Convective Risk Flows in Commodity Futures Markets

Online Appendix

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This Appendix contains details about data construction and additional analyses. Section A describes the construction of our time series. Section B describes our classification of traders. Section C relates our classification to those used in the literature. Section D details our data construction for other variables. Section E provides further robustness checks discussed in the paper. Section F discusses the alternative informational advantage hypothesis. Section G discusses how convective risk flows affect the cash market.

A. Construction of Time Series

Every day, trader positions in excess of a specified reporting threshold, which varies by commodity, are reported to the CFTC by exchange clearing members, futures commission merchants, and foreign brokers. Positions are reported at the contract level (e.g., December 2001 Corn). Aggregate positions in LTRS account for 70%-90% of open interest in any given market. The data contain the daily positions at the account-level in each commodity market, by futures contract expiration date.

We first construct an initial time series of days in which all 19 commodities for which we are concerned have position data (18 before October 15, 2005, before the introduction of RBOB Gasoline; for brevity we will just refer to this as 19 commodities). These commodities are listed in Table A.1. Second, we correct for the following "missing zeros" problem. Since our data is on the level of the position, and a position is only recorded in the data when it exceeds the reporting threshold, computing changes in a position in the data will fail to record changes when the position goes to zero or otherwise falls below the reporting threshold. That is, if a position is observed one day but not the next, a change will not be recorded in the data as there is no record of the position the next day from which to compute the change. We correct for this by computing changes where the next day's position is assumed to be zero if there is a position today yet no record of a position exists the next day. Similarly, we assume the previous day's position was zero if there is a position today yet no record of a position yesterday. This yields a clean dataset that can be aggregated across positions and time that will always satisfy the desirable aggregation property that the change in the sum of position levels equals the sum of changes in position levels.

We standardize all variables around the time series of days where there is position data for all 19 commodities. If a value is unavailable on a day on that time series, we pull through the last available level and compute changes using this value. We do this for all time series that we use. For example, if the value of the Baltic Dry Index is unavailable at time t, we pull through the previous available value (say, from day $s < t$) so that change for any two days between s and t is zero and the change between t and $t+1$ is then identical to the change between s and $t+1$. We define the n-th trading day of each month to be the n-th day in this time series, with the running assumption that the data are "thick" enough so that all days are appropriately represented. Our definition of weeks follows the exact set of reporting Tuesdays in the published Commitment of Traders reports.

B. Trader Classification

We classify traders into four major groups: commercial hedgers, hedge funds, commodity index traders (CITs), and other unclassified traders.

Commercial hedgers. The CFTC requires traders to report whether traders have commercial use for commodities in which they are invested. We classify traders as commercial hedgers if they indicated a commercial use in all commodities in which they have positions, among the following reported commercial use types in the data: "Dealer/Merchant" (AD), "Agricultural" (AM), "Manufacturer" (AO), "Producer" (AP), and "Livestock Feeder," "Slaughterer," or "Other Livestock" (LF, LO, LS, respectively). Given the agricultural tilt of the hedger classification codes, we expect this categorization to be conservative in non-agricultural commodities.

Hedge funds. The CFTC also requires traders to report their trader registrations. These registrations are supplemented by internal CFTC staff. We classify as a hedge fund any trader registered as a commodity pool operator (CPO), commodity trading advisor (CTA), an associated person of such an account (AP), or who has been otherwise marked as a financial leveraged speculator (FLS), financial asset manager (FAM), or managed money (MM) in their trader registrations. We also include traders who have the "FH" hedge fund commercial use code.

Commodity index traders (CITs). CITs in the Supplemental CIT report are identified by CFTC staff based on confidential interviews with traders, as well as analysis of trading patterns, but have been updated only on an irregular basis since the inception of the Supplemental CIT report. Given the changing nature of the commodity index investing business, we construct an annual classification of our own based on two important characteristics of trading patterns of broad-based portfolio investors in commodity indices: one is that they should be invested in many commodities, and the other is that they should be mostly long in those commodities.

We compute two variables that measure these two dimensions. First, we construct the average number of commodities for which a trader has net exposure by counting the total number of commodities every day for which a trader has any non-zero net position, and then taking a time-average over the year. We define this variable to be the *Number of Commodities with Exposure*. We then measure whether or not a trader tends to be short or long on average across these commodities. For each commodity and every day, we divide the total number contracts in which a trader is long by the total number of long plus short contracts, both totaled over all contract expirations. A number of 50% indicates that a trader is net zero for that commodity that day (perhaps spread over different contract expirations). We then take an equal-weighted average over all commodities in which a trader is invested in each day, followed by a time-average over every year.[1] We define this variable to be the *Percentage of Contracts Long Across Commodities.*

[1] We use an equal weight to avoid contaminating our trader characteristics with price information even though the trader may, on a dollar basis, be more long or more short.

We classify a trader as a potential CIT if the average number of commodities for which it has exposure to within year *t* is greater than 8 and the average percentage of contracts long is greater than 70%. The rationale is that due to the netting problem across lines of businesses, CITs may not appear to be 100% long. Because we are still concerned with potential contamination from non-CIT traders, we intersect this group of traders with the list of traders who have been tagged as CIT for the Supplemental CIT report.[2] Finally, to obtain a yearly list of CITs, we hand-check the list of names associated with each trader to ensure that they are in fact CITs. When aggregating positions, we count positions in year *t* as CIT if the trader was classified as a CIT in year *t*-1 to avoid any forward-looking bias. Our classification scheme should be viewed as conservative relative to the true number of CIT traders in the market.

Although our classification more cleanly separates CIT traders from CIT traders who are also designated as managed money, we cannot resolve the netting problem completely. CIT traders are often dealers who are hedging swap positions sold to clients by going long in futures. However, since dealers themselves are likely to have many types of positions, this will still contaminate the positions associated with the selected CIT traders. Although this is a limitation of the LTRS data, we have an ex ante expectation of which commodities are more susceptible to these problems. In particular, such problems are quite severe in energies and metals, as noted in the CFTC's accompanying note to the release of the Supplemental CIT report, while measurement in agricultural commodities is likely to be much more precise.[3]

Other unclassified traders. There may be traders who do not fit neatly into the other three categories. For example, there may be commercial hedgers who do not match the above criterion, particularly in non-agricultural commodities. Non-CIT swap dealers who do not have managed money businesses may also fit into this category. Traders who are not yet CITs may also be in this categorization.

Separating conflicting categories. At a fundamental level, traders may be engaged in multiple lines of business, including, for example, both CIT business and managed money. As a result, a trader in the LTRS data may have multiple self-reported trader registrations. In addition, the CIT designation is assigned to some traders for the purposes of constructing the Supplemental CIT report. As a result, it is possible for a trader to have designations of both CIT and commodity trading advisor (hedge fund). Thus, even the disaggregated LTRS data face the netting problem across each trader's multiple business lines.

We separate traders with multiple overlapping designations into respective categories. We track traders that have both a CIT categorization and hedge fund trader registration as "CIT-Hedge funds" (CIT-HFs); these traders

[2] In the LTRS data, trader registrations are not time-varying.

[3] The CFTC's accompanying note to the Supplemental CIT report is available online at http://www.cftc.gov/ucm/groups/public/@commitmentsoftraders/documents/file/noticeonsupplementalcotrept.pdf.

are active in both business lines. We track traders that have both a Hedge Fund and Commercial Hedger categorization as "Hedger-Hedge Funds" (Hedger-HFs), and may be traders who do physical hedging business but also have businesses speculating on behalf of others (in practice, this group is small). Theoretically, there may be "CIT-Hedgers" and traders that are all three ("Triple") as well; in practice, no traders fall in these two categories in any year.

The final result is that there are eight possible categories: three conflict-free categories (CIT, hedge fund, and commercial hedger); four conflict categories (CIT-HFs, Hedger-HFs, CIT-Hedgers, and Triple), and other unclassified Traders. The difference of the sum of these positions and zero are positions, which are not reported to the CFTC.

Figure 2 from the paper shows that other unclassified traders form a significant part of the short side of the market. There is a concern that we may have missed a significant portion of traders in the market. Indeed, in contrast to the construction of the producers category in the DCOT report, which includes all commercial positions not associated with swap dealers and is thus a "residual," our classification of commercial hedgers is conservative in that we only include positions if they are associated with traders whose dealings in all commodities are classified into the specific commercial uses of Dealer/Merchant, Agricultural, Manufacturer, Producer, Livestock Feeder, Slaughterer, or Other Livestock. These categories are relatively focused on activities in agriculture and livestock.

Figure 3 from the paper shows that aggregate net positions of other unclassified traders are relatively small in the grains sector, on par with commercial hedger net positions in livestock and softs, and form the largest segment of the short side in energies and metals. In energy and metals in particular, our commercial hedger group forms only a small part of the market. This could be due to two possibilities. First, true commercial hedgers could be more neutral in energies and metals; for example, there may be both producers (short) and customers (long) who are hedging in these markets. Second, our commercial hedger group may only be capturing a slice of hedging activity in energies and metals. The fact that other unclassified traders dominate the short side in these markets lends support to this second hypothesis. Under this hypothesis, our commercial hedger group conservatively captures a range of hedging activities most associated with grains, livestock and softs, and less so in energy and metal commodities, with other unclassified traders capturing this wider group of commercial hedgers. Empirically, the behavior of the unclassified traders is similar to that of commercial hedgers.

C. Classification and Relation to Literature

In the existing literature, there are four principal sources of data used to analyze positions in commodity futures markets. The first two are public data sources: the weekly Disaggregated Commitment of Traders report (DCOT), and the weekly Supplemental CIT report. One shortcoming of these two reports is that neither by

themselves allows for a precise joint analysis of the positions of hedge funds, commercial hedgers, and CITs due to the way they are aggregated, as they either co-mingle swap dealer positions with CIT positions (as in the DCOT), or hedge fund positions with all non-commercial positions (as in the Supplemental CIT). They are also not available before 2006.

