Futures Markets Regulation

Scott H. Irwin

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Executive Summary

Commodity futures markets provide both price discovery and risk management opportunities for agricultural producers and agribusiness managers. A global uproar about speculation in commodity futures markets ensued after the spike in food commodity prices during 2007–08. The rapid increase in prices coincided with emerging large-scale participation by a new type of speculator in commodity futures markets: financial index investors. Some market participants, regulators, and civic organizations argued that the inflow into new commodity index investments was the principal driver of the spike in agricultural and energy prices. This policy debate focused on more restrictive speculation position limits in commodity futures markets. The issue has been more or less settled with the preponderance of evidence indicating that commodity index trading was at most a minor player in recent price spikes.

At the same time as food commodity prices were spiking, a massive episode of convergence failures in grain futures markets occurred. It turns out that fixing this problem is relatively simple—storage rates that are part of contract designs were simply set too low for market conditions. Once contract rules were altered to raise storage rates, the worst of the problems largely disappeared. Recent and more moderate non-convergence problems suggest that the issue needs continued monitoring and that further increases in storage rates may be necessary.

The transition from a telephone and open outcry trading platform to computer and electronic order matching platform in the past decade is arguably the biggest structural change in futures markets since they began more than 150 years ago. This is raising issues that could not even be imagined in the old pit trading system. Since the issues with electronic trading are relatively new, there is limited academic or government research that can be used to assess these concerns. This will undoubtedly be a major area of research and regulatory attention in coming years.
Commodity futures markets provide both price discovery and risk management opportunities for agricultural producers and agribusiness managers. It is not an overstatement to say that these markets are the central nervous system for much of the agricultural sector. Modern commodity futures (and options) markets provide key financial and risk management services to agricultural producers and agribusinesses. For example, these markets are often used to develop forward contract prices for producers even if the latter do not directly participate in such markets. In addition, commodity futures markets are often used to establish settlement prices and, by extension, indemnity values for many crop insurance contracts. The US Commodity Futures Trading Commission (CFTC) is the primary regulatory agency for these markets.

The regulation of commodity futures and options markets has received considerable scrutiny in recent years, spurred on by the spike in food commodity prices during 2007–08 and several structural changes in the markets. Most notably, corn, soybean, and wheat futures prices all set new nominal price records in 2007–08. It is important to recognize that the history of agricultural futures markets is inexorably bound up with the cycles of agricultural prices. Periods of historically low prices (e.g., 1930s and mid-1980s) and high prices (e.g., late 1940s, mid-1970s, and mid-2000s) have led to public outcries about agricultural futures markets. In what can be considered an anti-speculation cycle (Figure 1), producers have attacked the legitimacy of futures markets when prices are low, and consumers have done so when prices are high.

Whichever situation dominates, the blame for undesirable price levels is not infrequently attributed to manipulation by speculators in futures markets. These complaints have led to attempts to regulate speculative trading in US agricultural futures markets through restrictive position limits, greater margin requirements, and even an outright ban on trading (onions). A discussion of the most salient regulatory issues in recent years follows.
Position Limits

Given the historical cycle between price levels and speculation concerns, it is not surprising that a global uproar about speculation ensued after the spike in food commodity prices during 2007–08. The rapid increase in prices coincided with emerging large-scale participation by a new type of speculator in commodity futures markets: financial index investors. These investors desire long-only exposure to an index of commodity prices for portfolio diversification, inflation hedging, and return enhancement. Concerns emerged in 2007–08 among other market participants, regulators, and civic organizations that the inflow into new commodity index investments was the principal driver of the spike in agricultural and energy prices. This notion is most commonly associated with hedge fund manager Michael Masters and is often referred to as the “Masters Hypothesis.”

The Masters Hypothesis essentially argues that unprecedented buying pressure from index investors created massive bubbles in commodity futures prices. In turn, these bubbles were transmitted to spot prices through arbitrage linkages between futures and spot prices. The end result was that commodity prices—spot and futures prices—exceeded fundamental values by substantial margins, perhaps by as much as 80 percent. Masters used colorful language to draw attention to the issue, labeling index investors the “accidental Hunt brothers,” drawing a parallel with the Hunt brothers’ famous attempt to corner the silver market in 1979–80.

