Does speculation disturb food markets?

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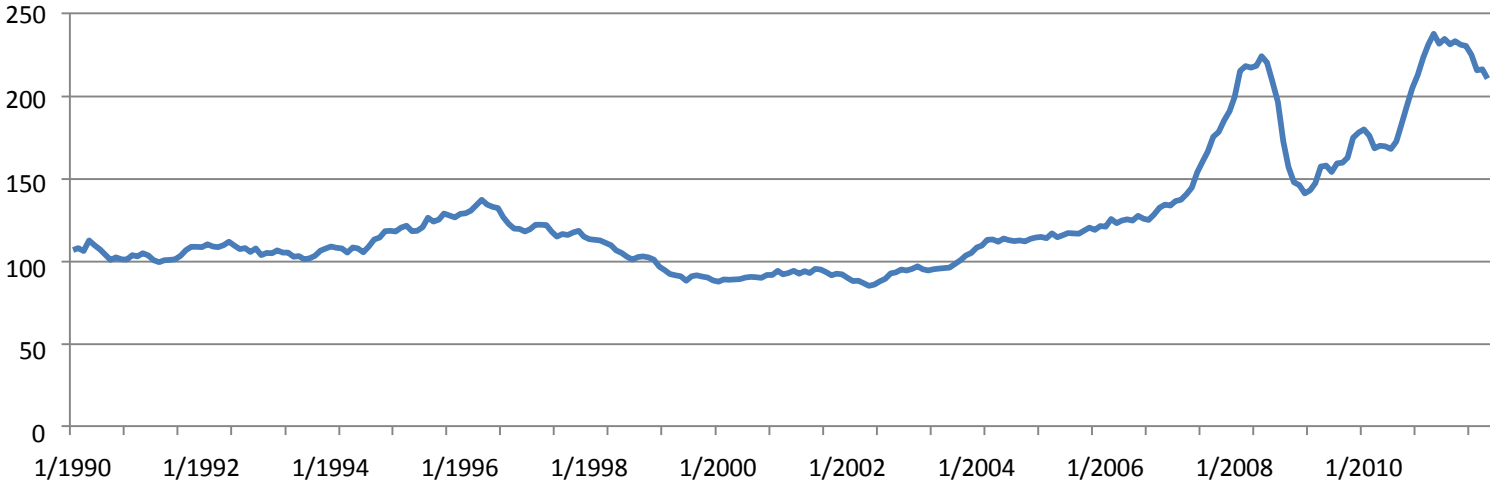
Introduction

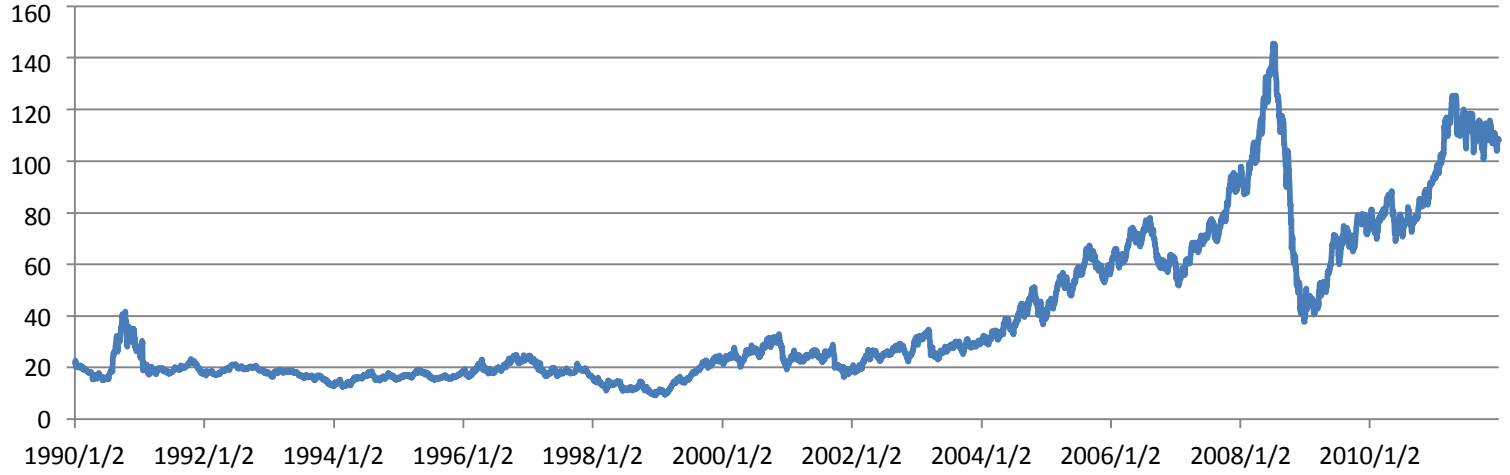
- Commodity prices increased significantly in late 2007. This included most basic foods: protein, maize, wheat, rice, and oilseeds.
- The increase in prices has been sustained, and has also been accompanied by increased price volatility.
- This results in both increased costs and increased price risk in food markets.