The DCOT report aggregates the micro-level LTRS data into public reports which break positions down into Producers, Swap Dealers, Managed Money, and Other Non-Commercial positions. Swap Dealer positions are not split into CIT positions and physical swap dealer positions separately. Instead, the literature often uses swap dealer data to proxy for CIT positions (e.g., Irwin and Sanders, 2011b). However, using swap dealer data to proxy for CIT positions can be noisy, as it co-mingles positions of both commodity index traders, who trade in financial swaps, and physical commodity swap dealers who are not CITs (intuitively, there were swap dealers in commodity futures markets well before the advent of CITs). Indeed, swap dealer positions in the DCOT are actually a sub-category of so-called commercial positions from the legacy COT report, rather than non-commercial positions. Producer positions are a "residual" of commercial positions less swap dealer positions.

The Supplemental CIT report breaks positions down into Non-Commercial, Commercial, and CIT positions, but does not break down non-commercial positions into finer categories such as hedge funds or managed money. Irwin and Sanders (2011a), Irwin, Sanders and Merrin (2009), and Sanders, Irwin and Merrin (2010) focus on this data. Accordingly, it is difficult to analyze the joint behavior of producers, managed money, and CITs using either the DCOT or Supplemental CIT report owing to how they are aggregated.

The third source of data is the micro-level LTRS data that underlies the two public reports, which we use in our paper. Brunetti and Buyukashin (2009), Brunetti, Buyukashin and Harris (2011), Buyukashin and Harris (2011), and Buyukashin and Robe (2010) also use the LTRS data in analyzing unconditional price-position correlations, Granger causality, and Working's T. To the extent that these papers analyze commodity index traders, they also use existing swap dealer classifications as proxies for index investment. Buyukashin and Robe (2010) proxies for CIT positions with the share of near-dated open interest held by swap dealers in the same market. Brunetti and Buyukashin (2009), Brunetti, Buyukashin and Harris (2011), and Buyukashin and Harris (2011) examine swap dealers explicitly. As mentioned in the paper, using swap dealer data to proxy for CIT positions can be noisy as it co-mingles CIT positions with physical swap dealer positions.

Finally, some studies have analyzed the CFTC's special call data on CIT positions. Irwin and Sanders (2012) document that the Supplemental CIT report, which splits positions into Commercial, Non-Commercial, and CIT positions starting in 2006, is problematic for energy and metal commodities, while noting that measurement error for agricultural commodities is more muted (pg. 260). This is consistent with our focus on the agricultural commodities. They go on to analyze the CFTC's low-frequency special call data on CIT positions. We do not use this data for several reasons. First, from December 2007 (the beginning) through June 2010, the report is

produced on a quarterly basis (monthly thereafter), which precludes a weekly analysis. Second, this also precludes an adequate pre-crisis analysis. Finally, this data is drawn from speaking with the traders, rather than drawn directly from clearing members. This introduces other potential issues into our analysis.

Our classification is built from both existing classification codes in the LTRS as well as an independent classification of CITs. For hedge funds, our classification of hedge funds is narrower than the "non-commercial" classification in the Supplemental CIT in that we focus on a certain set of classification codes explicitly related to hedge funds. For producers, our classification of producers is narrower than the "commercial" classification of the Supplemental CIT report since it is based off a trader having to register within a certain set of classification codes across all commodities rather than just one. Our classification for CITs is built from the ground up, and is thus finer than the swap dealer classification in the DCOT in that it isolates CITs from physical swap dealers. We do this to maximize the signal about these traders' behavior.

By building a classification from the micro-data using economically-motivated criteria, we not only are able to shed light on the existing public classifications, but are able to more precisely analyze the joint dynamics of positions of CITs, hedge funds, and producers for the entire period 2000-2010, without using general swap dealer positions as a proxy for CITs positions, and without grouping hedge fund positions with general non-commercial positions and producer positions with general commercial positions.

Finally, our classification also allows us to describe CIT behavior prior to 2006, which is a contribution in that neither of the relevant public reports (Supplemental CIT or DCOT) goes back before 2006. Of the papers listed that use the more detailed, confidential LTRS data, Buyukashin and Robe (2010) use a sample period before 2005 but use swap dealers to proxy for CITs, as do Brunetti and Buyukashin (2009), Brunetti, Buyukashin and Harris (2011), Buyukashin and Harris (2011) in their respective sample periods [2005-2009, 2005-2009, 2000-2009 but only in oil]. The special call report only begins in 2007.

D. Further Details on Data Construction

Futures contract return. Our primary source of settlement price data is Bloomberg, and we construct the return to a generic rolling indexed futures contract using price data for all underlying individual contracts. This return is the return to a position that is always invested in the contract that is currently indexed, accounting for a roll return where the position in the currently indexed contract is liquidated and reinvested in the next indexed contract at the end of the day before the index begins tracking the longer-dated contract.

To be precise, adopting the notation of Singleton (2012), the return between time s and time t for a generic contract continuously invested in the indexed contract can be given by

$$\frac{F_t^{T_1(t)}}{F_s^{T_1(s)}} - 1 \quad if\ t < D(s)$$

$$\frac{F_{D(s)-1}^{T_1(D(s)-1)}}{F_s^{T_1(s)}} \cdot \frac{F_t^{T_1(t)}}{F_{D(s)-1}^{T_2(D(s)-1)}} - 1\ if\ \ D(s) \le t \le D^2(s)$$

where *D(s)* denotes the first time after *s* that the index calls for a switch in contracts, and $F_t^{T_i(t)}$ denotes the futures settlement price with contract expiration $T_i(t)$ where *i=1,2,3…* denotes which contract in the index schedule is specified, with *i=1* being the first. The daily return is trivially $F_t^{T_1(t)}/F_{t-1}^{T_1(t-1)}$ on every day except for the 5th trading day of a roll month (when *D(s)=t* and *s=t-1*), when it is $F_t^{T_1(t)}/F_{t-1}^{T_2(t-1)}$, i.e., the return to the newly specified index contract. We pick the 5th trading day as it is typically the first day on which an index begins switching contracts. The weekly return is given by the above set of equations where *s* is the last day of the previous week and *t* is the last day of the current week. Since our maximum horizon is less than month, no more than one such roll return needs to be accounted for in our calculations. The roll schedule we use is listed in Table A.1.

On days when there is no available price for the generic indexed contract, we pull through the last available price using the procedure described in Section A; this is rare. In all returns, we do not do not include the cost of margin and collateral and thus do not include the risk-free rate in our calculations, following, e.g., Etula (2010) and Singleton (2012).

Data sources. Data on the VIX, the Baltic Dry Index, and the Shanghai A stock return index come from Bloomberg. Macroeconomic indicators such as the Moody's Baa credit spread, 10-year Treasury rate, and 3-month Treasury rate come from the Federal Reserve Board, while we use data on 10-year inflation compensation from Gürkaynak, Sack, and Wright (2010). For wheat, corn, soybeans, soybean oil, and cotton, we collect monthly projections of expected world demand, US production, and end-of-harvest US stocks issued by the U.S. Department of Agriculture (USDA) in its monthly *World Agricultural Supply and Demand Estimates* reports. We use these to compute the twelve-month percentage change in expected world demand, US supply, and US stocks for these commodities. We choose the year-on-year percentage change in forecast because each month's forecast is a forecast for that year's harvest, with the forecasted harvest year typically changing to the next harvest year in May.[4]

[4] For example, from May 2006 through April 2007, the USDA forecasts the harvest and usage for the 2006-2007 harvest year; in May 2007, it begins forecasting the 2007-2008 harvest. The April 2007 projection is typically very accurate for the actual realized 2006-2007 harvest. The estimated actual 2006-2007 harvest is reported from May 2007 through April 2007, with the finalized actual 2006-2007 harvest numbers reported starting May 2008, subject to subsequent revision.

Commodity basis. We compute the commodity basis as the average basis of the second, third, and fourth contracts on the index roll schedule relative to the spot price. Formally, for any given commodity, the basis at time t for the j-th contract in the roll schedule with expiration date T_j (where T_j and t are measured in absolute daily calendar time) and futures price F_{jt} when the spot price equals S_t is: $Basis_{jt} = \left(F_{jt}/S_t\right)^{\frac{30}{T_j - t}} - 1$. The average basis is then the average of the basis for j=2 through 4. We assume all contracts expire on the 1st of the expiration month. For many grain and livestock commodities, spot prices come from the weekly USDA market news reports published by their Agricultural Marketing Service. Spot price sources for other commodities are more varied, but all prices may be accessed through Bloomberg. We discuss the detailed data sources for spot prices, including all Bloomberg codes, in Table A.2.

Aggregation of positions across commodities. To summarize aggregate notional positions across many commodities without introducing additional variation from contemporaneous prices, we often aggregate positions using fixed prices as of December 15, 2006. These are listed in Table A.3.

E. Further Robustness

Alternative classification. We construct a more stringent classification of CIT traders using a cutoff of 80% long (as an equal weight across commodities) and a minimum average exposure to 12 commodities throughout the previous year. Doing so reduces the number of CIT traders over our baseline sample by roughly 20%, as reported in Table A.4. We then re-estimate equation (5) using positions aggregated using this alternative classification. Results are reported in Table A.5 and are very similar to those in the paper.

Extended Controls. Table A.6 and A.7 report full results from re-estimating equations (4) and (5) including the extended set of controls discussed in the paper, analogous to Tables 3 and 4 in the paper.

Timing. Table A.8 repeats the exercise in Table 4 in the main text, but defining the post-crisis period as starting August 1, 2007 through June 1, 2011. Table A.9 repeats this exercise using a window of September 15, 2008 and January 1, 2010.