If the Masters Hypothesis were indeed true, this would raise major questions about the efficiency of price discovery in agricultural futures markets and the usefulness of these markets for managing risk. Some policymakers were quick to adopt Masters-like arguments after the 2007–08 price spikes and pushed for regulations to limit commodity index activity and restrict speculation. Proposals ran the gamut from taxing transactions in commodity futures markets in order to cut down on speculation to creating a “virtual reserve” whereby a public agency would take futures positions opposite speculators to limit the harmful effects on market prices. It was not uncommon during this period to link concerns about speculation to world hunger, food crises, and civil unrest.

In the US, the 2010 Dodd-Frank Wall Street Reform and Consumer Protection Act (Dodd-Frank) was the first major piece of legislation in response to the speculation controversy, and it laid the groundwork for more restrictive speculative limits on commodity futures positions. The US has had a system of regulating the size of speculative positions in agricultural futures markets since the 1936 Commodity Exchange Act (CEA) passed. These limits had never been extended to nonagricultural commodity futures markets when these markets were launched, and, in some cases such as crude oil, they grew enormously. The Dodd-Frank Act directed the CFTC to develop speculative position limits for all futures markets for physical commodities.

The CFTC’s first attempt at position limit rules for all commodity futures markets under Dodd-Frank was passed after a highly contentious and public debate in October 2011. The rule was quickly challenged by futures industry groups and then vacated in September 2012 by US District Court Judge Robert Wilkins on grounds that the CFTC did not establish the necessity of the limits as required by the CEA. “Necessity” in this context refers to the original language in the CEA that grants the CFTC the ability to fix position limits that are necessary to prevent excessive speculation “causing sudden or unreasonable fluctuations or unwarranted changes in the price of [a] commodity.”¹ The CFTC skirted this issue in the proposed rulemaking, claiming that Dodd-Frank requires them to implement the new rules irrespective of the necessary conditions in the original CEA. Judge Wilkins disagreed and indicated that the necessity finding was in fact required.²

The CFTC both appealed the Court decision and simultaneously formulated new position limit rules in 2013. While the CFTC ultimately dropped the Court appeal, it approved the new and revised position limit rules in November 2013. The CFTC subsequently extended or reopened the comment period numerous times to provide industry participants ample opportunity to weigh in on the controversial rulemaking.
In 2015, the CFTC formed the Energy and Environmental Markets Advisory Committee (EEMAC) to review empirical evidence on speculation and commodity price movements and to make recommendations regarding positions limits. The EEMAC voted overwhelmingly (8–1) to recommend that the CFTC not finalize the proposed position limit rule, relying largely on the fact that the proposed rule fails the necessity finding the CEA requires due to the lack of empirical evidence. Finally, in December 2016 the CFTC re-proposed its position limits for derivatives but delayed formal consideration of the rulemaking until the Trump administration was in place. As of this writing, no further action has taken place on the December 2016 proposal.

The CFTC does not have an easy task in establishing the necessity described in the CEA and required by the US District Court. An economist’s interpretation of excessive speculation as outlined in the CEA represents a relatively high hurdle. First, the speculation must be causing the price fluctuations. Second, the price changes must be sudden, unreasonable, or unwarranted. This definition of excessive speculation seemingly excludes speculation that does not cause price changes and thereby implies a possible temporal ordering. Likewise, the CEA description precludes speculation that warrants price changes—that is, informed speculation.

Fortunately, a large number of studies have been published in the past decade to assist the CFTC in making a necessity determination for expanding position limits to all commodity futures markets. These studies have played an important part in the public debate and the regulatory process. Most of the academic studies fail to find evidence directly tying commodity index funds to agricultural futures price movements, which is obviously inconsistent with the Masters Hypothesis. The basic nature of the findings can be demonstrated graphically.

Before presenting the graphical results, it is helpful to briefly review the available data on index positions. The primary source of data on index positions is the CFTC, which began reporting in 2007 the positions held by commodity index traders (CITs) in 12 agricultural futures markets in the “Supplemental Commitment of Traders” (SCOT) report as a complement to the traditional “Commitments of Traders” (COT) report. The SCOT report is released each Friday in conjunction with the traditional COT report, and it shows the combined futures and options positions of CITs as of Tuesday’s market close. A significant limitation of the public CIT data is the lack of data before 2006. The CFTC collected additional data for selected grain futures markets over 2004–05 at the US Senate Permanent Subcommittee on Investigations’ request, and these data are used here to supplement the public data.