Food price index

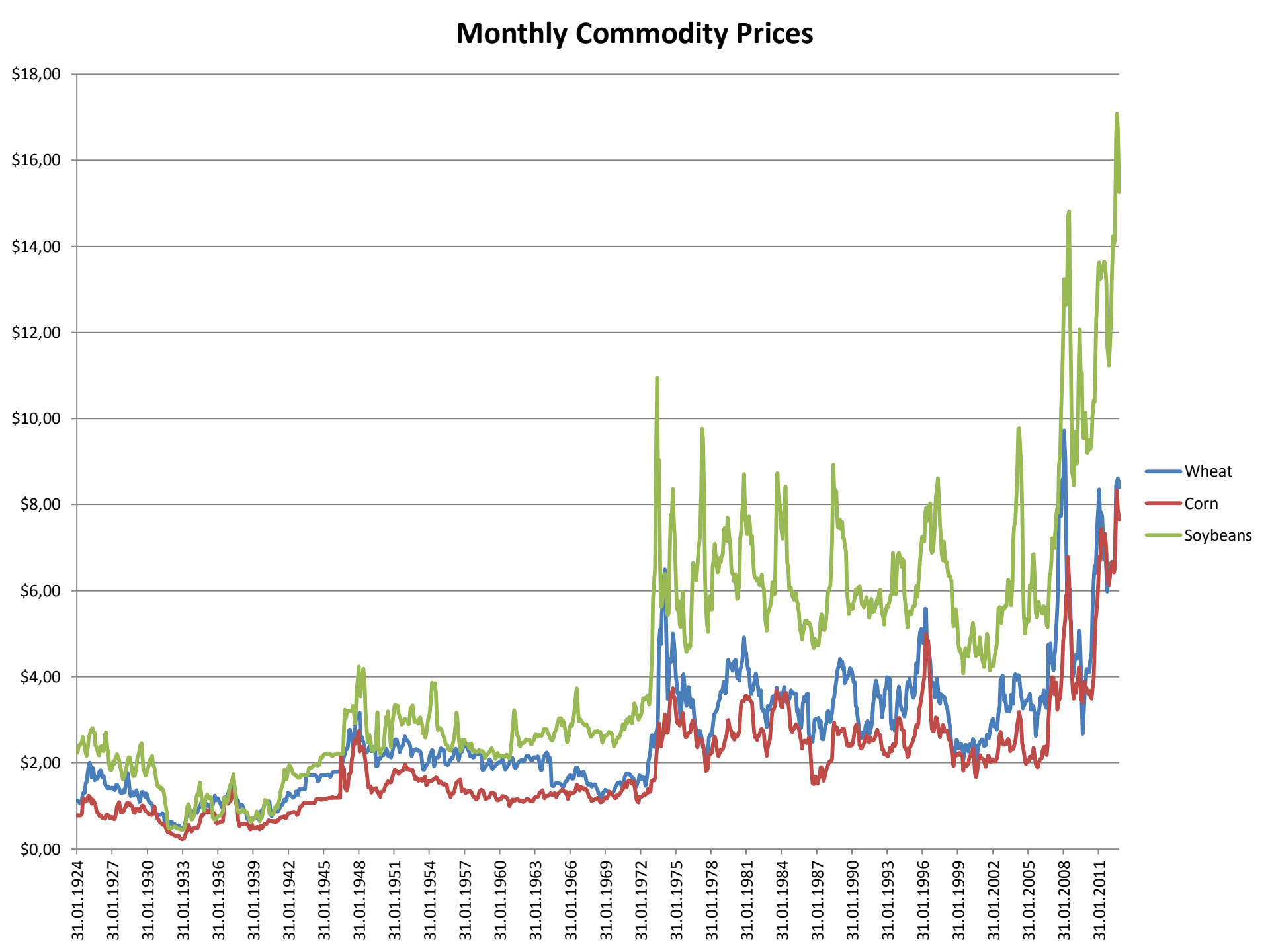


Data source: Food and Agriculture Organization of the United Nations (2002-2004=100)