F. Additional Evidence on Informational Advantage Hypothesis

An alternative hypothesis is that financial traders were exploiting an informational advantage over commercial hedgers by reacting more quickly to information about deteriorating fundamentals contained in a rising VIX during the crisis. Then, we could expect that, in response to an increase in the VIX, commodity prices would co-move negatively with VIX increases, and financial traders would sell commodity futures to commercial hedgers in response to a VIX increase. Here, we provide evidence against this hypothesis. We first examine the persistence of position responses. If financial traders trade to exploit an informational advantage, their VIX-

induced position changes should be temporary, as they will eventually unwind their positions after the information is fully incorporated into prices in order to profit from the trade. In contrast, distressed-induced position changes are likely to be more persistent over time.

To test whether responses are persistent, we regress the position change of each trader group on the contemporaneous plus 13 lags of changes in the VIX, as well as 13 lags of commodity returns:

$$dx_t = \alpha + \lambda \Delta VIX_t + \sum_{s=1}^{13} \beta_s \Delta VIX_{t-s} + \sum_{s=1}^{13} \gamma_s dF_{t-s},$$

where dx_t is the position change at time *t* for a particular trader group, dF_{t-s} is the lagged commodity return. By iterating this equation forward, it is clear that the cumulative response to an initial shock to the VIX over the next *s* periods, subsequent to initial effect, is the sum of β_s from 1 through lag *s*. If the initial response to an increase in the VIX reverted, this sum would be positive for CITs and financials (since they sell initially) and the subsequent response would be negative for hedgers (since they buy initially).

Table A.10 reports the 13-week cumulative subsequent position response to a unit basis point change in the VIX for each trader group and each commodity, while Figure A.1 plots these cumulative responses over the 13-week horizon. For CITs, we see that if anything, there is a continuation of the initial response to the VIX. An increase in the VIX today predicts that CITs sell even more positions over the next 13 weeks, particularly in grains. Furthermore, the commercial hedgers also show little sign of reversals to movements in the VIX, suggesting the risk convection was a re-allocation of risk that does not reverse over a 13-week horizon. This evidence is not consistent with the notion of an informational advantage of CITs.

Second, we test whether active hedgers were more attentive to VIX movements than passive hedgers. If our observed trading patterns reflect information, hedgers who trade often may respond to changes in the VIX more quickly than hedgers who trade very infrequently. We classify a group of "active" hedgers who have a record of trading both frequently and in large amounts. Specifically, we compute the median daily absolute position change for every hedger every year, and classify a hedger as active if it was in the top decile of all hedgers in that commodity in the previous year. We use the median rather than the mean as we want to capture hedgers who consistently and frequently trade large amounts as opposed to those who trade extraordinarily large amounts infrequently. By the same reasoning, we use absolute position changes as opposed to a measure of portfolio turnover. We then aggregate active and passive hedgers and test whether the aggregate positions of active hedgers display a significantly more positive sensitivity to the VIX than passive hedgers in a panel of these two time series.

In Table A.11, we regress weekly position changes on changes in the VIX, an indicator for the active group of hedgers, and an interaction between these two terms, along with one lag of commodity returns and our baseline controls and during the post-crisis period. The active hedgers tended to be on the other side of the financial

traders' trades in that they typically display a more pronounced positive sensitivity to the VIX. This evidence is inconsistent with the informational advantage hypothesis.

G. Additional Results Linking Convective Risk Flows to Cash Markets

Commercial hedgers take positions in futures markets to hedge positions in the cash market. In this section, we take a closer look at commercial hedgers and examine how such risk convection affects risk sharing in the cash market.

In practice, many commercial hedgers who participate in agricultural futures markets are distributors acting essentially as middlemen on behalf of farmers. For example, grain elevators are representative commercial hedgers in the grain futures markets. A grain elevator may commit to purchase grains from local farmers and store it while waiting for distribution. (The purchase commitments are essentially forward contracts.) To hedge this long exposure in the cash market, the grain elevator would take a short position in the corresponding futures market. All else equal, if distressed financials reduce their demand for long futures positions, the downward price pressure induces the grain elevator to reduce its short futures positions, which, in turn, tips the balance between its futures and cash positions. Limited risk-bearing capacity on the part of the grain elevator may further induce it to cut its cash positions by either offloading its physical stocks or reducing its purchase commitments to farmers. Through this chain of position reductions, farmers end up with greater exposure to the price risk, unless they reduce their production of the crop or hedge directly through the futures markets themselves.

The CFTC requires futures market participants in wheat, corn, soybeans, soybean oil, and cotton who have a "bona fide hedging exemption" (i.e., who hold a futures position larger than federally-mandated speculative limits) to report their cash positions as of the close of business on the last Friday of each month. Cash positions represent physical stocks, as well as sales and purchase commitments. For the grain commodities, participants report the thousands of bushels owned in stocks and committed to in purchase agreements and sales agreements. The sum of stocks owned and purchase agreements represent the total long cash position, while the sales commitments represent the total short cash position. Cotton is reported similarly in hundreds of bales weekly, every Friday.[5] To compare cash positions with futures positions, we convert cash positions into futures contract-equivalents using data on the size of futures contracts.[6] We then match the cash position with the futures position of the account

[5] For comparability with other commodities, we standardize this monthly frequency by taking the last Friday of each month.

[6] For soybean oil and cotton, contracts are specified in pounds, while cash positions in soybean oil are reported in bushel equivalents, and cotton positions are reported in bales. We use approximate conversion factors of 500 pounds/bale for cotton and 11 pounds of oil per soybean bushel of soybean oil. The former is based on the conversion factor suggested on the CFTC reporting form for cotton while the latter is based the CME soybean crush guidelines.

reported in LTRS. We focus on changes in net cash (long cash minus short cash) and changes in net futures.[7]

Table A.12, Panel A reports summary statistics for commercial hedger accounts that report both cash and futures data for the period January 2006 through May 2011.[8] For each commodity, the number of accounts reporting cash and futures is reported, as is how many futures positions are reported by accounts that report both cash and futures, as a percentage of total futures positions reported in the LTRS data. For wheat and soybeans, this is roughly 50%, corn is lower at 30%, and cotton is higher at 70%. The table also reports the time series average of the aggregate cash futures, and cash plus futures (C+F), expressed as the notional value of contracts (and contract-equivalents, for cash) using fixed prices as of December 15, 2006. For all commodities except soybean oil, our accounts are long cash and short futures, giving us confidence in the classification. Soybean oil exhibits near slightly short cash on average, as well as larger short futures positions. Given that soybean oil is a refined product, it is not surprising that this market operates differently than grains and cotton. Wheat, corn, soybeans, and cotton all exhibit "under-hedging," where aggregate futures positions tend to be smaller than cash positions in absolute value.[9]

Futures positions and cash positions tend to co-move negatively. For example, the panel correlation of the monthly change in net cash and change in net futures in soybeans is -0.32. This suggests that many accounts in our sample are indeed distributors who make the spread between futures contracts and cash purchase agreements. Indeed, an inspection of these accounts reveals that some of the largest accounts are involved in distribution or merchandising.

Panel B examines how movements in the VIX correlate with changes in futures, cash, and total cash plus futures positions of these accounts during the post-crisis period. We regress the change in futures (cash, cash plus futures) position as the left-hand side variable on the contemporaneous plus one lag monthly change in the VIX, and the previous calendar month's futures return, as right-hand side variables. When computing changes in the

[7] To our knowledge, this is the first study to utilize this data to examine the joint cash and futures behavior of hedgers. However, the reporting process for cash positions is different than that for futures positions and a few caveats are required. First, cash positions are self-reported by the account holder on paper (which is then keyed into a database by CFTC), as opposed to futures positions, which are reported electronically on behalf of account holders by clearing members. We hand-correct a number of obvious clerical data errors. However, the data from some accounts may be more or less reliable depending on how well each account tracks its daily positions. Second, given that only firms are only required to report if they have a bona fide hedging exemption and exceed federal speculative position limits, we observe gaps in coverage that do not represent a position close to zero, as in the LTRS data. Finally, although reporting is supposed to be as of the last Friday of the month, in practice reporting can sometimes occur around that day rather than on that day. We are careful to match an account's cash positions with its futures positions on the reporting day indicated by the account on the cash reporting form. Given these caveats, we examine the panel of changes in positions for individual accounts rather than changes in aggregate positions. We winsorize changes in the cash and futures at the 1% and 99% percent levels to remove the effect of extreme outliers.

[8] A handful of financial accounts report cash positions, which we do not include in our analysis. A number of other unclassified traders also appear in our analysis. As in the futures data, they tend to be much smaller in aggregate than commercial hedgers in the commodities we examine, although their behavior is similar. For consistency, we focus on the group of accounts classified as commercial hedgers.

[9] However, our data does not include option positions, which mitigate this observed difference.

VIX, we are careful to compute the change in VIX from the reporting day of the previous month to the reporting day of this month for each account so that all information is available at time *t*. The coefficient on the contemporaneous change in VIX is positive for all commodities, indicating that increases in the VIX tend to reduce hedgers' short futures positions. For example, in cotton, a one-standard deviation increase in the VIX (675 basis points in the sample) is associated with a +0.14-standard deviation change in futures position, and is statistically significant at the 1% level. The coefficients in other commodities are also positive, although the statistical significance is limited given the limited number of months and accounts.[10]

Increases in the VIX also tend to reduce commercial hedgers' cash positions as well, with negative coefficients in all commodities (with the exception of soybean oil). For example, in cotton, a one-standard deviation increase in the VIX is associated with a cash position reduction of 0.08-standard deviations during this period, statistically significant at the 1% level. Coefficients in other commodities (with the exception of soybean oil) are also negative, but statistically insignificant. Overall, the data suggest that commercial hedgers in commodities futures markets adjust their cash positions in the opposite direction as adjustments in futures positions. This chain of adjustments implies that producers such as farmers may end up with increased exposures to commodity price risk.