Figures 2–5 show the weekly net-long positions of CITs and weekly nearby futures prices for Chicago Board of Trade (CBOT) corn, CBOT soybeans, CBOT wheat, and Kansas City Board of Trade (KCBT) wheat from January 6, 2004, through July 1, 2014. Several interesting patterns are apparent. First, the rapid increase in CIT positions occurred from 2004 to 2006. Over this interval, long positions held by index traders quadrupled in corn and CBOT wheat, more than doubled in soybeans, and tripled in KCBT wheat. Clearly, the buildup in CIT positions generally was concentrated in the 2004–06 period, not the 2007–08 period associated with the alleged commodity bubble under the Masters Hypothesis. If CIT buying had a substantial market impact, it would have been most likely during 2004–06 when CIT market holdings increased dramatically. Second, in three of the four markets—corn, CBOT wheat, and KCBT wheat—CIT positions peaked long before the peak of prices during 2007–08. There is more of a parallel buildup in CIT positions and prices during 2007–08 in soybeans.

Correlation analysis provides a more formal perspective on the relationships in Figures 2–5. As an example, Figure 6 shows that there is a positive contemporaneous association between changes in net positions held by CITs and price changes (returns) in the soybean futures market. The simple correlation coefficient is a moderate 0.25, but the relationship is statistically significant at the 5 percent level. However, this contemporaneous analysis cannot distinguish between the increase in CIT positions and other correlated shifts in fundamentals. In other words, contemporaneous correlation does not imply causation.
Figure 2. Weekly CIT Net-Long Position and Nearby Price in the CBOT Corn Futures Market, January 6, 2004–July 1, 2014

Source: Commodity Futures Trading Commission.

Figure 3. Weekly CIT Net-Long Position and Nearby Price in the CBOT Soybean Futures Market, January 6, 2004–July 1, 2014

Source: Commodity Futures Trading Commission.
Figure 4. Weekly CIT Net-Long Position and Nearby Price in the CBOT Wheat Futures Market, January 6, 2004–July 1, 2014

![Graph showing weekly CIT net-long position and nearby price in the CBOT wheat futures market from January 6, 2004, to July 1, 2014.]

Source: Commodity Futures Trading Commission.

Figure 5. Weekly CIT Net-Long Position and Nearby Price in the KCBT Wheat Futures Market, January 6, 2004–July 1, 2014

![Graph showing weekly CIT net-long position and nearby price in the KCBT wheat futures market from January 6, 2004, to July 1, 2014.]

Source: Commodity Futures Trading Commission.
Figure 6. Contemporaneous Relationship Between Weekly Changes in CIT Net-Long Position and Nearby Returns in the CBOT Soybean Futures Market, January 13, 2004–July 1, 2014

\[ y = 0.0002x + 0.1146 \]
\[ R^2 = 0.0605 \]

Source: Author’s calculations.

Figure 7. Lagged Relationship Between Weekly Changes in CIT Net-Long Position and Nearby Returns in the CBOT Soybean Futures Market, January 13, 2004–July 1, 2014

\[ y = 3E-06x + 0.1571 \]
\[ R^2 = 7E-06 \]

Source: Author’s calculations.
A more rigorous test is to correlate the current weekly return with the change in CIT positions lagged by one week. Figure 7 shows that this relatively minor change in timing completely eliminates the contemporaneous relationship estimated in Figure 6. From the perspective of this more rigorous hurdle, there is no evidence that changes in CIT net-long positions lead to higher (or lower) market prices. Similar results are found for the other three agricultural futures markets.

Given the inconsistency of the timing between the period of most rapid buildup in commodity index positions and the spikes in agricultural futures prices, it should not be surprising that most studies fail to find a significant link between index positions and futures price changes. A few studies report evidence of a significant price impact of index positions in agricultural futures markets. However, when interpreting results from these studies, it is important to keep in mind the basic tenants of the Masters Hypothesis. Specifically, the Masters Hypothesis and related concerns about speculative impacts rests on the following assertions: (1) Long-only commodity index funds were directly responsible for driving commodity futures prices higher, (2) the deviations from fundamental value were economically large, and (3) the impact was pervasive across commodity futures markets. That is, empirical evidence should demonstrate a direct link between long-only commodity index positions and commodity futures prices that result in economically large deviations from fundamental value. The few empirical studies that claim to support the Masters Hypothesis tend to fall short on at least two if not all three of these criteria.