Crude oil



Data source: Commodity Research Bureau

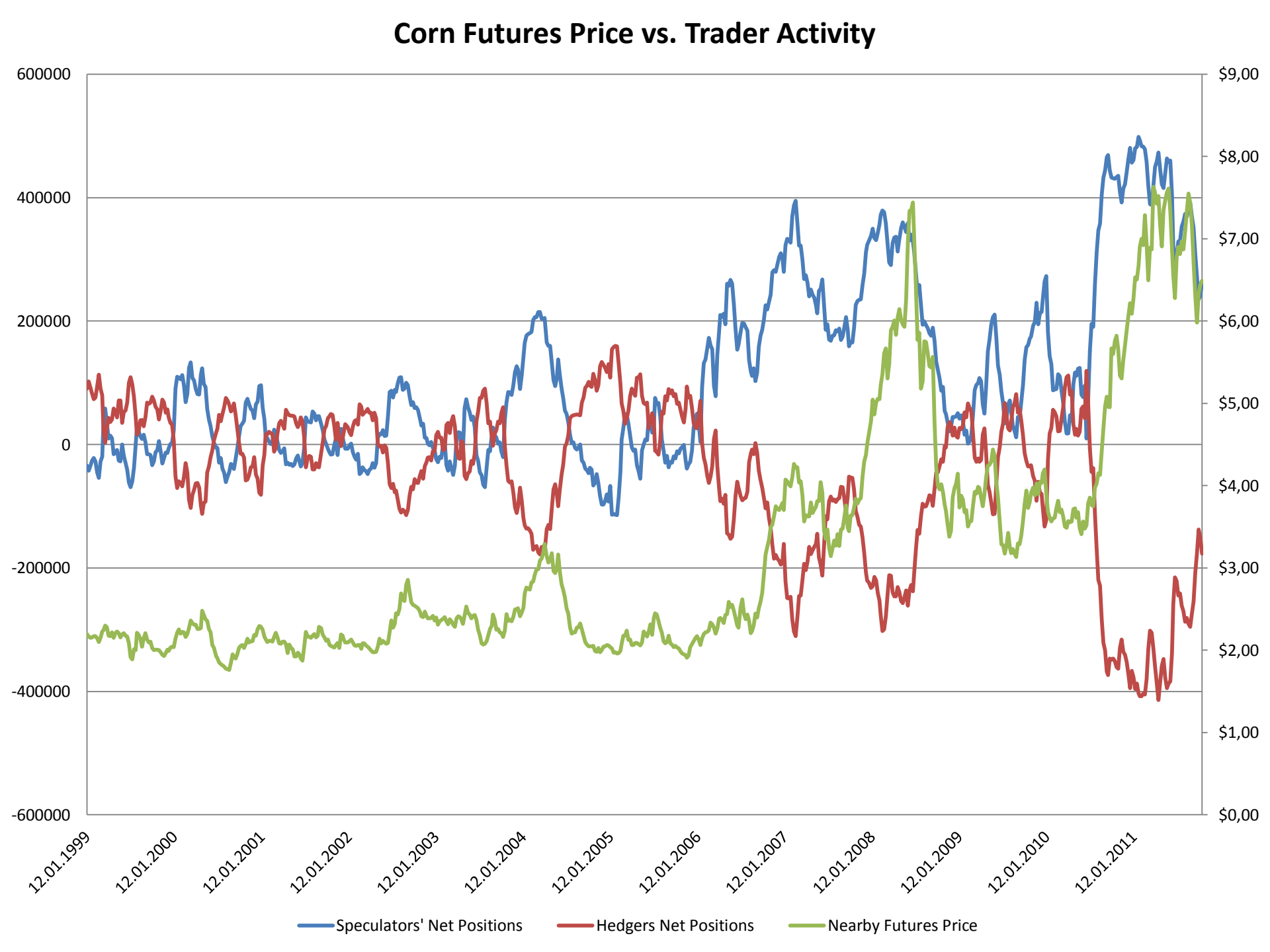

Monthly Commodity Prices
$18,00
$16,00
$14,00
$12,00
$10,00
$8,00
$6,00
$4,00
$2,00
$0,00
31.01.1924
31.01.1927
31.01.1930
31.01.1933
31.01.1936
31.01.1939
31.01.1942
31.01.1945
31.01.1948
31.01.1951
31.01.1954
31.01.1957
31.01.1960
31.01.1963
31.01.1966
31.01.1969
31.01.1972
31.01.1975
31.01.1978
31.01.1981
31.01.1984
31.01.1987
31.01.1990
31.01.1993
31.01.1996
31.01.1999
31.01.2002
31.01.2005
31.01.2008
31.01.2011
Wheat
Corn
Soybeans

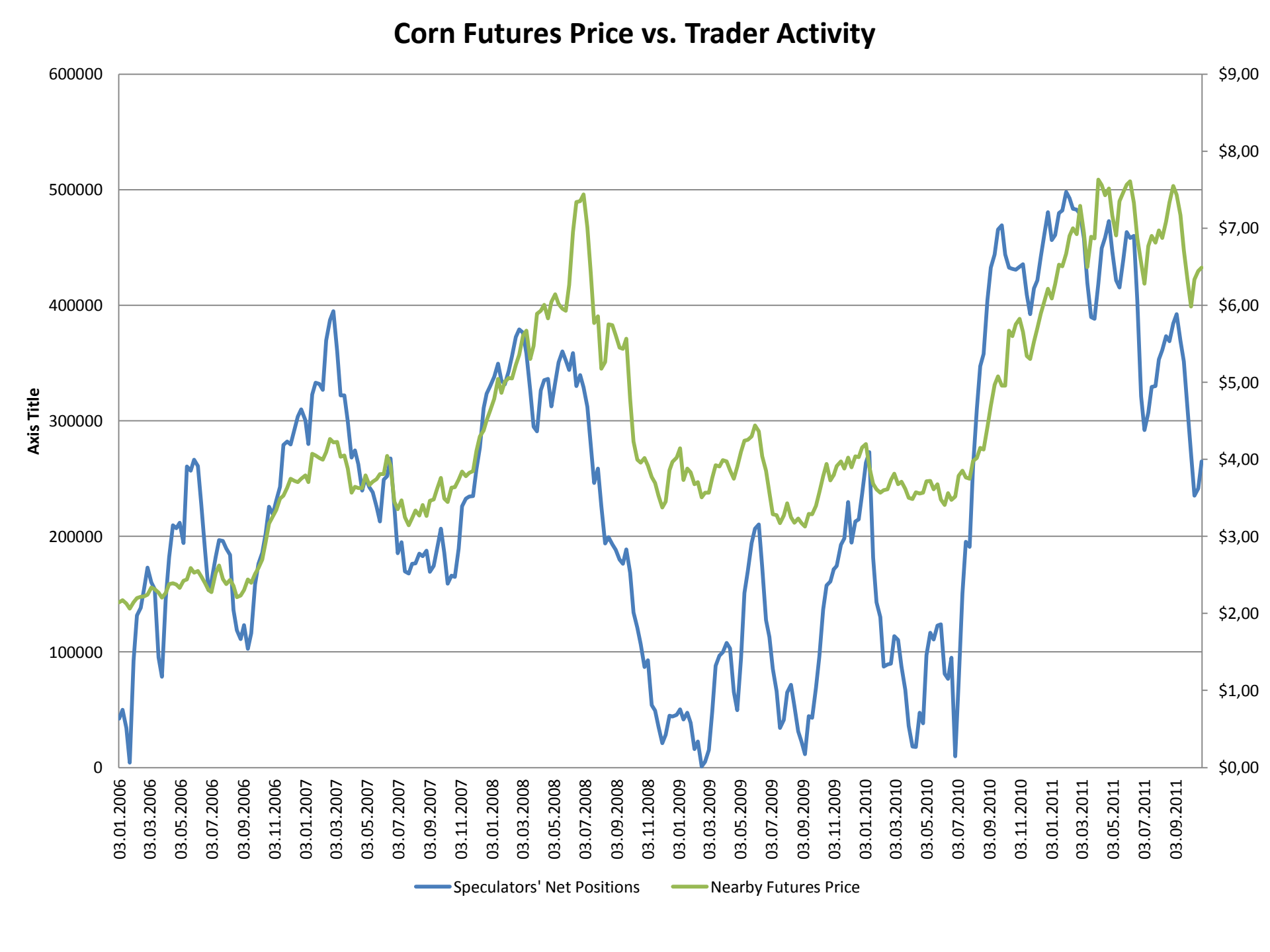
Background

- The number of speculative positions in food and feed crop derivatives also increased and reached historically high levels in 2007 (Masters 2008).

Price and Volatility Perceptions

Speculative activity in the derivative (especially futures) markets has resulted in increased prices, increased price volatility, and inefficient price discovery.


Corn Futures Price vs. Trader Activity
600000
400000
200000
0
-200000
-400000
-600000
$9,00
$8,00
$7,00
$6,00
$5,00
$4,00
$3,00
$2,00
$1,00
$0,00
12.01.1999
12.01.2000
12.01.2001
12.01.2002
12.01.2003
12.01.2004
12.01.2005
12.01.2006
12.01.2007
12.01.2008
12.01.2009
12.01.2010
12.01.2011
Speculators' Net Positions
Hedgers Net Positions
Nearby Futures Price


