

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

by

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Commodity prices increased rapidly after 2006, punctuated by large price spikes in 2007-2008 and again in 2010-2011. Given the magnitude of these increases, the consequences can be devastating to consumers in less-developed countries. The World Bank (2008) estimates that the cost in 2008 associated with high food and fuel prices to consumers in developing countries was about \$680 billion, pushing over 130 million people into extreme poverty and increasing by 44 percent the number of children suffering permanent cognitive and physical injury due to malnutrition. Other studies indicate that food commodity price increases led to a significant deterioration of democratic institutions and increased political unrest, particularly in low-income countries (Arezki and Bruckner 2011, Bellemare 2011).

Effective policy responses to the rising and volatile commodity prices require a careful assessment of the underlying causes. An acrimonious and world-wide debate has ensued about the nature and cause of the price spikes. Much attention has been directed towards the trading activities of a new type of participant in agricultural futures markets—financial index investors. A common assertion (e.g., Masters, 2008 2009) is that unprecedented buying pressure from index investors created a series of massive bubbles in commodity futures prices. However, a number of recent studies fail to find a direct empirical link between index trading and agricultural futures price movements, casting doubt on the view that index trading distorted pricing in these markets (see Irwin and Sanders (2011) for a review of these studies).

The failure to find a link between the positions of a particular group of traders (index investors) and agricultural futures prices does not necessarily rule out the presence of bubble components in prices, particularly during the spikes that have been of such concern to policy-makers. To remedy this, a new strand of literature directly test the existence of bubble components in agricultural futures (Gilbert, 2010; Gutierrez, 2012; Etienne, Irwin, and Garcia, 2014). These studies utilize new bubble tests developed by Phillips, Wu, and Yu (2011) and Phillips, Shi and Yu (2012) and show that under a rational speculative bubble framework it is possible to detect and date-stamp financial bubbles by testing whether prices

deviate away from a random walk and become mildly explosive. While finding mixed results, bubbles identified in these studies in general appear to be rather small and often only short-lived. For instance, Etienne, Irwin, and Garcia (2014) report that prices were driven by bubbles for about 2% of the time during 1970-2011, and prices during bubble episodes may have been on average over- or under-valued by at most 1%.

Though findings in these previous studies are informative, none of them attempt to account for bubbles in the Minneapolis wheat futures market. In particular, there is one dramatic episode requiring closer scrutiny that has yet to receive attention in the literature. As figure 1 shows, the daily nearby close prices of Minneapolis wheat dramatically increased from around \$5.00/bushel in May 2007 to \$24.00/bushel in February 2008, a nearly 500% increase in less than nine months. On February 25, 2008, the March 2008 Minneapolis wheat futures contract traded at \$25.00/bushel, the highest-ever price for any U.S. wheat contract. In fact, the price increase in February 2008 alone was over 70%. However, these high prices proved to be only short-lived. Starting from the beginning of March 2008, the price of Minneapolis wheat has experienced several huge drops, first plummeting 30% to \$16.90/bushel in one week, then dropping another \$7.00/bushel two months later, closing at around \$10.00/bushel in May 2008. Such a dramatic price change over such a short time period has all the hallmarks of a classic bubble, at least on the surface. Indeed, Kendell Keith, president of the National Grain and Feed Association, argues that “there's no question there's been speculation.”¹

The purpose of this work is to empirically test for bubbles in Minneapolis wheat futures prices, with a particular focus on the enormous price spike between February and March, 2008. As the world's principal hard red wheat market, price signals and market behavior at the Minneapolis Grain Exchanges (MGEX) are not only of great concern to farmers, millers, elevators, and consumers, but also to policy-makers who wish to stabilize domestic cereal prices. Given its economic significance and the dramatic price behavior during 2007-2008, there is a clear need in the literature to examine bubble patterns in

¹ See http://www.foreignpolicy.com/articles/2011/04/27/how_goldman_sachs_created_the_food_crisis