In sum, an overwhelming preponderance of evidence indicates commodity index investment was not a primary driver of the agricultural price spikes over the past decade. No smoking gun has been found regarding index investment causing massive bubbles. The evidence simply does not support a necessity finding regarding index trading and “sudden or unreasonable fluctuations or unwarranted changes in the price of [a] commodity.” It is hard to argue with the conclusion of Michael Cosgrove—a member of the EEMAC—who after reviewing the empirical evidence noted that “instead of being obvious, it is undetectable. If we claim that elephants were playing in the backyard then we would expect to see their footprints. The alleged excessive speculation, if it is taking place, is leaving no data footprints.”

The debate over position limits was long, costly, and, ultimately, unnecessary. In the words of Thomas Glauben, “The alarmism about financial speculation should be classified as a false alarm.” It is important to emphasize this does not mean that index investment in commodity futures markets did not have any impact. The rise of large-scale index investment may have had rational, non-bubble impacts in commodity futures markets, such as increasing market integration and reducing risk premiums. These types of market impacts typically come under the heading of “financialization” and may be permanent but relatively small over short time spans. This should not be confused with the large and irrational bubble impacts under the more policy-relevant Masters Hypothesis.

While the acrimonious debate about index investment has ultimately proved unnecessary, it has had the salutary effect of focusing attention on the position limits regime that has been in place for the agricultural futures markets since the 1930s. At the heart of the existing regulations is the definition of a *bona fide* hedger versus a speculative trader. Making this distinction has always been hard in practice, leading some to question whether it is possible to do so in any meaningful way. For example, Thomas Hieronymus made this argument after another round of legislative changes on the subject in the mid-1970s:

> The definition of hedging in the context of the CFTC Act is extraordinarily difficult, if not impossible. It assumes that “hedging” and “speculation” are at least different, if not opposite. They are not. All hedges are more or less speculative and all speculative positions are more or less hedged. There is not a simple solution to the problem of establishing a process for granting exceptions from speculative position and trading limits.

The controversy surrounding the CFTC’s proposal to change existing rules about aggregating
positions for hedgers as part of the recent position limit rulemakings nicely illustrates just how arcane and difficult the task of defining bona fide hedging positions has become. The problem has undoubtedly grown over time with the entry of new market participants such as hedge funds and index funds that blur the distinction between hedgers and speculators.

The timing seems ripe to reform the current position limit regime for agricultural futures markets. Allen Paul developed a proposal that still provides a useful starting point. Echoing Hieronymus, the foundation of his proposal is the impossibility of classifying trading into speculation and hedging:

Regulation of commodity markets should avoid, where possible, classifying trading into the categories of “speculating” and “hedging.” These terms represent only the polar positions of a large continuum. Most business uses of futures trading are combinations of speculative and hedging elements. Hence, classification of commitments into one or the other category often is arbitrary.\(^{10}\)

Paul emphasizes there is still a need for position limits, but the limits should be focused on preventing manipulation during the delivery period of contracts, when the greatest danger for artificiality of prices is present. He makes no distinction between hedgers and speculators with respect to manipulation in the delivery period. Historically, hedgers or commercials have been implicated in more delivery period manipulations than speculators. Paul’s proposal is as follows:

Larger holdings would be permitted early in the life of the contract and this amount would be reduced to the threshold level at the start of the delivery month and then further reduced as the delivery month progresses. This general constraint would permit much wider business use of futures than now because of the difficulty of qualifying many business use as bona fide hedges.\(^{11}\)

In essence, Paul proposes to set wide position limits for all traders early in a contract’s life and then reduce these in a linear manner as expiration approaches. Such a system would match position limits to a real problem—manipulation in the delivery period—and would eliminate all the problems associated with defining a bona fide hedger.

