
Evidence: Price will stay stable
Evidence: Price will go down
Evidence: Based on the markets and their fundamentals (Current and foreseeable supply, demand, stocks, trade, prices)

What we do

Our analytical approach

- Influence of media on price levels because this is what the poor consumers of these commodities will feel

- We proceeded to analyze the returns because the behavior of investors and speculators are conditional on them

- Finally look at effects on price volatility

What we do

Data

- **Prices:**
  - daily futures price data from the Chicago Board of Trade for futures of Maize, Soft, Soybean, Rice and Oil and from Kansas City Board of Trade for Hard Wheat.
  - We augment these price data with market variables such as the SP index, the daily exchange rates between the US dollar and the currencies of major participant countries in the agricultural commodity markets, for example Canada, Thailand, China, Australia, and The European Union.
- **Measures of media coverage:**
  - every day, we monitor a comprehensive set of RSS (Really Symple Syndication) feeds drawn from global media outlets via Google news. A total of 31 feeds related to global food prices and food security are monitored
  - Each media article is analyzed using linguistic and semantic object network-mapping algorithms to analyze the relationships between key terms found in each article.
  - On a daily basis, the system provides reports analyzing movement (increases-ups or decreases-downs) in commodities prices. These reports provide a count of the number of articles each day with "up" or "down" movements for each commodity by analyzing the text within the articles.
  - The period spans from the 3rd of August of 2009 to the 11th of June of 2012. In "market time" we obtain 707 periods (days) for a total of 4,242 observations

Empirical implementation

1. For Price levels:

$$p_{i,t} = \alpha_i + \theta p_{i,t-1} + \gamma^u UP_{it} + \gamma^d DOWN_{it} + \beta X_t + \varepsilon_{it}$$

$$p_{i,t} = \alpha_i + \theta p_{i,t-1} + \Sigma_{k=0}^{K} \{\gamma_k^u UP_{it} + \gamma_k^d DOWN_{it}\} + \beta X_t + \varepsilon_{it}$$

Where:
i=Hard Wheat, Maize, Oil, Rice, Soft Wheat, Soybeans
t= 1…T (1 is 08/03/2009 and T is 06/12/2012 in 'market time')
p_{it} is the log price level
α_i is a commodity specific intercept (fixed effect)
UP_{it} is the number of 'increase in price of *i* news for day *t*
$DOWN_{it}$ is the number of 'decrease in price' of *i* news for day *t*
X_t is a matrix of market variables at date t
ε_{it} is a random error term, which depending of the specification will have a different structure
K is the number of lags

We assume that the news variables are predetermined or sequentially exogenous, that is that $E[\varepsilon_{it}|\alpha_i, X_t, Up_{i,t-k}, Down_{i,t-k}] = 0 \; for \; k = 1 \ldots t$ which allow us to use moment restriction to obtain a GMM-IV estimator

How we do it

Empirical implementation

2. For Price returns:

$$r_{i,t} = \theta \Delta r_{i,t-1} + \gamma^u \Delta UP_{it} + \gamma^d \Delta DOWN_{it} + \beta \Delta X_t + \Delta \varepsilon_{it}$$

Alternative we use the following specification of the returns, which accounts for the possible persistent correlation for each commodity and exploits better the variation in the media coverage variables.

$$r_{it} = \alpha_i + \check{\gamma}^u UP_{it} + \check{\gamma}^d DOWN_{it} + \check{\beta} \Delta X_t + \check{\varepsilon}_{it}$$

We note that the $\check{\gamma}$ are different parameters than the γ parameters. These can be related by $\check{\gamma} \sim \frac{\gamma}{1-\theta}$. We cluster the standard errors by date and allow for auto-correlated (AR1) common disturbances and arbitrary heteroskedasticity, using a truncated kernel as recommended in Thompson (2009).

Empirical implementation

3. For Price volatility:

We estimate the following model (in addition to simple difference in variance tests); this is informed by the estimations in Ohlson and Penman (1985) and Dubofsky (1991):

$$e_{it}^2 = \rho e_{it-1}^2 + \Sigma_{k=0}^{K} \{\check{v}^u UP_{i,t-k} + \check{v}^d DOWN_{i,t-k}\} + \pi_{it}$$

where

$$e_{it} = p_{it} - \hat{\theta} p_{it-1} - \hat{\alpha}_i - \hat{\beta} \Delta X_t$$

How we do it

Results on Log Price levels

OLS and Fixed Effects Estimates	(1)	(2)	(3)	(4)
UPS in price news	0.018	0.015	0.0006	0.00045
	[0.0032]***	[0.0022]***	[0.00027]**	[0.00025]*
DOWSN in price news	-0.0037	-0.0087	-0.00079	-0.0008
	[0.0049]	[0.0028]***	[0.00045]*	[0.00040]**
L.price_ln			0.99	0.99
			[0.0028]***	[0.0032]***
Constant	7.06	6.73	0.046	0.081
	[0.010]***	[0.017]***	[0.020]**	[0.022]***
Commodity Effects	Yes	Yes	Yes	Yes
Market Controls	No	Yes	No	Yes
Observations	4242	4236	4236	4236