One might argue that producers may hedge directly through the futures markets themselves or reduce their production. According to our analysis, the reduced aggregate short futures positions by commercial hedgers gives no evidence for producers directly taking short positions in futures. As production in grains and cotton move according to an annual harvest schedule, it is also difficult for them to reduce production in response to weekly or monthly fluctuations in the VIX. To examine this issue more closely, we turn to the USDA monthly projections of the next year's harvest for wheat, corn, soybeans, soybean oil, and cotton. We analyze whether the monthly 12-month percentage change in expected production covaries with changes in the VIX. Table A.13 confirms that expected production did not co-move in any significant way with changes in the VIX.

Our analysis of commercial hedgers' cash positions in a set of commodities suggests that as distressed financials liquidated long futures positions in response to increases in the VIX, commodity price risk flowed from financial traders back towards the ultimate producers of these commodities.

[10] We cluster standard errors at the monthly level because position changes across traders may be correlated within a month given aggregate shocks. As with the account-level CIT analysis, clustering standard errors at the account-level has a negative statistically significant coefficient for corn at the 5% level and for cotton at the 1% level.

Figure A.1: Long-Run Position Responses of CITs

This figure plots the cumulative response of CITs to a one-standard deviation change in the VIX during the period from September 15, 2008 to June 1, 2011. The vertical axis indicates the position response standardized to standard-deviations of post-crisis position changes.

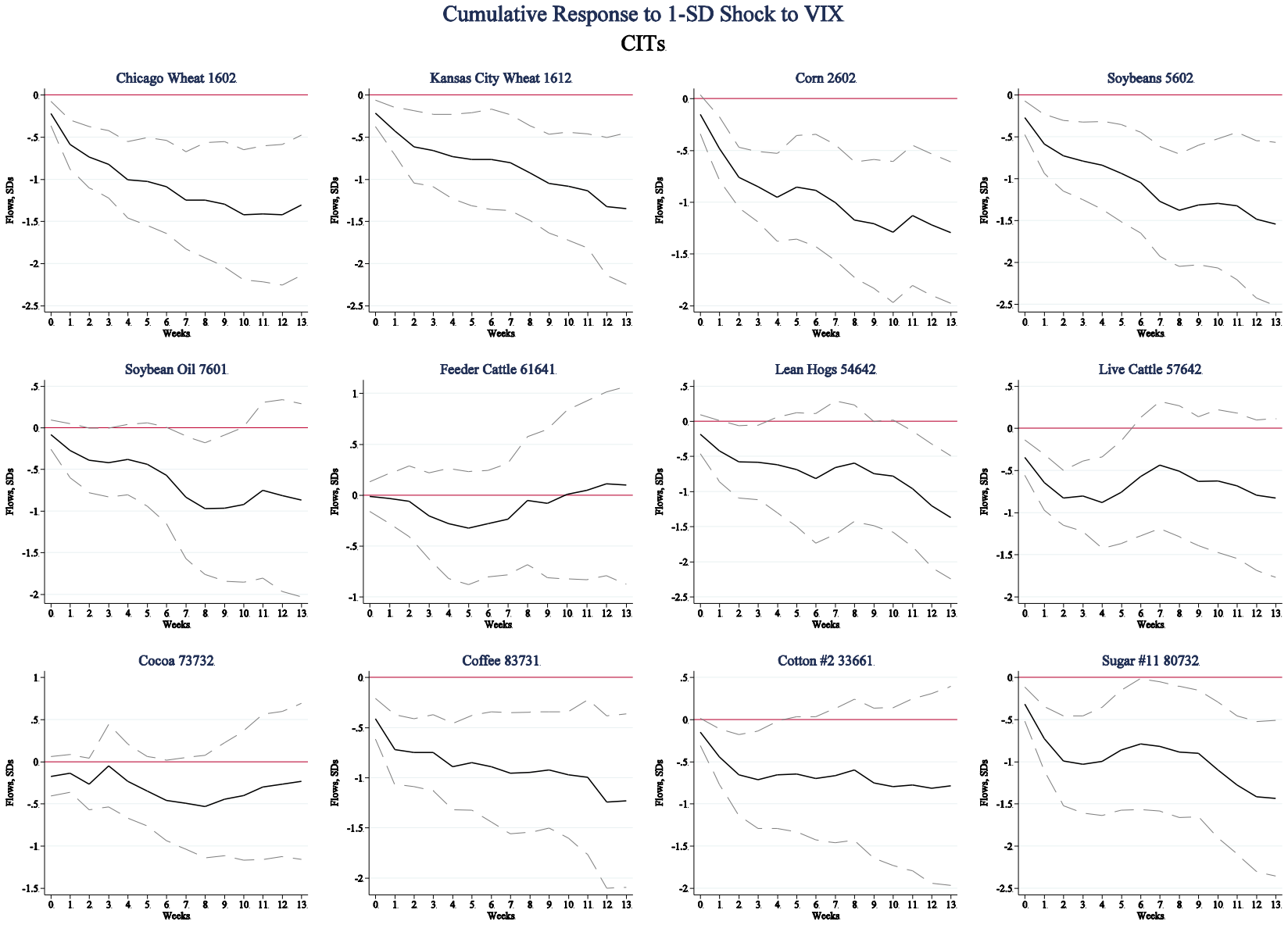

Table A.1: Commodities and Roll Schedule

We list the 19 US indexed commodities compromising the S&P GSCI and Dow Jones-UBS Commodity Indices in 2011. Each commodity is listed, along with the roll schedule of the S&P GSCI in 2011. Aluminum, Brent Crude Oil, Lead, Gasoil, Nickel, Zinc are not included as they are not traded on US exchanges. For a given commodity, each index tracks the same contract (e.g., Sugar #11 traded on ICE), except for Copper. The GSCI tracks copper traded on the London Metal Exchange, for which we do not have data. We use the DJ-UBS roll schedule for copper, which tracks copper traded on CME/COMEX.

Sector	**Commodity Name**	**Exchange**	**GSCI**	**DJ-UBS**	**Designated Contract Expirations at Beginning of Month (GSCI)**											
					Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Grains	Chicago Wheat	CME/CBT	X	X	3	3	5	5	7	7	9	9	12	12	12	3
	Corn	CME/CBT	X	X	3	3	5	5	7	7	9	9	12	12	12	3
	Kansas City Wheat	KBCT	X		3	3	5	5	7	7	9	9	12	12	12	3
	Soybeans	CME/CBT	X	X	3	3	5	5	7	7	11	11	11	11	1	1
	Soybean Oil	CME/CBT		X	3	3	5	5	7	7	12	12	12	12	1	1
Livestock	Feeder Cattle	CME	X		3	3	4	5	8	8	8	9	10	11	1	1
	Lean Hogs	CME	X	X	2	4	4	6	6	7	8	10	10	12	12	2
	Live Cattle	CME	X	X	2	4	4	6	6	8	8	10	10	12	12	2
Softs	Cocoa	ICE	X		3	3	5	5	7	7	9	9	12	12	12	3
	Coffee	ICE	X	X	3	3	5	5	7	7	9	9	12	12	12	3
	Cotton #2	ICE	X	X	3	3	5	5	7	7	12	12	12	12	12	3
	Sugar #11	ICE	X	X	3	3	5	5	7	7	10	10	10	3	3	3
Energy	Crude Oil	CME/NYMEX	X	X	2	3	4	5	6	7	8	9	10	11	12	1
	Heating oil	CME/NYMEX	X	X	2	3	4	5	6	7	8	9	10	11	12	1
	Natural Gas	CME/NYMEX	X	X	2	3	4	5	6	7	8	9	10	11	12	1
	RBOB Gasoline	CME/NYMEX	X	X	2	3	4	5	6	7	8	9	10	11	12	1
Metals	Copper	CME/COMEX	X	X	3	3	5	5	7	7	9	9	12	12	12	3
	Gold	CME/COMEX	X	X	2	4	4	6	6	8	8	12	12	12	12	2
	Silver	CME/COMEX	X	X	3	3	5	5	7	7	9	9	12	12	12	3

Table A.2: Spot Price Bloomberg Codes

Commodity	Spot price code	Description	Units
Chicago Wheat	WEATCHEL Index	USDA No. 2 Soft Red Winter Wheat Spot Price/Chicago Illinois	USD/bushel (60lbs)
Kansas City Wheat	WEATTKHR Index	USDA No. 1 Hard Red Winter Wheat Spot Price/Kansas City Missouri	USD/bushel (60lbs)
Corn	GXGRCPSP Index	USDA No. 2 Yellow Corn Bid Spot - Chicago/Term Elev - USD/Bushel	USD/bushel (56lbs)
Soybeans	GXGRSPSP Index	USDA No. 1 Yel Soybean Bid Spot - Chicago - USD/Bushel	USD/bushel Note that CME futures are for No. 2 soybean, with a 6 cent premium for No 1. We thus subtract 6 cents from this spot price.
Soybean Oil	SOYPIOIL Index	USDA Crude Soybean Oil Spot Price/Illinois	Cents/pound
Feeder Cattle	None		
Lean Hogs	HOGSNATL Index	USDA National Markets 51-52% Lean Hogs Weighted Spot Price	USD/cwt
Live Cattle	CATLLSP3 Comdty	USDA Cattle Live Slaughtered Steer Average Price of 35 -65% Choice	Cents/pound
Cocoa (ICE)	COCMSANZ Index	Cocoa Merchants Sanchez F.A.Q. Cocoa Bean Spot Price	USD/MT
Coffee (ICE)	COFECPAR Index	Intl Coffee Organization Other Milds New York	Cents/pound
Cotton #2 (ICE)	COTNSAVG Index	USDA Strict Low Middling Grade Cotton Average Spot Price	Cents/pound
Sugar #11 (ICE)	SUGARSPT Index	CSCE No. 11 Sugar Spot Price/Global	Cents/pound
Crude Oil	USCRWTIC Index	WTI Cushing Crude Oil Spot Px	USD/barrel
Heating Oil	NO2INYPR Index	Bloomberg New York Harbor No.2 Heating Oil Prompt-Month Spot Price	Cents/gallon
Natural Gas	NGUSHHUB Index	Henry Hub Natural Gas Spot Price	USD/MMBtu
RBOB Gasoline	RBOB87PM Index	Bloomberg 84 Octane RBOB Gasoline Prompt Month Spot Pipeline Px/New York Harbor	Cents/gallon
Copper	MBCUCU16 Index	Copper High Grade Comex Spot Settlement Daily Price	Cents/pound
Gold	XAU BGN Curncy	XAUUSD Spot Exchange Rate - Price of 1 XAU in USD	Dollars
Silver	XAG BGN Curncy	XAGUSD Spot Exchange Rate - Price of 1 XAG in USD	Dollars