Corn Futures Price vs. Trader Activity
Axis Title
600000
500000
400000
300000
200000
100000
0
$9,00
$8,00
$7,00
$6,00
$5,00
$4,00
$3,00
$2,00
$1,00
$0,00
03.01.2006
03.03.2006
03.05.2006
03.07.2006
03.09.2006
03.11.2006
03.01.2007
03.03.2007
03.05.2007
03.07.2007
03.09.2007
03.11.2007
03.01.2008
03.03.2008
03.05.2008
03.07.2008
03.09.2008
03.11.2008
03.01.2009
03.03.2009
03.05.2009
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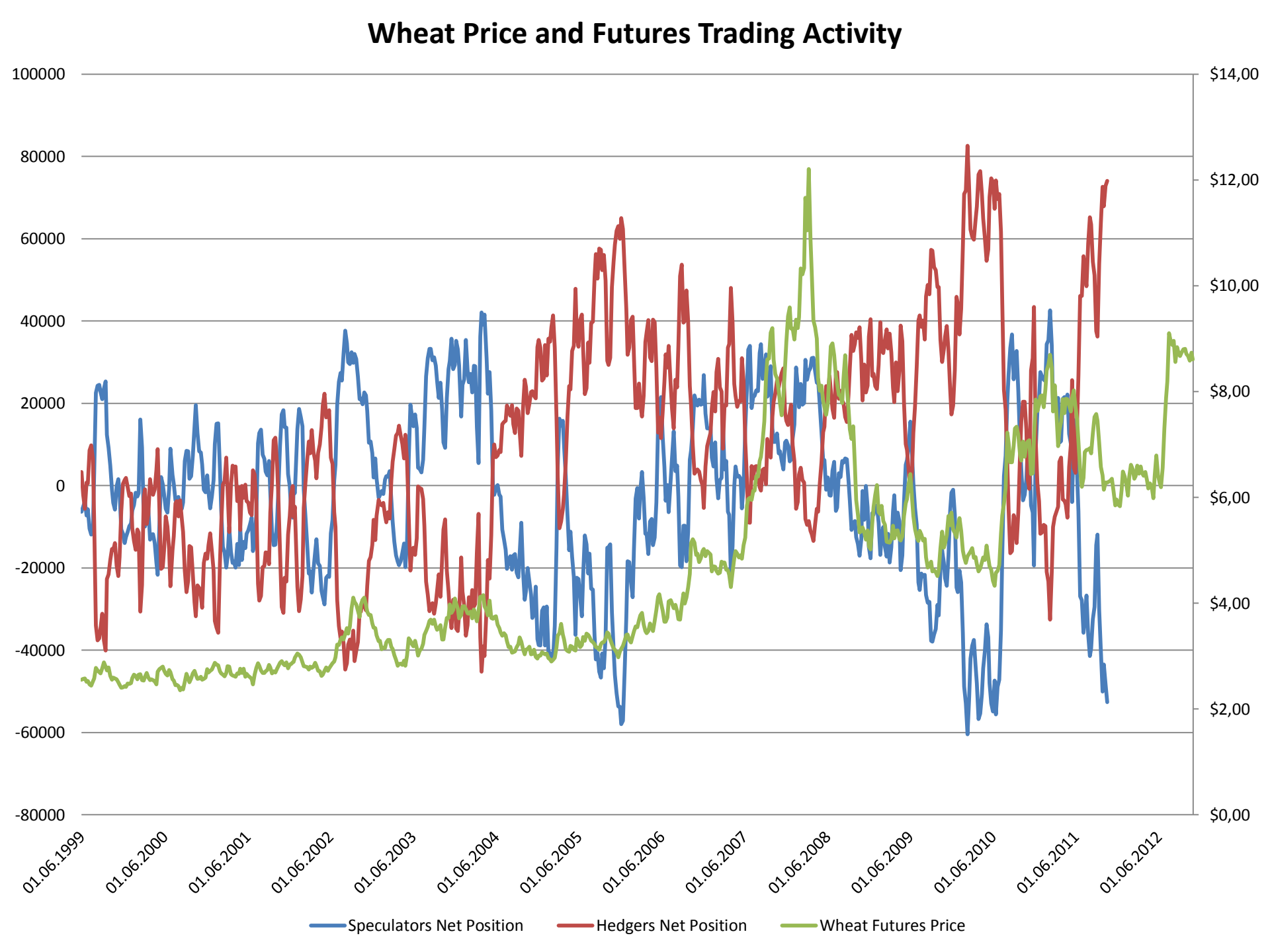
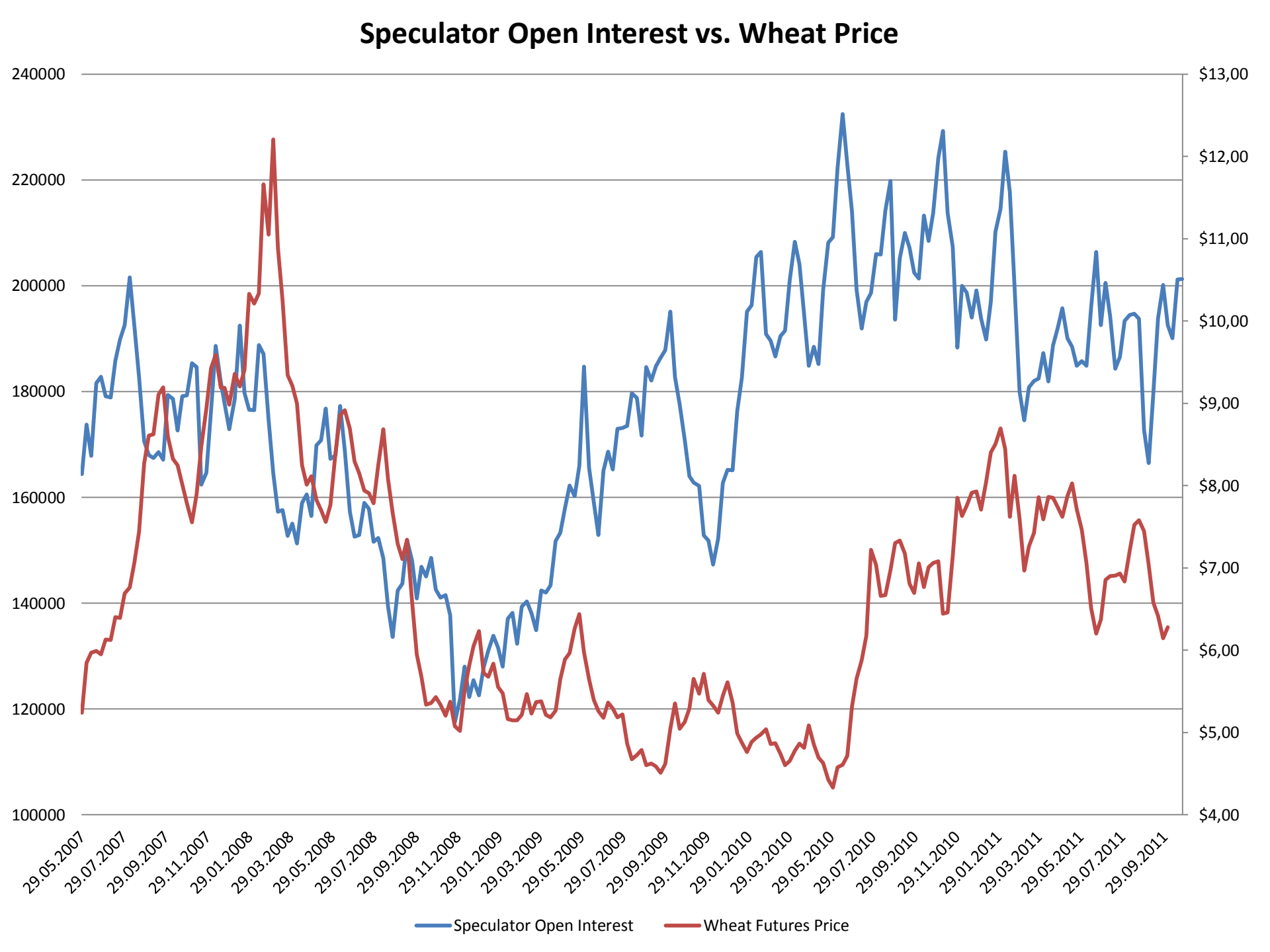
03.09.2009
03.11.2009
03.01.2010
03.03.2010
03.05.2010
03.07.2010
03.09.2010
03.11.2010
03.01.2011
03.03.2011
03.05.2011
03.07.2011
03.09.2011
Speculators' Net Positions
Nearby Futures Price