*HAC-SE (in brackets) and Statistics robust to both arbitrary heteroskedasticity and arbitrary common autocorrelation. Clustered on date. *<.10 **<.05 ***<.01*

Key results

Results on Price Returns with Difference instruments(DIV)

	(1)	(2)	(3)	(4)
UPS in price news	0.151	0.151	0.135	0.146
	[0.059]**	[0.059]**	[0.054]**	[0.071]**
DOWNS in price news	-0.091	-0.091	-0.173	-0.204
	[0.089]	[0.089]	[0.083]**	[0.100]**
Commodity Effects	No	Yes	Yes	Yes
Market Controls	No	No	Yes	Yes
Observations	4212	4212	4212	4212

Lags 1-5 included for UPS and Downs

SE (in brackets) and Statistics robust to both arbitrary heteroskedasticity

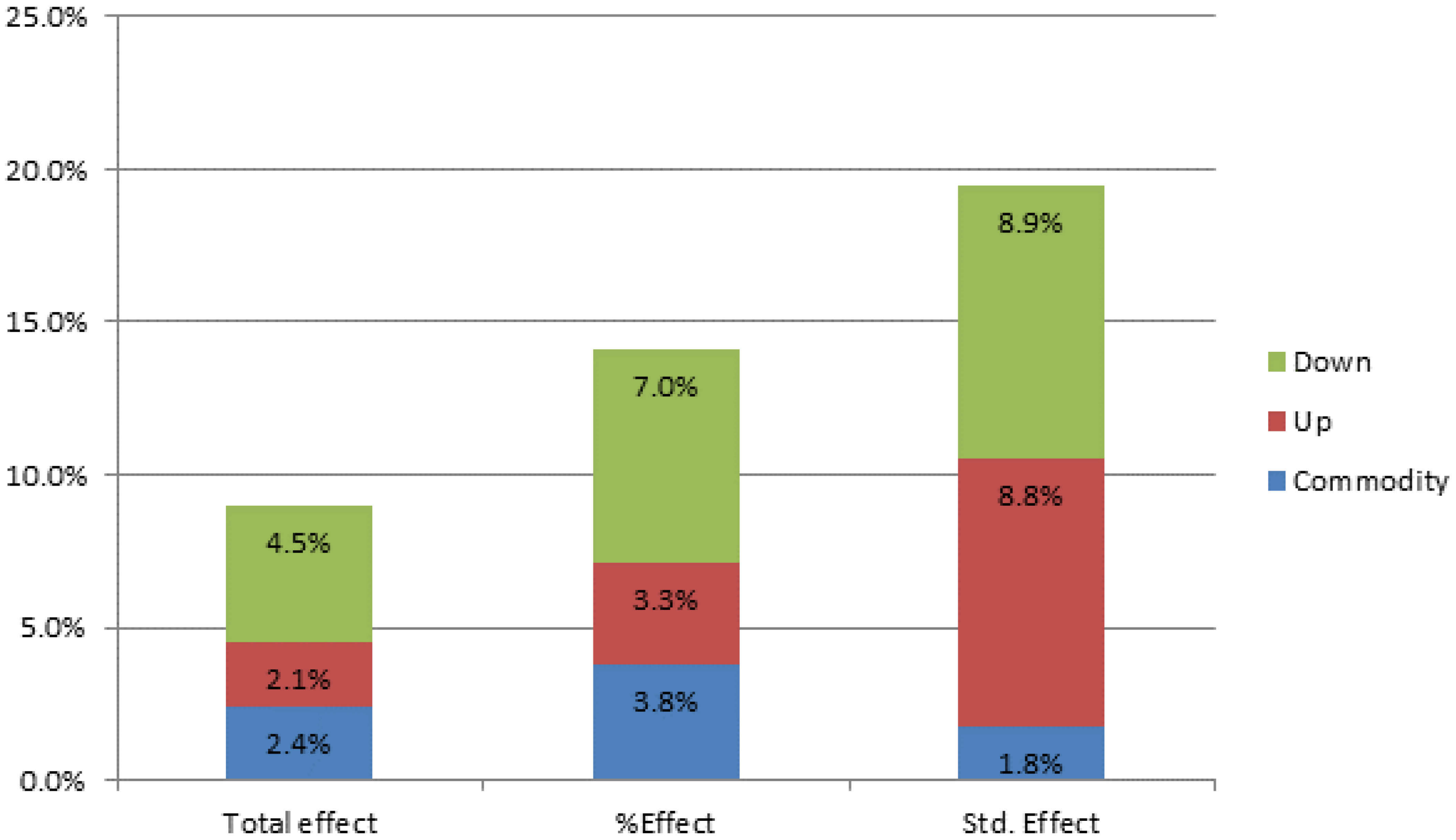
*and arbitrary common autocorrelation. Clustered on date. *<.10 **<.05 ***<.01*

The instruments are 5 lagged differences of media coverage for each commodity. In total there are 20

excluded instruments in the regressions.