Minneapolis wheat market. To shed light on the causes of the dramatic volatility in Minneapolis wheat market during 2004-2013, we follow Etienne, Irwin, and Garcia (2014) and use a revised version of the recently developed bubble testing procedure developed by Phillips, Shi, and Yu (PSY, 2012). The PSY procedure is based on forward and backward recursive right-tailed Augmented Dickey-Fuller (ADF) test to detect and date-stamp mildly explosive periods (or “bubbles”), and is more powerful than previously bubble testing procedures because it can consistently detect the existence of multiple explosive periods. To account for potential small sample bias and conditional heteroskedasticity, inferences are derived from the recursive wild bootstrap procedure as discussed in Gonçalves and Kilian (2004). Preliminary testing results suggest that bubbles may have played a role in Minneapolis wheat market, but only for a very short time period. This conclusion holds even for the period of 2007-2008 when Minneapolis wheat prices experienced record-high volatility. In addition, we find significant evidence of negative bubbles, which appear when prices decrease over a consistent period of time.

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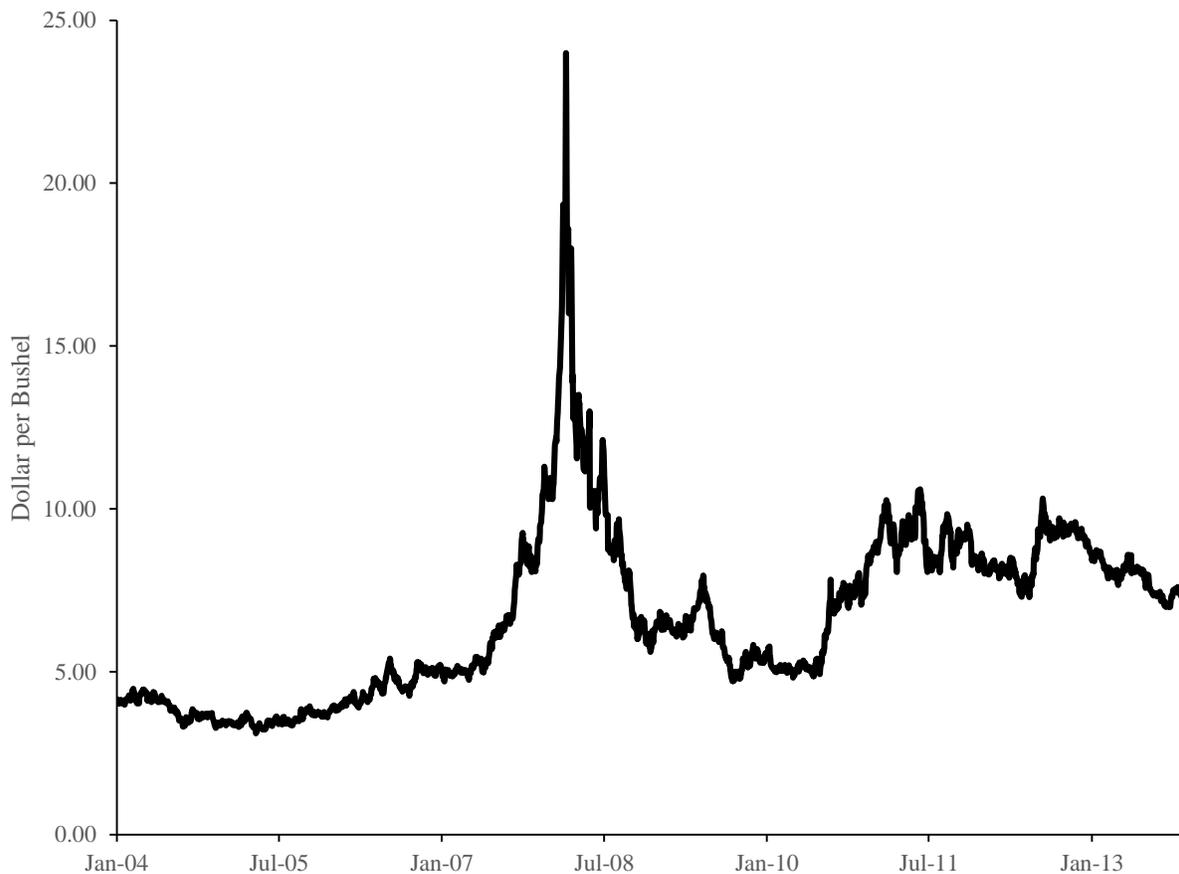


Figure 1. Daily Nearby Close Prices of Minneapolis Wheat Futures Contract, 2004-2013