Table A.3: December 15, 2006 Prices

Prices of Indexed Contracts on December 15, 2006			
Chicago Wheat	494.25 cents/bushel (5000 per contract)	Cotton #2 (ICE)	54.96 cents/pound (50000 per contract)
Corn	369 cents/bushel (5000 per contract)	Sugar #11 (ICE)	11.5 cents/pound (112000 per contract)
Kansas City Wheat (KCBT)	509.75 cents/bushel (5000 per contract)	Crude Oil	64.09 dollars/barrel (1000 per contract)
Soybeans	672.25 cents/bushel (5000 per contract)	Heating Oil	181.67 cents/gallon (42000 per contract)
Soybean Oil	28.59 cents/pound (60000 per contract)	Natural Gas	7.486 dollars/mmBtu [million British thermal units] (10000 per contract)
Feeder Cattle	96.85 cents/pound (50000 per contract)	RBOB Gasoline	171.34 cents/gallon (42000 per contract)
Lean Hogs	62.25 cents/pound (40000 per contract)	Copper	301.65 cents/pound (25000 per contract)
Live Cattle	89.5 cents/pound (40000 per contract)	Gold	619.1 dollars/troy ounce (100 per contract)
Cocoa (ICE)	1650 dollars/ton (10 per contract)	Silver	12.98 dollars/troy ounce (5000 per contract)
Coffee (ICE)	125.4 cents/pound (37500 per contract)		

Table A.4: Alternative Classification

We report the number of traders and trader characteristics by year and trader category using an 80% cutoff for long positions and 12 commodity cutoff for CITs. Panel A gives counts of traders, while Panel B gives the median notional value of each traders' positions during the year. Panel C reports the average number of commodities with any exposure. For security reasons, the number of traders for CIT-HF and Hedger-HFs are concealed as they are very small.

Panel A: Number of Traders

Ranking Year	Population	CIT	C.Hedger	Hedge Fund	CIT-HF	Hedger-HF	Others
2000	4822	2	810	324			3674
2001	4576	3	857	335			3370
2002	4729	5	953	391			3364
2003	4990	5	1075	468			3425
2004	5376	7	1169	567			3612
2005	5197	7	1208	689			3269
2006	5664	10	1453	878			3295
2007	5629	11	1483	979			3124
2008	5667	12	1503	1093			3030
2009	5148	13	1332	1085			2693
2010	5699	14	1465	1122			3076

Panel B: Median Notional Net Position, 15Dec2006 Indexed Contract Prices $M

Ranking Year	Population	CIT	C.Hedger	Hedge Fund	CIT-HF	Hedger-HF	Others
2000	0.026	984.881	-2.434	0.806	.	-3.936	0.070
2001	0.014	586.170	-1.056	-0.030	.	-2.463	0.055
2002	0.005	316.405	-2.970	1.712	314.100	-4.127	0.045
2003	0.023	851.146	-2.482	2.447	278.254	-4.814	0.056
2004	-0.008	874.096	-3.265	0.720	388.174	-5.765	0.000
2005	-0.181	1893.471	-3.626	0.118	519.363	-5.048	-0.040
2006	-0.103	1737.572	-4.760	0.205	662.153	-7.797	0.000
2007	-0.191	2759.156	-5.569	0.387	501.475	-6.402	-0.024
2008	-0.291	3098.530	-5.301	0.232	699.306	-6.139	-0.014
2009	-0.261	3876.971	-5.084	0.445	722.193	-4.362	-0.054
2010	-0.242	2631.126	-7.128	1.407	780.652	-6.736	-0.013

Panel C: Average Number of Commodities with Any Exposure

Ranking Year	Population	CIT	C.Hedger	Hedge Fund	CIT-HF	Hedger-HF	Others
2000	1.257	16.474	1.246	2.364	.	1.011	1.154
2001	1.268	16.243	1.215	2.448	.	1.166	1.151
2002	1.263	16.163	1.210	2.442	12.516	1.106	1.117
2003	1.289	16.315	1.210	2.418	12.796	1.053	1.135
2004	1.328	16.928	1.204	2.543	13.727	1.160	1.135
2005	1.373	17.234	1.194	2.605	14.667	1.164	1.122
2006	1.415	17.792	1.200	2.609	15.005	1.337	1.110
2007	1.480	18.538	1.243	2.671	15.131	1.233	1.116
2008	1.502	18.192	1.239	2.437	15.793	1.164	1.188
2009	1.549	18.168	1.208	2.528	15.999	1.154	1.191
2010	1.574	17.932	1.242	2.639	17.125	1.221	1.230

Table A.5: Results Using Alternative Classification

These tables report the results from estimating equation (5) using a regression of position changes for each group on changes in the VIX, analogous to Table 4 in the paper, but with an alternative classification for CITs. The sample period is September 15, 2008 through June 1, 2011. Coefficients are standardized to standard deviations in flows per standard deviations of post-crisis VIX changes. For brevity, only the term on the contemporaneous change in VIX is reported. We use the Newey and West (1987) construction for standard errors with four lags. */**/*** denotes significant at the 10%, 5% and 1% levels, respectively.

		Coefficient on Contemporaneous ΔVIX							
		CITs		**Hedge Funds**		**Comm. Hedgers**		**Other Unclassified**	
Flows (σ)		Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic
Grains	Chi W	-0.173	[-2.13]**	-0.222	[-2.72]***	0.295	[3.92]***	0.165	[1.38]
	Corn	-0.155	[-1.71]*	-0.173	[-1.86]*	0.134	[1.61]	0.160	[2.48]**
	KC W	-0.171	[-1.89]*	-0.137	[-1.70]*	0.222	[2.70]***	-0.027	[-0.41]
	Soybeans	-0.225	[-2.18]**	-0.170	[-1.83]*	0.176	[2.24]**	0.205	[2.56]**
	Soyb Oil	-0.088	[-0.83]	-0.143	[-1.67]*	0.179	[1.81]*	0.141	[1.93]*
Livestock	F Cattle	-0.080	[-1.22]	-0.067	[-0.81]	0.181	[2.31]**	-0.042	[-0.62]
	L Hogs	-0.157	[-0.99]	-0.050	[-0.87]	-0.003	[-0.04]	0.196	[2.20]**
	L Cattle	-0.364	[-2.84]***	-0.050	[-0.59]	0.175	[2.41]**	0.144	[2.15]**
Softs	Cocoa	-0.127	[-1.21]	0.034	[0.48]	0.040	[0.75]	0.066	[0.59]
	Coffee	-0.367	[-3.15]***	-0.129	[-1.54]	0.210	[2.73]***	0.170	[2.08]**
	Cotton	-0.224	[-2.08]**	-0.182	[-2.27]**	0.222	[2.69]***	0.253	[2.66]***
	Sugar	-0.341	[-2.33]**	-0.144	[-1.75]*	0.144	[2.28]**	0.232	[2.84]***
Average R-Squared		13.07%		16.13%		15.85%		10.69%	

Table A.6: Price Changes with Extended Controls (Equation 4)

This table reports results from estimating equation (4) with extended controls. The sample period is September 15, 2008 through June 1, 2011. Coefficients are standardized to percentage points of return per one-standard deviation change. */**/*** denotes significant at the 10%, 5%, and 1% levels.