Key results

Summarizing Effect Size of Media Influence



Key results

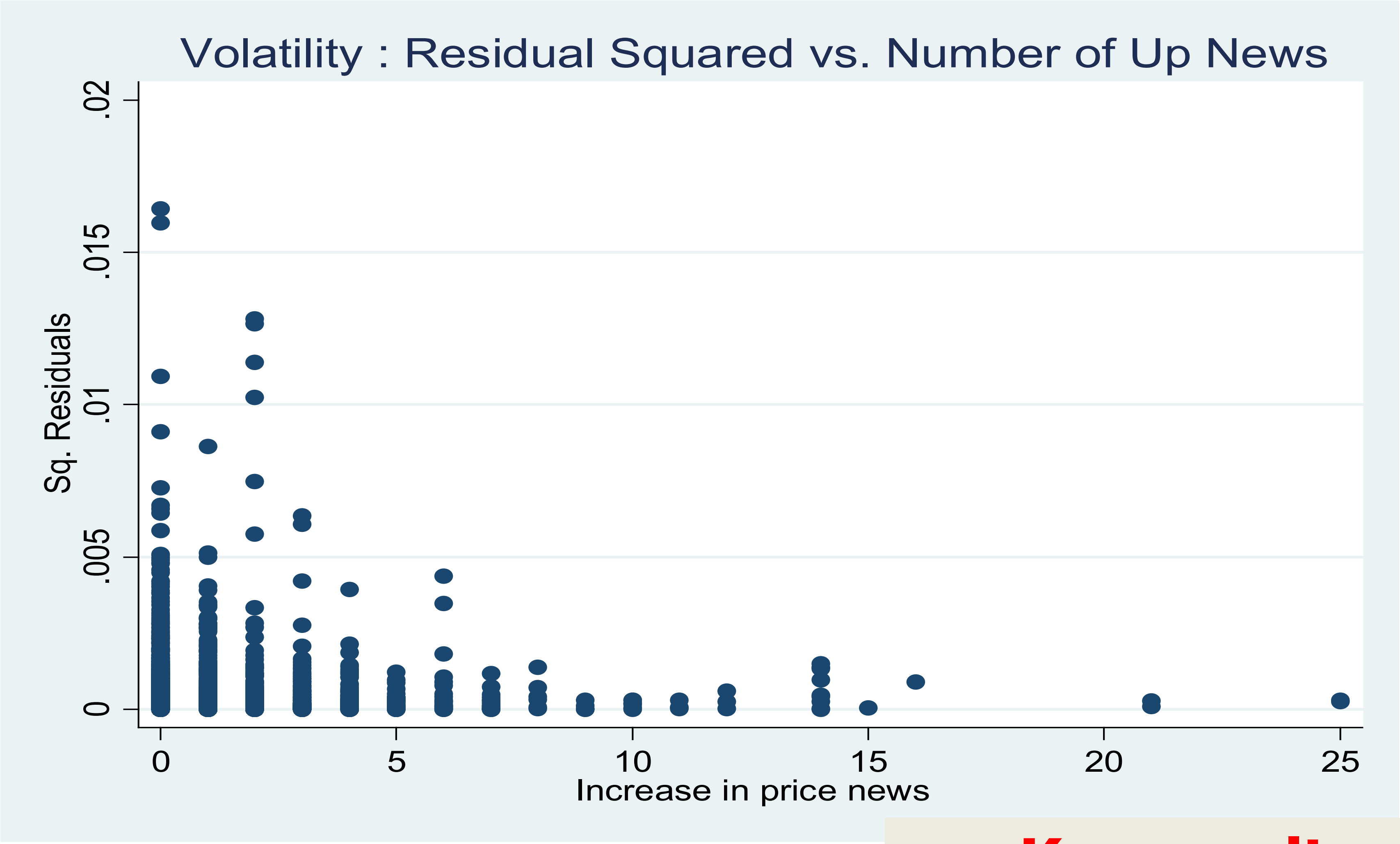
Results on Volatility

- We present a graphical analysis of the residuals, given that this simple test might not reflect the heterogeneity in volatility due to the intensity of media coverage (we don’t differentiate the intensity of media).