**Non-Convergence**

Convergence of cash and futures markets during the delivery period is a bedrock principle of commodity futures markets. In a competitive market, arbitrage will force the futures price at expiration to equal the cash price. A well-designed contract will involve few actual deliveries because the terms of the contract balance the interests of long and short futures position holders. As Hieronymus notes, “A futures contract is a temporary substitute for an eventual cash transaction. In markets that work, delivery is rarely made and taken; futures contracts are entered into for reasons other than exchange of title.”\(^{12}\)

Storable and non-storable agricultural futures markets have a long history of idiosyncratic pricing anomalies that have arisen due to market manipulation in the form of corners and squeezes.\(^{13}\) In these episodes, a trader or group of traders acquires market power by building up large long positions in futures and the cash market at delivery locations. Once having cornered the market, the trader or group of traders can use their market power to squeeze the shorts in the market and force prices during the delivery period to be much higher.

The classic signature of these episodes is always a short-run artificiality in the level of expiring futures prices compared to cash prices in the delivery area and in the level of the expiring futures prices compared to deferred futures prices. The artificiality seldom lasts more than one contract cycle because of the difficulty of preventing additional supplies from being moved into deliverable position. This is one of the reasons that regulators pay so much attention to the issue of deliverable supply.

CBOT corn, wheat, and soybean futures contracts exhibited dramatic convergence failures over 2005–10. The initial response by exchange staff, market
participants, regulators, and academic researchers was to focus on potential structural and manipulation problems with the grain futures contracts. Consequently, the number of warehouse receipts and shipping certificates that a trader could hold was limited, delivery locations were expanded in some cases, and other contract terms were adjusted, all to no avail as the convergence problems continued after changes were made. In particular, the magnitude of the convergence failures was unprecedented, with futures contracts expiring at prices up to 35 percent greater than the prevailing cash grain price. The duration and magnitude of the convergence failures was unlike anything seen in the modern record of grain futures markets and signaled that traditional explanations would not be sufficient to address the problem.

Heated public and academic debate ensued as to the possible causes of the convergence failures. In a twist on the Masters Hypothesis, many blamed new financial index traders in grain futures markets. For example, a report by the United States Senate Permanent Subcommittee on Investigations claimed commodity index trading caused the non-convergence in wheat markets. The report maintained that index fund capital overpowered arbitrageurs, who may have been limited by credit constraints and uncertainty over the time it would take to realize arbitrage profits. Others simply maintained that the grain futures markets were “broken” and questioned whether the contracts would remain a useful hedging tool. Without effective hedging, grain producers, merchandisers, and consumers have less ability to manage risk, a development that could mean potentially serious welfare effects. Likewise, the price discovery function of agricultural futures markets could be seriously threatened. Despite these fears, average daily trading volume in the CBOT corn, soybean, and wheat contracts doubled between September 2005 when non-convergence first appeared and September 2008 when non-convergence was at its worst.

The first major breakthrough occurred when Scott Irwin et al. discovered a direct relationship between the carry and delivery location basis. The term “carry” as used in the grain futures markets refers to the market-determined return of holding stocks of grain. It is measured as the difference in the futures prices between the first deferred contract and the expiring contract. This difference is often stated as a percentage of the “full carry” for storing grain between the delivery period for two contracts. It is computed as the sum of interest opportunity costs for storing grain and the maximum storage rate that can be charged under the contract specifications. The storage rates are necessary to compensate those holding the grain that backs delivery instruments (warehouse receipts or shipping certificates).

Figure 8 shows that non-convergence, or weak delivery location basis, systematically appears in CBOT wheat whenever the carry begins to exceed about 80 percent of full carry. Similar relationships are present in corn and soybeans.

Based on this finding, the CBOT instituted a variable storage rate (VSR) system for the wheat contract in July 2010 that allowed the contract storage rate to adjust up and down based on the percentage of full carry. If the percentage of full carry averaged more than 80 percent (less than 50 percent) during the specified averaging period, the maximum storage rate for the wheat contract increased (decreased) 3 cents per bushel for the next-to-expire contract. The maximum storage rate increased from 6 cents per bushel before VSR to a peak of 20 cents per bushel in a little over a year. Large non-convergence failures subsequently disappeared in CBOT wheat and have not reappeared.

While empirically it was clear that adjusting contract storage rates upward was the key to solving the convergence problems plaguing grain futures contracts during 2005–10, the underlying market dynamics that created the problem in the first place were not yet well understood. The second major breakthrough occurred when Philip Garcia, Irwin, and Aaron Smith developed a dynamic rational expectations model of commodity storage and showed that the convergence failures were generated by a disequilibrium between the price of storage in the physical market for grain and the storage rate paid to holders of the delivery instrument for the grain futures contracts.