		ΔVIX, Contemp.		ΔVIX., Lag 1		Comdty Ret., Lag 1		ΔBDI		ΔBkeven Inf.		ΔBaa Spread		Avg Basis, Lag 1	
Returns (%)		Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic
Grains	Chi W	-2.550	[-6.44]***	-0.196	[-0.33]	-0.181	[-1.99]**	1.195	[2.30]**	0.080	[0.15]	0.015	[0.03]	0.072	[0.10]
	Corn	-2.269	[-3.92]***	-0.464	[-0.75]	-0.375	[-4.21]***	0.555	[0.84]	0.173	[0.29]	-0.716	[-1.26]	-0.665	[-1.35]
	KC W	-2.495	[-7.16]***	-0.556	[-1.07]	-0.195	[-2.11]**	0.943	[2.16]**	0.139	[0.29]	0.125	[0.28]	1.082	[2.56]**
	Soybeans	-1.492	[-3.71]***	-0.576	[-1.30]	-0.242	[-3.06]***	0.023	[0.05]	0.022	[0.06]	-0.743	[-1.34]	0.185	[0.26]
	Soyb Oil	-1.656	[-3.51]***	-0.415	[-0.92]	-0.179	[-2.71]***	0.320	[0.78]	0.363	[1.02]	-0.597	[-1.10]	0.890	[2.10]**
LS	L Hogs	-0.463	[-1.43]	-1.127	[-3.95]***	-0.092	[-1.14]	-0.036	[-0.12]	-0.467	[-1.49]	0.740	[1.57]	-0.219	[-0.56]
	L Cattle	-0.867	[-4.03]***	-0.698	[-3.81]***	-0.274	[-3.43]***	0.212	[0.98]	0.163	[0.68]	0.053	[0.24]	0.186	[0.88]
Softs	Cocoa	-0.913	[-2.32]**	0.215	[0.64]	0.047	[0.59]	0.387	[0.72]	0.611	[0.90]	0.021	[0.04]	0.004	[0.01]
	Coffee	-1.317	[-4.09]***	-0.018	[-0.05]	-0.083	[-1.18]	-0.296	[-0.83]	1.335	[2.98]***	0.410	[0.74]	-0.976	[-2.52]**
	Cotton	-1.502	[-4.80]***	0.489	[0.88]	0.019	[0.23]	0.277	[0.54]	0.032	[0.06]	-0.549	[-0.85]	3.966	[2.39]**
	Sugar	-1.118	[-1.85]*	0.083	[0.17]	-0.277	[-3.99]***	-0.569	[-1.15]	0.685	[1.41]	-0.741	[-1.05]	-0.426	[-0.90]
Energy	Oil	-2.075	[-3.76]***	-0.671	[-0.94]	-0.213	[-2.13]**	0.696	[1.29]	1.264	[1.93]*	0.106	[0.14]	-0.975	[-2.21]**
	Heat Oil	-1.818	[-3.47]***	-0.594	[-0.96]	-0.078	[-1.00]	0.152	[0.27]	1.446	[2.08]**	-0.116	[-0.16]	-0.155	[-0.20]
	Nat Gas	-1.369	[-2.18]**	-0.291	[-0.45]	-0.145	[-1.78]*	0.272	[0.52]	0.502	[0.64]	-0.145	[-0.19]	0.161	[0.23]
	Gas	-1.627	[-2.44]**	-0.948	[-1.37]	-0.159	[-2.24]**	0.806	[1.48]	1.311	[2.37]**	-0.340	[-0.43]	-0.158	[-0.19]
Metals	Copper	-1.733	[-4.68]***	-0.509	[-0.69]	-0.082	[-1.26]	0.622	[1.26]	-0.307	[-0.90]	-0.202	[-0.37]	0.075	[0.15]
	Gold	-0.362	[-0.79]	0.367	[1.35]	-0.156	[-2.26]**	0.650	[1.70]*	0.198	[0.38]	0.378	[0.96]	-0.580	[-2.90]***
	Silver	-0.887	[-1.53]	0.559	[1.65]*	-0.122	[-1.16]	1.024	[1.70]*	1.311	[1.88]*	0.467	[0.74]	-1.424	[-3.81]***

		ΔTerm Spread		ShanghaiA Ret.		Δ3-mo T Bill		%12mΔ E[Demand]		%12mΔ E[Stocks]		%12m Δ E[US Prod]	
Continued		Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic
Grains	Chi W	0.783	[1.35]	0.502	[0.89]	0.412	[0.85]	-4.765	[-1.49]	-1.118	[-1.55]	5.863	[1.65]*
	Corn	0.392	[0.56]	0.966	[1.59]	0.384	[0.61]	1.789	[1.43]	1.263	[0.83]	-0.259	[-0.24]
	KC W	0.957	[1.89]*	0.591	[1.14]	0.191	[0.45]						
	Soybeans	0.437	[0.80]	1.183	[2.43]**	0.414	[0.86]	0.252	[0.53]	0.580	[1.28]	-0.326	[-0.78]
	Soyb Oil	0.537	[0.67]	1.300	[3.02]***	0.443	[0.71]	0.887	[1.92]*	0.171	[0.38]	0.019	[0.04]
LS	L Hogs	0.814	[1.71]*	0.868	[3.03]***	0.153	[0.41]						
	L Cattle	0.046	[0.15]	-0.059	[-0.28]	-0.080	[-0.38]						
Softs	Cocoa	-0.600	[-0.97]	0.915	[2.31]**	-1.242	[-2.26]**						
	Coffee	0.494	[0.89]	1.157	[4.16]***	-0.388	[-0.91]						
	Cotton	-0.625	[-0.81]	0.963	[2.03]**	0.113	[0.21]	-1.390	[-1.01]	-1.322	[-1.03]	4.712	[2.94]***
	Sugar	0.030	[0.04]	0.575	[0.63]	0.008	[0.01]						
Energy	Oil	1.828	[1.32]	0.787	[1.32]	1.431	[1.33]						
	Heat Oil	0.701	[0.50]	0.936	[1.70]*	0.499	[0.51]						
	Nat Gas	-0.781	[-0.58]	0.246	[0.37]	-0.517	[-0.52]						
	Gas	1.357	[1.13]	0.904	[1.41]	1.036	[1.15]						
Metals	Copper	1.864	[2.38]**	1.071	[2.18]**	0.439	[0.78]						
	Gold	-0.193	[-0.40]	0.699	[1.93]*	-0.326	[-0.63]						
	Silver	0.524	[0.57]	1.398	[2.86]***	0.482	[0.57]						

Table A.7: Position Changes with Extended Controls (Equation 5)

This table reports results from estimating equation (5) with extended controls for each trader group. The sample period is September 15, 2008 through June 1, 2011. Coefficients are standardized to percentage points of return per one-standard deviation change. */**/*** denotes significant at the 10%, 5%, and 1% levels.

CIT Position Changes and Changes in VIX

		15Sep2008-01Jun2011, (T=142 Weeks)													
		ΔVIX, Contemp.		**ΔVIX., Lag 1**		**Comdty Ret., Lag 1**		**ΔBDI**		**ΔBkeven Inf.**		**ΔBaa Spread**		**Avg Basis, Lag 1**	
		Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic
Grains	Chi W	-0.204	[-2.12]**	-0.198	[-1.57]	-0.114	[-1.03]	0.010	[0.12]	0.083	[0.78]	-0.092	[-0.74]	-0.088	[-0.70]
	Corn	-0.124	[-1.00]	-0.089	[-0.79]	0.048	[0.57]	0.069	[0.97]	0.001	[0.01]	-0.119	[-1.05]	-0.011	[-0.13]
	KC W	-0.207	[-2.21]**	-0.080	[-1.07]	-0.027	[-0.29]	0.010	[0.11]	0.053	[0.52]	-0.095	[-0.96]	0.150	[1.75]*
	Soybeans	-0.236	[-2.24]**	-0.194	[-1.67]*	0.108	[0.88]	-0.029	[-0.39]	0.000	[0.00]	-0.128	[-0.79]	0.017	[0.10]
	Soyb Oil	-0.053	[-0.47]	-0.038	[-0.28]	0.075	[0.80]	-0.083	[-0.74]	0.026	[0.35]	-0.033	[-0.28]	0.297	[2.56]**
Lstock	F Cattle														
	L Hogs	-0.174	[-1.14]	-0.113	[-1.09]	0.269	[3.41]***	0.035	[0.41]	-0.143	[-0.78]	-0.229	[-1.34]	-0.338	[-2.16]**
	L Cattle	-0.370	[-2.55]**	-0.112	[-1.46]	0.195	[1.94]*	-0.003	[-0.04]	-0.058	[-0.32]	-0.187	[-1.46]	0.052	[0.70]
Softs	Cocoa	-0.146	[-1.90]*	0.188	[0.92]	0.033	[0.41]	0.006	[0.08]	0.080	[0.57]	-0.182	[-1.18]	0.086	[0.82]
	Coffee	-0.319	[-2.80]***	-0.172	[-1.68]*	-0.063	[-0.72]	0.061	[0.78]	0.037	[0.51]	-0.118	[-0.87]	-0.053	[-0.63]
	Cotton	-0.138	[-1.45]	-0.122	[-1.41]	0.155	[1.97]**	0.062	[1.03]	-0.090	[-0.94]	-0.191	[-1.23]	-0.149	[-0.60]
	Sugar	-0.273	[-2.46]**	-0.262	[-2.76]***	-0.067	[-1.00]	-0.027	[-0.40]	-0.094	[-1.02]	-0.084	[-0.91]	-0.122	[-1.63]

		ΔTerm Spread		**ShanghaiA Ret., Contemp**		**Δ3-mo T Bill**		**12mo %Δ E[Demand]**		**12mo %Δ E[Stocks]**		**12mo %Δ E[US Prod]**	
Continued		Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic
Grains	Chi W	-0.025	[-0.19]	-0.028	[-0.38]	-0.054	[-0.52]	0.256	[0.41]	0.176	[1.52]	-0.630	[-0.95]
	Corn	-0.171	[-1.25]	-0.088	[-1.21]	-0.067	[-0.79]	-0.241	[-0.85]	0.007	[0.02]	0.285	[1.12]
	KC W	-0.120	[-0.70]	0.082	[0.75]	-0.259	[-1.59]						
	Soybeans	-0.110	[-0.99]	-0.038	[-0.53]	-0.108	[-1.10]	-0.056	[-0.36]	0.159	[1.44]	0.086	[0.60]
	Soyb Oil	-0.126	[-1.04]	-0.096	[-1.30]	-0.013	[-0.14]	0.067	[0.40]	-0.133	[-1.16]	0.031	[0.20]
Lstock	F Cattle												
	L Hogs	0.079	[0.31]	-0.029	[-0.28]	0.120	[0.64]						
	L Cattle	-0.155	[-0.68]	-0.085	[-0.84]	-0.065	[-0.43]						
Softs	Cocoa	-0.282	[-1.53]	-0.129	[-1.10]	-0.168	[-1.25]						
	Coffee	-0.073	[-0.63]	0.049	[0.61]	0.050	[0.54]						
	Cotton	-0.074	[-0.54]	-0.045	[-0.59]	0.027	[0.22]	0.407	[1.80]*	0.609	[2.97]***	-0.044	[-0.17]
	Sugar	-0.166	[-1.15]	0.056	[0.82]	-0.190	[-1.97]**						