- We found that for days with fewer than 5 articles of up or down news, the residuals are very spread out in comparison to ones in day with more than 5 articles.

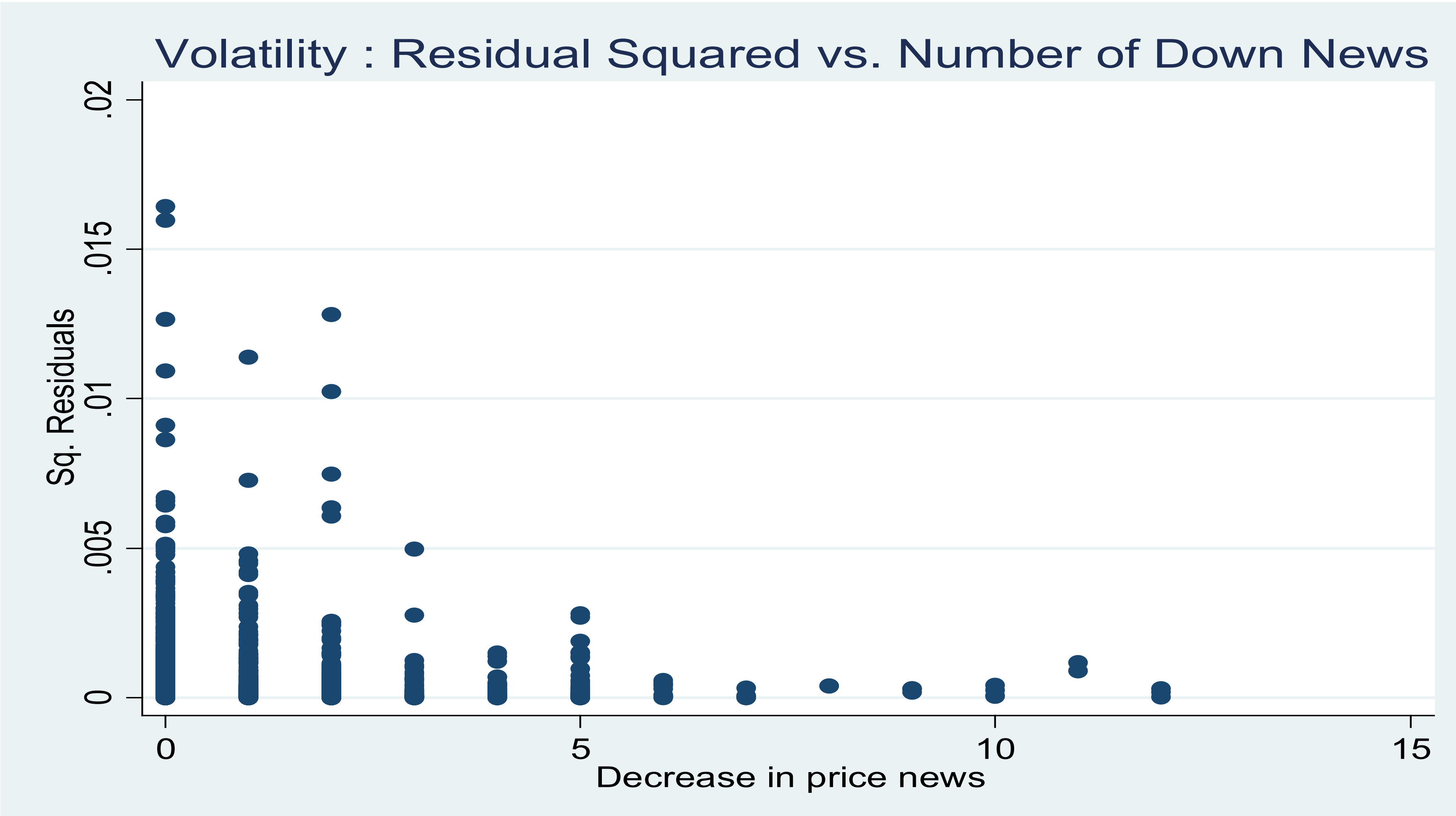
- This evidence points to lower volatility when media coverage is more intense.

Results on Volatility: : Squared Residual vs. Intensity of Media Coverage



Key results

Results on Volatility: : Squared Residual vs. Intensity of Media Coverage



Key results

Conclusions

- There are interesting correlations between the price dynamics and the media coverage intensity
- Increased media attention can exacerbate the increase in price (more than 8% of the change in prices)
- The variability of commodities return and prices tends to decrease as more attention is paid by the media to the situation in those commodities markets

Conclusions

Conclusions

- The major policy implication is the crucial role of providing appropriate information as fast as possible so media reacts in the correct direction

“In the real world, the right thing never happens in the right place and the right time. It is the job of journalists and historians to make it appear that it has”

Mark Twain

Conclusions