Figure 9 illustrates the problem using a classic supply-of-storage framework. The cost of carry on
Figure 8. Basis at Toledo, Ohio, and Percentage of Full Carry on the First Day of Delivery for CBOT Wheat Futures, March 2000–September 2010 Contracts


Figure 9. Convergence and the Price of Storage

the y-axis represents the equilibrium price paid for storing grain one period, and the x-axis represents the equilibrium amount of grain inventory that is stored at this price. Panel A shows a case with high inventory and a high price of storing physical grain because the demand for storage is high. The equilibrium price of storing grain in the physical market in this case exceeds full carry in the futures market (determined by the fixed maximum storage rate on the futures contract), and this is the heart of the problem. The futures spread cannot go any higher than full carry; otherwise, risk-free arbitrage would be possible between futures contracts.

But this in turn means that grain hedged in the futures market earns a lower storage return than unhedged grain in the cash physical market. Something has to give to equate the return to storing hedged and unhedged grain, and that something is the delivery location basis, which widens enough to restore equilibrium in the storage market. Panel B shows a case with low inventory carryover and a price of physical storage below full carry on the futures contract. In this case, there is no disequilibrium, and the delivery location basis is zero.

The analysis is more complex for the multi-period case, but the essential insight is that the current delivery location basis widens by the expected value of positive “wedges” between the price of storage in the physical market and full carry determined by the fixed contract storage rate. Consider a simple example in which the wedge between the price of physical storage and the maximum storage rate is 5 cents per month, and this wedge is expected to last for 12 months. The current delivery location basis does not widen by 5 cents but instead by 60 cents (5 cents \times 12 months = 60 cents) to reflect the cumulative value of the expected disequilibrium. This is an important insight because it shows how relatively modest wedges between the physical price of storage and the contract storage rate can generate a surprisingly wide delivery location basis if the wedges are expected to persist for a lengthy period of time.

Garcia, Irwin, and Smith conducted econometric tests for CBOT corn, soybeans, and wheat and for KCBT wheat that supported the predictions of their model, with the expected discounted wedge closely mapping the magnitude of non-convergence. They also tested whether commodity index investment contributed to convergence failures as suggested by the United States Senate Permanent Subcommittee on Investigations and found no evidence to support this claim. Their work also convincingly demonstrates that the upward VSR adjustments in storage rates for CBOT wheat followed increases in the price of storage in the physical wheat market. Some in the wheat trade have vehemently argued that the causality is reversed, when the evidence clearly indicates this is not the case. Finally, their analysis showed why non-convergence could not be solved by changing delivery points, limiting the holding of delivery certificates, or forcing delivery loadout—as many advocated. Instead, the solution was to simply raise the contract storage rate.

One intriguing puzzle is why grain market futures trading volume could increase in the midst of such severe non-convergence problems. Garcia, Irwin, and Smith’s model suggests a solution to the puzzle. In short, traders can do the math and add the difference between market and contract storage rates to the delivery location basis. This requires a certain level of market sophistication regarding the relationship between futures prices, cash prices, and storage rates. Nonetheless, some market participants may have lacked the ability to decode the message from market prices and as a result may have been confused about how to interpret market signals. This could have adversely affected stockholding, price discovery, and risk management strategies.

Non-convergence problems did not entirely disappear after 2010. In May 2016, another major episode of non-convergence began for the KCBT wheat futures contract. The fixed storage rates for the KCBT contract were raised in the wake of the 2005–10 convergence problems. However, in retrospect the increases were clearly not large enough in light of the size of the 2016 wheat crop and subsequent increases in the demand for storage. The KCBT will implement a VSR system similar to that already in place for CBOT wheat starting in March 2018. The expectation is that this will reduce non-convergence problems in KCBT wheat as it has for CBOT wheat.
At this point in time there is agreement that recent convergence problems in grain futures contracts were due to contract storage rates that were too low relative to the market clearing price of storage in the physical market. The only real question is the best approach to adjusting contract storage rates and whether that approach should be extended to the remaining grain futures markets (CBOT corn and soybeans). One approach is the aforementioned VSR system, which has the advantage of providing market participants with a prespecified rule for adjusting futures storage rates.