Wheat Price and Futures Trading Activity
100000
80000
60000
40000
20000
0
-20000
-40000
-60000
-80000
$14,00
$12,00
$10,00
$8,00
$6,00
$4,00
$2,00
$0,00
01.06.1999
01.06.2000
01.06.2001
01.06.2002
01.06.2003
01.06.2004
01.06.2005
01.06.2006
01.06.2007
01.06.2008
01.06.2009
01.06.2010
01.06.2011
01.06.2012
Speculators Net Position
Hedgers Net Position
Wheat Futures Price


Speculator Open Interest vs. Wheat Price
240000
220000
200000
180000
160000
140000
120000
100000
$13,00
$12,00
$11,00
$10,00
$9,00
$8,00
$7,00
$6,00
$5,00
$4,00
29.05.2007
29.07.2007
29.09.2007
29.11.2007
29.01.2008
29.03.2008
29.05.2008
29.07.2008
29.09.2008
29.11.2008
29.01.2009
29.03.2009
29.05.2009
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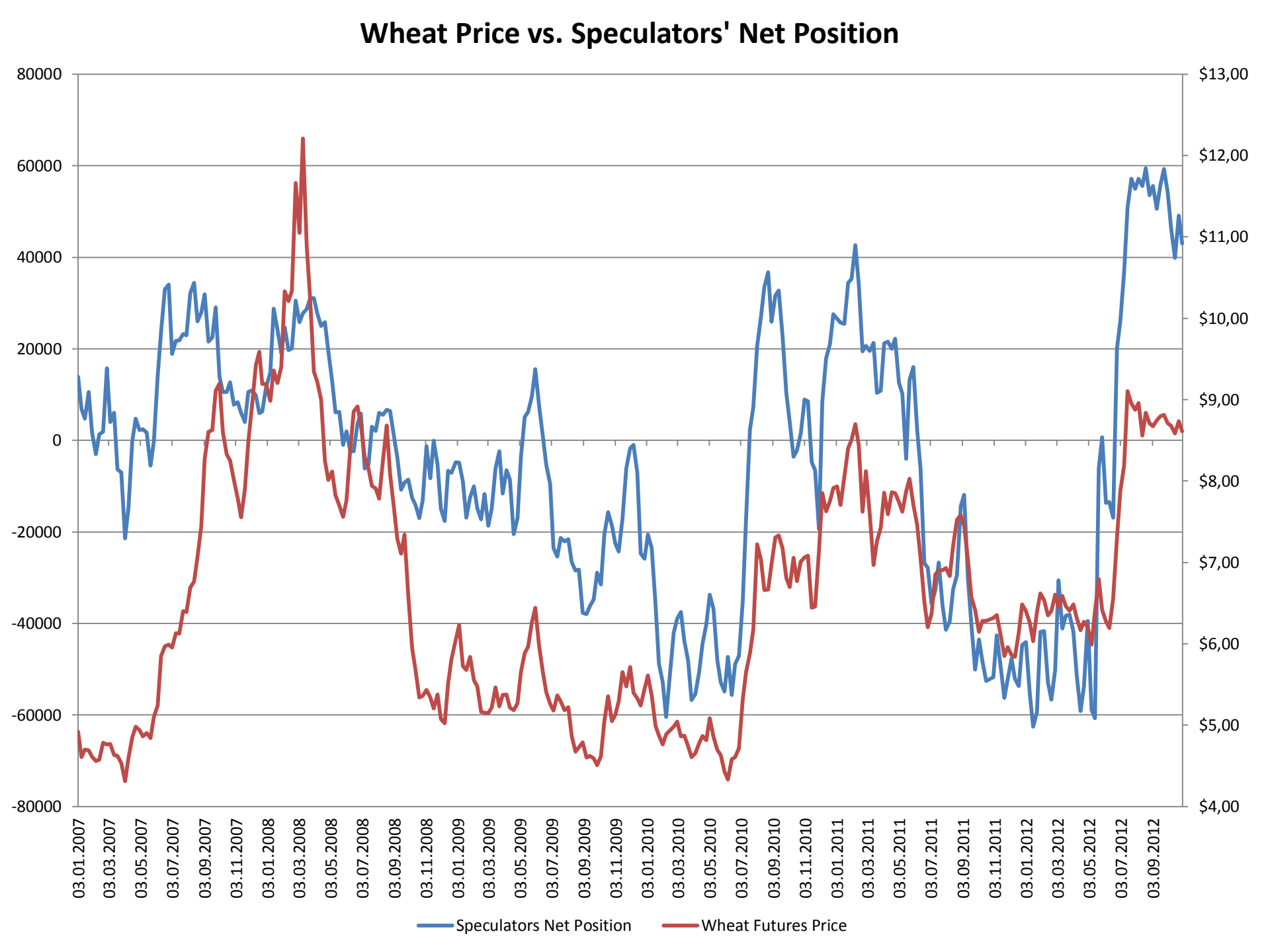
29.03.2010
29.05.2010
29.07.2010
29.09.2010
29.11.2010
29.01.2011
29.03.2011
29.05.2011
29.07.2011
29.09.2011
Speculator Open Interest
Wheat Futures Price


