$25 Minneapolis Wheat Had to be a Bubble, Right?

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Speculation?

What Goldman Sachs should admit: it drives up the cost of food
As Goldman shareholders meet today, they should be hearing about the financial titan’s exploitative business practices.

Big Banks Made £2.2bn From Food Price Speculation

FOR IMMEDIATE RELEASE
461 Economists call for urgent action against excessive speculation on food commodities

UN food and agriculture agency warns about negative impact of food speculation
Policy Responses

• Dodd-Frank ACT → Authorizes CFTC to set position limits

• European Parliament → adopt amendments imposing position limits on commodity derivatives
Present Study

- Testing for bubbles in Minneapolis wheat futures markets
- Bubble testing procedures and modifications
- Data
- Testing results
- Conclusions and policy implications
Testing for Bubbles

- Structural model approach: model imperfection vs. bubbles?
- Time series procedure: not consistent when multiple bubbles
- Recent development: Peter Phillips

Peter C.B. Phillips
Yale University
No Bubbles: Random Walk

\[ P_t = \delta P_{t-1} + \epsilon_t, \text{ where } \epsilon_t \sim IID (0, 1) \text{ and } \delta = 1 \]
What Constitutes an Explosive Period?

\[ P_t = \delta P_{t-1} + \epsilon_t \text{ where } \epsilon_t \sim \text{IID } (0, 1) \text{ and } \delta > 1 \]

\[ \delta = 1.05 \]
Mixed Random Walk & Explosive Processes

How to determine when transitions occurred?
Phillips, Shi, and Yu (2012, PSY)

Right-tailed Augmented Dickey-Fuller (ADF) Test

\[ \Delta P_t = \alpha + \beta P_{t-1} + \sum_{i=1}^{k} \gamma_i \Delta P_{t-i} + \varepsilon_t \]

\[ H_0: \beta = 0 \quad \text{vs.} \quad H_1: \beta > 0 \]

\[ H_0: \delta = 1 \quad \text{vs.} \quad H_1: \delta > 1 \]
Phillips, Shi, and Yu (2012, PSY)

Forward recursive until $P_N$

Initial sample

Backward recursive until $P_1$

For every ending point $P_m$, run ADF test on $m-\tau + 1$ samples
Phillips, Shi, and Yu (2012, PSY)

- Date-stamping explosive periods: \textit{Sup ADF test}

\[ SADF_m = \sup(ADF_1, ADF_2, \ldots, ADF_{m-\tau+1}) \]

\[ \tilde{r}_{1s} = \inf_m \{ m : SADF_m > CV_m \} \] \hspace{1cm} \text{Start}

\[ \tilde{r}_{1e} = \inf_m \{ m : SADF_m < CV_m \} \] \hspace{1cm} \text{End}

- Need to last $h$ days to consider a bubble

- Critical values obtained from recursive wild bootstrap
Hard Red Spring Wheat in the US

- High protein: bread flour and high-gluten flours
- Primarily in the Northern Plains
- Accounts for 25% of US wheat production, exports to over 70 countries
- Mostly traded at Minneapolis Grain Exchange
- Price signals important to farmers, millers, elevators, consumers, policy-makers
There's no question there's been speculation.
Data

• Daily individual futures contract prices at close \( (F^T_{t1}, F^T_{t2}, \ldots) \)

\[
F^T_t = E_t(P_T | I_t)
\]

• March, May, July, September, December 2008 MGEX wheat futures contract

• 13 moth before contract expires
MN Wheat March 2008 Contract


Test Statistic

Price, left
SADF, right
CV95, right
Only 2 Days!

2/22/2008-2/26/2008

Price

Test Statistic

MN Wheat May 2008 Contract
MN Wheat September 2008 Contract

MN Wheat December 2008 Contract

Summary and Conclusions

- Bubbles do exist in MN wheat futures prices in 2007-2008


- Prices are still mostly driven by fundamentals

- Even during bubble periods, fundamentals may play a role
Possible Causes of Huge Volatility?

• Rising global demand for grain → consumption > production

• 2006 Drought in Australia → cut production in half

• US wheat inventories before the 2008 harvest lowest levels in 50 yrs

• World wheat inventories fallen to their lowest levels since 1982

• Traders hold rather different views during volatile periods → leading to bubbles (Singleton 2013, Scheinkman 2013)
Thanks!