However, there can be some added volatility in the price spreads between contracts when the market is close to the threshold for adjusting rates. The other approach is to simply raise and lower fixed contract storage rates as conditions change. This is the system used by the futures exchanges in the US for most of the past 150 years. The advantage of this system is that there is no uncertainty about carry calculations. The disadvantage is uncertainty about whether and when rates will be adjusted by the exchange.

Electronic Trading

Until recently, the basic structure of agricultural futures markets had been remarkably stable over time. Irwin and Dwight Sanders argue that a trader from the latter part of the 19th century magically transported to the trading pits of the waning years of the 20th century might have been surprised by the size of the agricultural futures markets but not by the way trading was conducted or the main types of participants. This would no longer be true with the transition from the telephone and open outcry trading platform to the computer and electronic order matching platform in the past decade—arguably the biggest structural change in the futures markets since they began more than 150 years ago.

Market participants, exchange officials, and regulators have all struggled to adapt to this revolution in the trading environment. In the old open outcry, pit system capacity was limited by the number of traders and their ability to physically process orders, and trading speed was constrained by the ability to signal trades by hand and voice. In the new electronic markets, trading takes place literally at the speed of light, and there is no theoretical constraint on capacity.

A host of issues have been presented by the transition to electronic trading that go by colorful names such as spoofing, quote stuffing, and predatory trading. However, none have approached the intensity of concern directed toward high frequency traders (HFTs). While widely discussed and debated, there is no agreed on definition of an HFT. Albert Menkveld provides a useful perspective:

A formal definition does not exist but most associate HFT with extremely fast computers running algorithms coded by traders who trade for their own account. Collectively, their participation rate in trades is typically a couple of deciles (SEC 2010). These traders typically do not work at the deep-pocket sell-side banks, but at privately held firms. They therefore need to keep their positions small and short-lived to keep the capital tied up in margin accounts in check. They trade a lot intraday and avoid carrying a position overnight. These characterizations suggest that HFTs are best thought of as a new type of intermediary, either benefiting market quality or hurting it.

Concerns about HFTs in agricultural futures markets spilled into the headlines in 2016 when cattle producers pointed the finger at HFTs as the reason for the sharp drop in cattle prices during 2015. The controversy is summarized by Meyer:

Cowboys and Flash Boys are headed for a showdown as savage price swings whip Chicago’s cattle futures market. A US beef industry already squeezed by plunging prices has become aggravated by gyrations on the Chicago Mercantile Exchange. The cattlemen’s prime suspect: high-speed trading firms that have marched into futures markets as the old pits fall silent. . . . “We’re seeing these limit-up and limit-down [move] with no changes in the fundamentals. There’s nothing that would otherwise be driving that kind of action outside of just computers. That’s what concerns us,”
said Colin Woodall, vice-president of government affairs at the cattlemen’s association.\textsuperscript{23}

It is tempting to dismiss the concerns of cattle producers about HFTs as just another example of the anti-speculation cycle. After all, it is exceedingly difficult to connect a price drop in live cattle futures of $70 per hundredweight over an 18-month period to trading that occurs at the level of a millisecond. But this does not mean HFTs do not raise legitimate policy issues. The markets are fundamentally different with electronic trading. In particular, speed advantages for the fastest traders allow the potential for a variety of new strategic trading not even imaginable under the old pit trading system.

Electronic trading has also raised policy concerns in other ways. For example, important US Department of Agriculture (USDA) crop and inventory reports have long been released outside the regular trading hours for the CBOT grain futures markets. This allowed market participants a lengthy time-out to read and digest the information provided by these USDA reports before trading resumed. The expansion in trading hours under electronic trading made it much more difficult for the USDA to maintain its decades-old convention of releasing USDA crop and inventory reports outside of trading hours.

Starting in May 2012 the USDA recognized this new reality and began releasing crop and inventory reports in real time during CBOT trading hours. Many market participants expressed concerns about the change to real-time release of USDA reports, in particular, increased price volatility and the economic advantage provided by HFT trading speed. The latter worry is that HFTs could capture the lion’s share of the market impact of USDA crop and inventory reports before other more traditional (human) traders have time to react.