Wheat Price vs. Speculators' Net Position
80000
60000
40000
20000
0
-20000
-40000
-60000
-80000
$13,00
$12,00
$11,00
$10,00
$9,00
$8,00
$7,00
$6,00
$5,00
$4,00
03.01.2007
03.03.2007
03.05.2007
03.07.2007
03.09.2007
03.11.2007
03.01.2008
03.03.2008
03.05.2008
03.07.2008
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03.11.2008
03.01.2009
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03.11.2010
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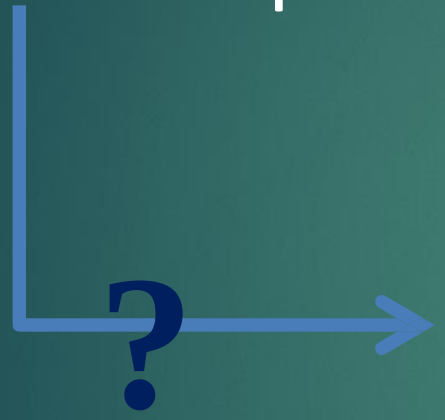
03.03.2011
03.05.2011
03.07.2011
03.09.2011
03.11.2011
03.01.2012
03.03.2012
03.05.2012
03.07.2012
03.09.2012
Speculators Net Position
Wheat Futures Price

Question

Increase of speculative positions



Increase in price

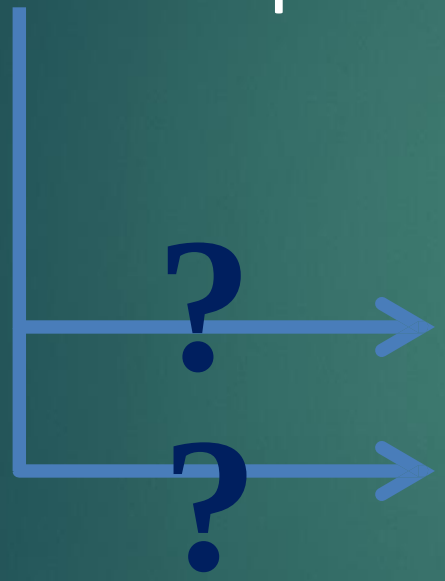
Published and/or Public Statements

- YES: Masters (2008, 2010); Singleton (2012).

- NO: Brunetti and Büyükşahin (2009); Büyükşahin and Harris (2011); Sanders and Irwin (2011); Hamilton and Wu (2012); Irwin and Sanders (2012).

Question

Increase of speculative positions



Increase in price

Increase in price volatility

Published and/or Public Statements

- Witherspoon: Theoretically possible (1993)
- Fortenbery and Zapata: Maybe – need to more rigorously test (2004)
- Brunetti and Büyükşahin (2009); Bozic and Fortenbery (2010); Brunetti and Büyükşahin et al. (2011); Sanders and Irwin (2011), Li and Fortenbery (2013,2014)

Previous Work Focused on Derivative Markets

- The most vulnerable producers and consumers have no position in derivatives, and many have no access even if they wanted to take a position.

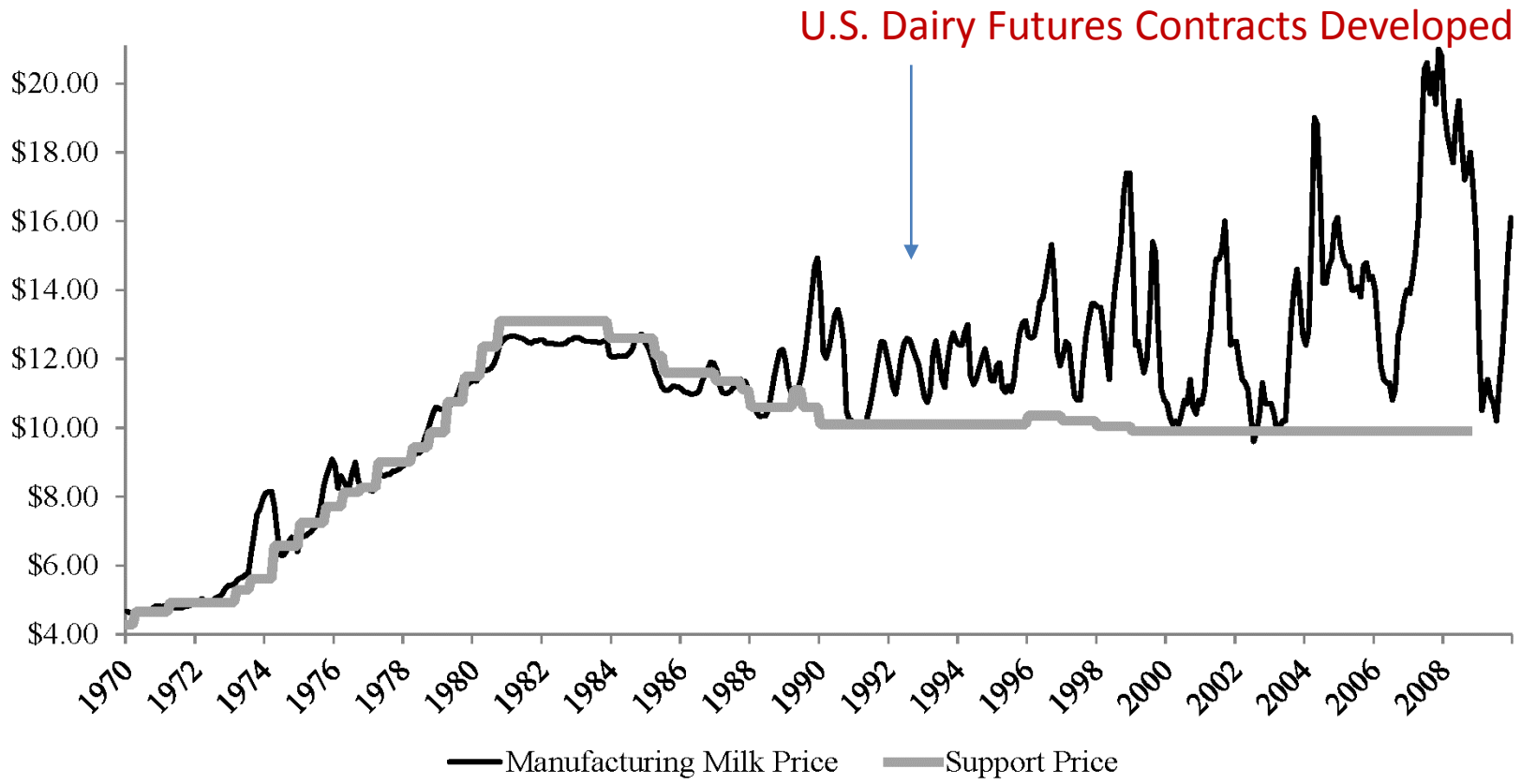
- Thus, the critical question is whether speculators first bring instability to derivative markets, and then cash markets experience volatility spillover from derivatives.