Table A.7, Continued

Hedge Fund Position Changes and Changes in VIX

		15Sep2008-01Jun2011, (T=142 Weeks)													
		ΔVIX, Contemp.		**ΔVIX., Lag 1**		**Comdty Ret., Lag 1**		**ΔBDI**		**ΔBkeven Inf.**		**ΔBaa Spread**		**Avg Basis, Lag 1**	
		Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic
Grains	Chi W	-0.221	[-2.90]***	0.153	[1.37]	0.317	[3.31]***	0.147	[1.58]	0.008	[0.09]	0.024	[0.19]	0.006	[0.04]
	Corn	-0.175	[-1.82]*	0.002	[0.02]	0.147	[1.31]	-0.013	[-0.16]	0.108	[1.62]	-0.043	[-0.41]	-0.088	[-0.76]
	KC W	-0.155	[-2.58]**	-0.083	[-1.00]	0.287	[3.38]***	0.095	[1.28]	0.002	[0.02]	0.100	[1.18]	0.106	[1.15]
	Soybeans	-0.194	[-2.33]**	-0.103	[-0.72]	0.201	[2.48]**	-0.033	[-0.38]	-0.004	[-0.05]	-0.073	[-0.67]	0.229	[1.71]*
	Soyb Oil	-0.192	[-2.09]**	-0.027	[-0.23]	0.323	[5.34]***	-0.001	[-0.02]	0.013	[0.19]	-0.069	[-0.60]	0.112	[1.12]
Lstock	F Cattle														
	L Hogs	-0.058	[-0.82]	-0.080	[-1.00]	0.374	[4.84]***	0.020	[0.28]	-0.025	[-0.25]	-0.043	[-0.44]	0.037	[0.36]
	L Cattle	-0.058	[-0.61]	-0.003	[-0.04]	0.284	[3.06]***	-0.058	[-0.63]	-0.013	[-0.16]	0.133	[1.06]	-0.005	[-0.04]
Softs	Cocoa	0.031	[0.43]	0.148	[2.15]**	0.456	[4.41]***	0.028	[0.32]	0.013	[0.13]	-0.025	[-0.21]	-0.063	[-0.74]
	Coffee	-0.171	[-1.98]**	0.011	[0.12]	0.373	[3.67]***	-0.133	[-1.36]	0.204	[1.71]*	-0.067	[-0.57]	-0.096	[-1.19]
	Cotton	-0.224	[-2.45]**	-0.104	[-0.91]	0.180	[1.67]*	0.058	[0.62]	-0.031	[-0.29]	0.133	[0.90]	-0.265	[-0.70]
	Sugar	-0.124	[-1.39]	-0.023	[-0.23]	0.030	[0.43]	-0.053	[-0.46]	0.185	[1.53]	-0.014	[-0.12]	0.045	[0.65]

		ΔTerm Spread		**ShanghaiA Ret., Contemp**		**Δ3-mo T Bill**		**12mo %Δ E[Demand]**		**12mo %Δ E[Stocks]**		**12mo %Δ E[US Prod]**	
Continued		Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic
Grains	Chi W	0.130	[0.98]	-0.036	[-0.35]	0.053	[0.48]	-0.021	[-0.03]	-0.077	[-0.56]	0.179	[0.24]
	Corn	-0.036	[-0.32]	0.159	[2.18]**	-0.046	[-0.56]	0.477	[1.70]*	0.548	[1.50]	-0.264	[-1.14]
	KC W	0.034	[0.39]	0.041	[0.50]	-0.086	[-1.13]						
	Soybeans	0.012	[0.11]	0.224	[2.71]***	-0.100	[-1.15]	-0.000	[-0.00]	0.048	[0.49]	0.043	[0.32]
	Soyb Oil	0.048	[0.42]	0.201	[2.50]**	-0.143	[-2.03]**	0.032	[0.22]	0.200	[1.63]	0.016	[0.12]
Lstock	F Cattle												
	L Hogs	0.164	[1.30]	-0.064	[-0.70]	0.164	[1.62]						
	L Cattle	0.162	[1.41]	0.109	[1.32]	0.036	[0.43]						
Softs	Cocoa	0.035	[0.28]	0.003	[0.05]	-0.028	[-0.34]						
	Coffee	0.066	[0.60]	0.128	[1.90]*	-0.015	[-0.19]						
	Cotton	0.100	[0.71]	0.175	[2.21]**	-0.032	[-0.40]	0.155	[0.45]	0.173	[0.63]	-0.389	[-0.93]
	Sugar	-0.145	[-1.10]	0.005	[0.05]	-0.043	[-0.33]						

Table A.7, Continued

Commercial Hedger Position Changes and Changes in VIX

		15Sep2008-01Jun2011, (T=142 Weeks)													
		ΔVIX, Contemp.		ΔVIX., Lag 1		Comdty Ret., Lag 1		ΔBDI		ΔBkeven Inf.		ΔBaa Spread		Avg Basis, Lag 1	
		Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic
Grains	Chi W	0.278	[4.13]***	-0.037	[-0.41]	-0.095	[-1.13]	-0.090	[-1.08]	-0.020	[-0.23]	-0.023	[-0.19]	0.028	[0.21]
	Corn	0.132	[1.70]*	0.071	[0.75]	-0.160	[-1.68]*	-0.033	[-0.37]	-0.110	[-1.54]	0.006	[0.05]	0.037	[0.28]
	KC W	0.207	[2.93]***	0.074	[0.84]	-0.214	[-2.19]**	-0.119	[-1.75]*	0.036	[0.56]	-0.032	[-0.39]	-0.141	[-1.60]
	Soybeans	0.241	[3.41]***	0.146	[1.16]	-0.200	[-2.65]***	-0.016	[-0.19]	0.012	[0.20]	0.029	[0.30]	-0.163	[-1.08]
	Soyb Oil	0.220	[2.31]**	0.069	[0.62]	-0.199	[-2.88]***	-0.050	[-0.57]	0.051	[0.64]	0.055	[0.50]	-0.195	[-2.33]**
Lstock	F Cattle														
	L Hogs	0.022	[0.28]	0.104	[1.61]	-0.248	[-2.51]**	-0.022	[-0.27]	-0.061	[-0.71]	0.026	[0.28]	0.280	[1.88]*
	L Cattle	0.180	[2.38]**	0.091	[1.05]	-0.210	[-2.74]***	-0.074	[-0.94]	0.039	[0.42]	-0.088	[-0.85]	-0.097	[-0.96]
Softs	Cocoa	0.033	[0.55]	-0.106	[-1.50]	-0.445	[-4.66]***	-0.097	[-1.02]	-0.030	[-0.32]	0.006	[0.06]	0.080	[0.94]
	Coffee	0.217	[2.66]***	0.073	[0.69]	-0.232	[-2.31]**	0.102	[1.08]	-0.338	[-4.69]***	0.056	[0.42]	0.113	[1.55]
	Cotton	0.222	[2.55]**	0.195	[1.98]**	-0.213	[-1.92]*	-0.038	[-0.53]	0.125	[1.36]	-0.013	[-0.12]	0.059	[0.22]
	Sugar	0.135	[2.09]**	-0.008	[-0.09]	0.089	[1.07]	0.137	[1.39]	-0.084	[-1.04]	0.178	[1.46]	0.047	[0.70]

		ΔTerm Spread		ShanghaiA Ret., Contemp		Δ3-mo T Bill		12mo %Δ E[Demand]		12mo %Δ E[Stocks]		12mo %Δ E[US Prod]	
Continued		Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic
Grains	Chi W	-0.083	[-0.73]	-0.140	[-1.34]	-0.029	[-0.29]	0.292	[0.47]	-0.026	[-0.18]	-0.329	[-0.48]
	Corn	0.009	[0.08]	-0.140	[-1.64]	0.114	[1.32]	-0.320	[-1.19]	-0.421	[-1.13]	0.107	[0.50]
	KC W	0.020	[0.18]	-0.117	[-1.47]	0.073	[0.73]						
	Soybeans	0.017	[0.15]	-0.215	[-2.56]**	0.153	[1.71]*	-0.089	[-0.55]	-0.119	[-1.27]	-0.147	[-1.06]
	Soyb Oil	-0.085	[-0.62]	-0.314	[-3.56]***	0.142	[1.56]	0.038	[0.26]	-0.180	[-1.56]	-0.100	[-0.65]
Lstock	F Cattle												
	L Hogs	-0.252	[-2.19]**	0.235	[2.33]**	-0.223	[-2.51]**						
	L Cattle	-0.160	[-1.18]	-0.096	[-1.24]	-0.044	[-0.53]						
Softs	Cocoa	-0.096	[-0.81]	-0.018	[-0.24]	-0.128	[-1.78]*						
	Coffee	-0.009	[-0.08]	-0.096	[-1.37]	0.009	[0.12]						
	Cotton	-0.095	[-0.90]	-0.217	[-2.98]***	-0.041	[-0.43]	-0.091	[-0.26]	-0.302	[-1.42]	-0.009	[-0.03]
	Sugar	0.243	[1.62]	-0.078	[-0.82]	0.152	[1.44]						