Michael Adjemian and Irwin analyzed the impact of the change to real-time release of USDA crop and

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Figure 10. Differenced High-Low Price Volatility for CBOT Corn Futures Around USDA Crop and Inventory Report Announcements, July 2009–14

Note: Significant at the 5 percent level.
inventory reports. Figure 10 clearly shows that corn futures prices are more volatile in the minutes immediately following release of USDA reports in the real-time era. Their results confirm that when grain futures markets are permitted to discover prices freely in response to USDA reports, the adjustment process is not instantaneous as markets experience heightened volatility in response to news relative to what was observed during the era of non-real-time release (trading halts). In addition, markets appear to now have more difficulty distinguishing between the newsworthiness of USDA reports, at least in the short run. Figure 10 also shows that these differences persist only for a handful of trading minutes. These mixed results suggest that the debate about real-time release of USDA crop and inventory reports is likely to continue.

**Conclusions**

Two issues have been paramount in recent years regarding the regulation of futures markets. The first issue is the role that speculation by financial index investors played in the commodity price spikes of the past decade. This was the fuel for the long and acrimonious debate in the US over more restrictive speculation position limits in commodity futures markets. The issue has been more or less settled with the preponderance of evidence indicating that commodity index trading was at most a minor player in recent price spikes. This has left the push for more restrictive limits on speculative trading in commodity futures markets dead in the water.

The second issue is the massive convergence failures in grain futures markets during 2005-10. This is an issue that truly has a happy ending from a regulatory standpoint. It turns out that the problem is relatively simple—storage rates that are part of contract designs were simply set too low for market conditions. Once contract rules were altered to raise storage rates, the worst of the problems largely disappeared. Recent and more moderate non-convergence problems suggest that the issue needs continued monitoring and that further increases in storage rates may be necessary.

One issue that has emerged in recent years is likely to be the focus of futures market regulation for the foreseeable future. The transition from a telephone and open outcry trading platform to computer and electronic order matching platform is arguably the biggest structural change in futures markets since they began more than 150 years ago. This is raising issues that could not even be imagined in the old pit trading system. Since the issues with electronic trading are relatively new, there is limited academic or government research that can be used to assess these concerns. This will undoubtedly be a major area of research and regulatory attention in coming years.

**About the Author**

Scott H. Irwin is the Laurence J. Norton Chair of Agricultural Marketing and director of the farm doc program at the University of Illinois at Urbana-Champaign. He teaches courses on commodity price analysis and futures market research. His research on commodity markets is widely cited by other academic researchers, and his expertise is frequently sought out by market participants, policymakers, and the media.
Notes

1. Excessive Speculation, 7 USC § 6a (2010).

2. The latest chapter in this ongoing controversy came in January 2017, when the US House of Representatives passed the Commodity End User Relief Act, which, in addition to reauthorizing the CFTC through 2021, directs the CFTC to impose and implement position limits as it finds necessary, provided the CFTC makes a finding before imposing such limits. In commenting on this latter provision, Rep. Mike Conaway (R-TX) stated from the House floor that “prior to Dodd-Frank, the law was clear: If the Commission wanted to impose position limits, it first had to make a determination that such limits would, in fact, diminish, eliminate or prevent the burdens of excess speculation. Post Dodd-Frank, the courts have ruled that additions to the statute have rendered it ambiguous.” If this provision is eventually approved by the US Senate and signed into law by President Trump, it would likely be the final nail in the coffin of current efforts to expand position limits. Charlie Passut, “House Passes CFTC Reauthorization Bill with Amendment Making Position Limits Optional,” NGI’s Daily Gas Price Index, January 13, 2017, http://www.naturalgasintel.com/articles/109055-house-passes-cftc-reauthorization-bill-with-amendment-making-position-limits-optional.


16. Figure 8 was reprinted from Irwin et al., “Spreads and Non-Convergence in Chicago Board of Trade Corn, Soybean, and Wheat Futures.”
17. The VSR system was based on a prepublication version of Irwin et al., “Spreads and Non-Convergence in Chicago Board of Trade Corn, Soybean, and Wheat Futures.”
19. Figure 9 was reprinted from Garcia, Irwin, and Smith, “Futures Market Failure?”
21. Irwin and Sanders, “Index Funds, Financialization, and Commodity Futures Markets.”
25. Figure 10 was reprinted from Adjemian and Irwin, “USDA Announcements in Real-Time.”