Bozic and Fortenbery (2010 – 2012)

- If futures market speculation destabilizes cash prices, it may be most apparent in thin markets.

- In thin markets prices may be sensitive to very small changes in market volume/open interest.

U.S. Cash Milk Prices

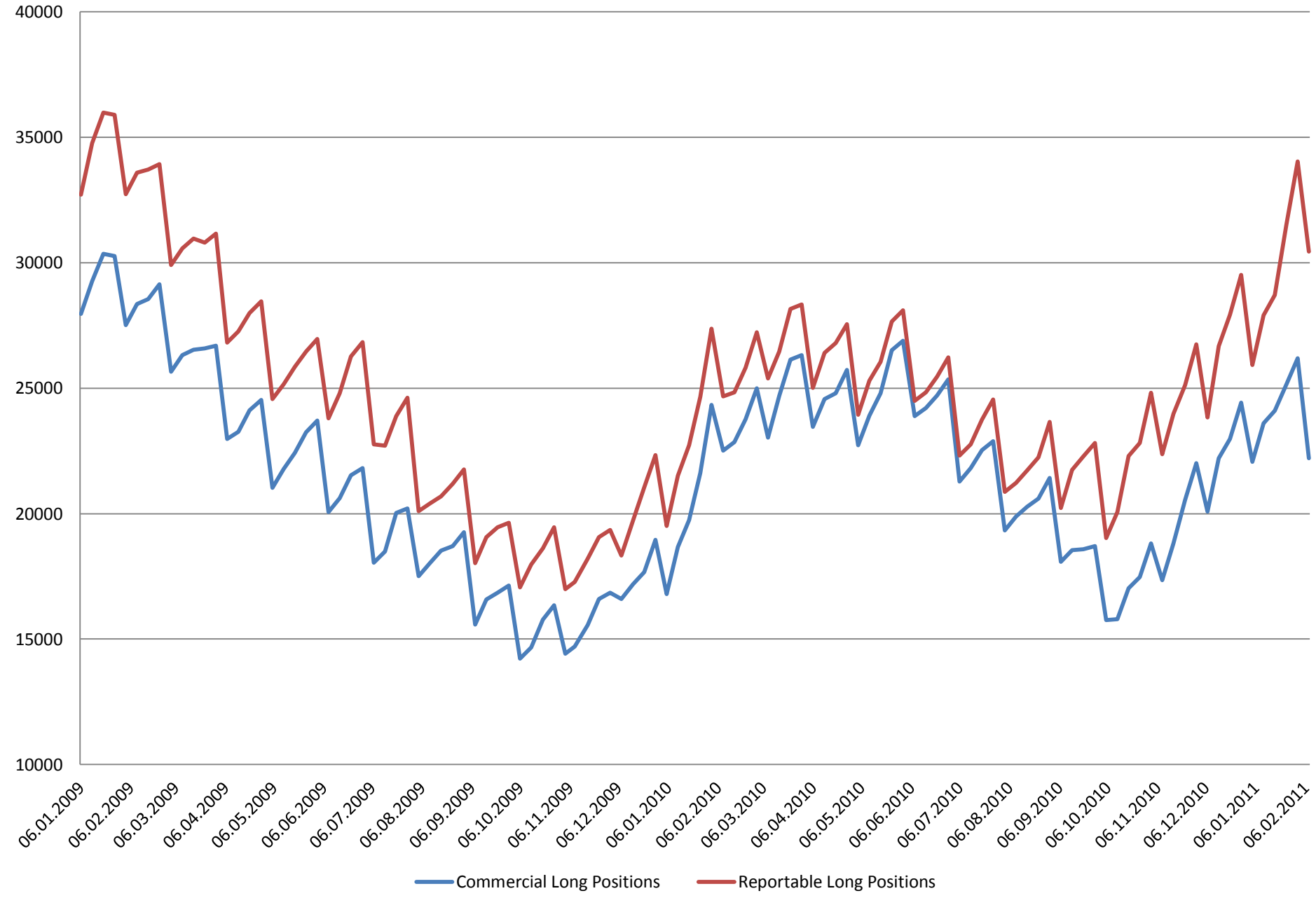


Purpose

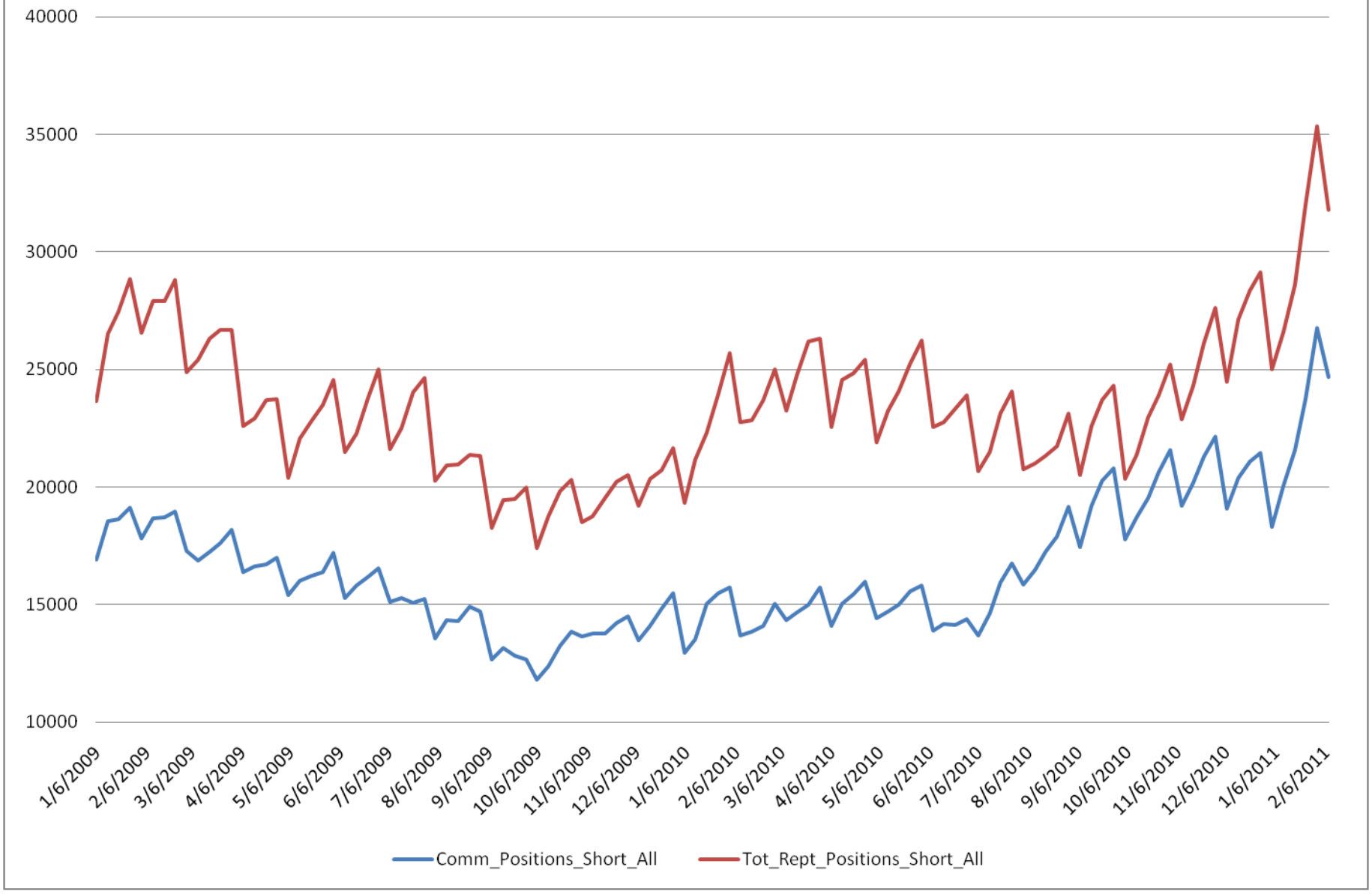
- Developed in response to commercial interests related to hedging milk prices.

- Change in government price support meant that market prices were above support, and volatility increased since government floors were no longer binding.

Milk Open Interest - Long



Milk Open Interest - Short



Working's T

Hedging Net Long:

$$T = \frac{S_L + 2H_L}{H_S + H_L} = 1 + \frac{S_S}{H_S + H_L}$$

Hedging Net Short:

$$T = 1 + \frac{S_L}{H_S + H_L}$$

Evaluating Adequacy of Speculation in the Milk Futures Market

Variations on Working's T

	Avg.	Min	Max
Proportional	1.03	1.00	1.08
Upper bound	1.16	1.06	1.29
Lower bound	1.02	1.00	1.09
Industry	1.03	1.00	1.11
Dynamic	1.10	1.00	1.26
Proportional (S)	1.12	1.03	1.22
Dynamic (S)	1.21	1.03	1.41
Upper bound (S)	1.28	1.12	1.45
Lower bound (S)	1.12	1.03	1.23

Presentation to the CFTC - 2011

- Futures for dairy markets suffer from inadequate speculation. This is confirmed by applying the theoretical work of Holbrook Working to this market.
- There is bi-directional causality in price variance between cash and futures markets for dairy, thus speculative volatility does de-stabilize cash markets. However, increased levels of futures speculation would likely have a stabilizing effect.
- Futures cannot solve cash market problems.
- Markets are unique – there is no "one size fits all" policy/market intersections.

What about a "BIG" Market? The case of wheat

- Li and Fortenbery – 2013 - 2014

Approach

- Are futures and cash prices cointegrated?
  - Cointegration test
- Is there volatility spillover between the two prices?
  - Volatility spillover test
- Does the increase in speculative positions cause the increase in futures price volatility?

Data

- Cointegration test and volatility spillover test: daily futures and cash prices from Jan 1st 1990 to Jan 23rd 2012.
  - Weekly speculative positions data from the first week of 2007 to the last week of 2011.
  - Weekly futures price volatility from the first week of 2007 to the last week of 2011 are constructed using the daily futures prices over this period.

Several Different Tests

- Price volatility: weekly variance; weekly realized volatility; absolute weekly return; weekly trading range.
- Speculative position: total non-commercial open interests; percentage of non- commercial total open interests relative to total market open interests; Non-commercial net-long open interests.

Conclusions for Wheat

- Futures and cash prices are cointegrated.
- There is bi-directional volatility spillover between futures and cash prices.
- There is strong evidence suggesting that increases in speculative positions contribute to decreased futures price volatility, and thus cash price volatility.

Policy Implications

- Fundamentals still matter:
  - Land Use
  - Asian Demand
  - Alternatives Uses
  - Production Expectations/Realizations
- Most of the authors arguing in favor of speculative destabilization are confusing correlation with causation, and relying heavily on anecdotal evidence.
- Policies that are responding to those type studies will not be successful in regulating away volatility.
- Evidence of this already exists.