Table A.7, Continued

Other Unclassified Position Changes and Changes in VIX

		15Sep2008-01Jun2011, (T=142 Weeks)													
		ΔVIX, Contemp.		**ΔVIX., Lag 1**		**Comdty Ret., Lag 1**		**ΔBDI**		**ΔBkeven Inf.**		**ΔBaa Spread**		**Avg Basis, Lag 1**	
		Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic
Grains	Chi W	0.245	[2.47]**	-0.007	[-0.07]	-0.274	[-2.86]***	-0.139	[-1.49]	-0.009	[-0.08]	-0.002	[-0.01]	0.037	[0.32]
	Corn	0.168	[1.91]*	-0.014	[-0.12]	0.001	[0.01]	0.020	[0.25]	-0.078	[-0.82]	0.130	[1.07]	0.004	[0.04]
	KC W	0.052	[0.76]	0.076	[0.63]	-0.135	[-1.59]	0.033	[0.36]	-0.204	[-2.29]**	-0.061	[-0.58]	0.012	[0.11]
	Soybeans	0.195	[1.95]*	0.094	[0.88]	-0.023	[-0.27]	0.113	[0.97]	-0.021	[-0.15]	0.118	[1.09]	-0.189	[-1.54]
	Soyb Oil	0.139	[1.64]	0.004	[0.04]	-0.219	[-2.53]**	0.092	[1.15]	-0.138	[-1.56]	0.022	[0.21]	-0.136	[-1.32]
Lstock	F Cattle														
	L Hogs	0.205	[1.91]*	0.160	[1.75]*	-0.271	[-4.33]***	-0.005	[-0.07]	0.112	[1.26]	0.046	[0.55]	-0.059	[-0.46]
	L Cattle	0.173	[2.25]**	0.045	[0.51]	-0.339	[-3.37]***	0.162	[1.40]	0.090	[1.14]	-0.058	[-0.53]	0.028	[0.30]
Softs	Cocoa	0.062	[0.59]	-0.172	[-1.71]*	-0.283	[-2.80]***	0.033	[0.41]	-0.028	[-0.20]	0.178	[1.20]	-0.024	[-0.30]
	Coffee	0.222	[2.33]**	-0.010	[-0.11]	-0.321	[-4.25]***	0.061	[0.62]	0.071	[0.37]	0.157	[1.23]	0.056	[0.67]
	Cotton	0.244	[2.30]**	0.072	[0.62]	-0.138	[-1.37]	-0.036	[-0.40]	-0.000	[-0.00]	-0.042	[-0.31]	0.290	[0.74]
	Sugar	0.205	[2.36]**	0.195	[2.25]**	-0.038	[-0.48]	-0.083	[-0.82]	-0.056	[-0.46]	-0.082	[-0.67]	-0.035	[-0.59]

		ΔTerm Spread		**ShanghaiA Ret., Contemp**		**Δ3-mo T Bill**		**12mo %Δ E[Demand]**		**12mo %Δ E[Stocks]**		**12mo %Δ E[US Prod]**	
Continued		Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic
Grains	Chi W	-0.198	[-1.65]*	0.147	[1.47]	-0.063	[-0.55]	-0.643	[-1.05]	0.011	[0.08]	0.694	[0.99]
	Corn	0.137	[1.02]	-0.000	[-0.00]	-0.077	[-0.63]	0.034	[0.13]	0.142	[0.49]	-0.066	[-0.37]
	KC W	0.007	[0.06]	-0.021	[-0.20]	0.058	[0.66]						
	Soybeans	-0.051	[-0.44]	-0.058	[-0.76]	-0.013	[-0.14]	0.161	[0.91]	0.009	[0.07]	0.139	[0.99]
	Soyb Oil	0.166	[1.48]	-0.012	[-0.12]	0.118	[1.44]	-0.175	[-1.30]	-0.088	[-0.81]	0.115	[0.97]
Lstock	F Cattle												
	L Hogs	-0.171	[-1.24]	-0.099	[-1.11]	-0.112	[-1.15]						
	L Cattle	0.020	[0.19]	-0.080	[-1.08]	0.047	[0.50]						
Softs	Cocoa	0.167	[1.21]	-0.020	[-0.25]	0.224	[2.12]**						
	Coffee	-0.014	[-0.09]	-0.137	[-1.85]*	0.023	[0.20]						
	Cotton	-0.028	[-0.19]	-0.112	[-1.23]	0.019	[0.20]	-0.384	[-1.32]	-0.412	[-1.52]	0.392	[1.00]
	Sugar	-0.058	[-0.35]	-0.020	[-0.22]	-0.065	[-0.54]						

Table A.8: Positions Changes and the VIX - Expanded Crisis

We report coefficients from a weekly regression of position changes as the left-hand side variable on contemporaneous and one lag of changes in the VIX as right hand side variables, controlling for lagged commodity returns, percentage changes in the BDI index, changes in the Baa credit spread, and changes in inflation compensation. For wheat, corn, soybeans, soybean oil, and cotton, we also include the 12-month percentage change in projected world demand, US stocks, and US production. Each row reports coefficients for a different commodity, and each column reports coefficients for different trader groups. Coefficients are standardized to standard deviations in flows per one standard deviation change in the VIX during the sample period. The sample period is August 1, 2007 through June 1, 2011 (T=200). For brevity, only the term on the contemporaneous change in VIX is reported. We use the Newey and West (1987) construction for standard errors with four lags. */**/*** denotes significant at the 10%, 5% and 1% levels, respectively.

		Coefficient on Contemporaneous ΔVIX (1-SD)							
		CITs		**Hedge Funds**		**Comm. Hedgers**		**Other Unclassified**	
Flows (σ)		Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic
Grains	Chi W	-0.122	[-1.79]*	-0.222	[-3.11]***	0.282	[4.19]***	0.129	[1.28]
	Corn	-0.143	[-1.83]*	-0.148	[-1.77]*	0.136	[1.78]*	0.142	[1.98]**
	KC W	-0.160	[-2.39]**	-0.137	[-1.90]*	0.170	[2.42]**	0.049	[0.79]
	Soybeans	-0.118	[-1.43]	-0.148	[-1.85]*	0.136	[2.01]**	0.174	[2.38]**
	Soyb Oil	-0.071	[-0.80]	-0.124	[-1.59]	0.153	[1.80]*	0.101	[1.65]*
Livestock	F Cattle	-0.034	[-0.46]	-0.072	[-1.07]	0.119	[1.73]*	0.030	[0.49]
	L Hogs	-0.195	[-1.62]	-0.056	[-1.07]	-0.028	[-0.37]	0.213	[2.66]***
	L Cattle	-0.307	[-2.49]**	-0.055	[-0.74]	0.165	[2.62]***	0.119	[1.81]*
Softs	Cocoa	-0.039	[-0.39]	-0.011	[-0.19]	0.013	[0.26]	0.046	[0.54]
	Coffee	-0.309	[-3.36]***	-0.121	[-1.67]*	0.189	[2.69]***	0.154	[2.23]**
	Cotton	-0.137	[-1.59]	-0.156	[-2.32]**	0.152	[2.30]**	0.207	[2.78]***
	Sugar	-0.246	[-2.35]**	-0.167	[-2.31]**	0.154	[2.08]**	0.145	[1.76]*
Average R-Squared		9.15%		13.93%		13.02%		8.91%	

Table A.9: Positions Changes and the VIX - Immediate Post-Crisis

We report coefficients from a weekly regression of position changes as the left-hand side variable on contemporaneous and one lag of changes in the VIX as right hand side variables, controlling for lagged commodity returns, percentage changes in the BDI index, changes in the Baa credit spread, and changes in inflation compensation. For wheat, corn, soybeans, soybean oil, and cotton, we also include the 12-month percentage change in projected world demand, US stocks, and US production. Each row reports coefficients for a different commodity, and each column reports coefficients for different trader groups. Coefficients are standardized to standard deviations in flows per one standard deviation change in the VIX during the sample period. The sample period is September 15, 2008 through January 1, 2010 (T=68). For brevity, only the term on the contemporaneous change in VIX is reported. We use the Newey and West (1987) construction for standard errors with four lags. */**/*** denotes significant at the 10%, 5% and 1% levels, respectively.

		Coefficient on Contemporaneous ΔVIX (1-SD)							
		CITs		**Hedge Funds**		**Comm. Hedgers**		**Other Unclassified**	
Flows (σ)		Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic
Grains	Chi W	-0.283	[-3.15]***	-0.262	[-2.50]**	0.309	[3.48]***	0.314	[1.93]*
	Corn	-0.374	[-2.82]***	-0.151	[-1.33]	0.112	[1.15]	0.340	[2.33]**
	KC W	-0.314	[-1.90]*	-0.085	[-0.84]	0.376	[3.44]***	-0.130	[-1.35]
	Soybeans	-0.428	[-3.20]***	-0.051	[-0.59]	0.102	[1.28]	0.231	[2.06]**
	Soyb Oil	-0.182	[-1.00]	-0.092	[-0.82]	0.037	[0.32]	0.298	[3.05]***
Livestock	F Cattle	-0.147	[-1.61]	-0.145	[-1.18]	0.261	[2.79]***	0.028	[0.32]
	L Hogs	-0.244	[-1.17]	-0.160	[-1.27]	0.217	[2.37]**	0.236	[1.37]
	L Cattle	-0.540	[-3.03]***	-0.054	[-0.47]	0.280	[2.49]**	0.189	[2.22]**
Softs	Cocoa	-0.192	[-1.78]*	-0.045	[-0.33]	0.065	[0.71]	0.143	[0.89]
	Coffee	-0.504	[-3.63]***	-0.098	[-1.10]	0.187	[2.28]**	0.256	[2.82]***
	Cotton	-0.264	[-2.25]**	-0.163	[-1.93]*	0.209	[2.66]***	0.275	[2.19]**
	Sugar	-0.384	[-2.37]**	-0.163	[-1.33]	0.149	[1.85]*	0.324	[2.68]***
Average R-Squared		26.00%		22.29%		24.12%		20.51%	

Table A.10: Persistence of Equity Market Shocks on Trader Positions

We report the sum of coefficients from a weekly regression of position changes as the left-hand side variable on contemporaneous and thirteen lags of changes in VIX as right hand side variables, controlling for thirteen lags of commodity returns, during the post-crisis period September 15, 2008 - June 1, 2011. Each row reports the sum of coefficients on the thirteen lags of changes in the VIX results for a different commodity, while each column reports a different trader group. Coefficients are standardized to standard deviations in flows per one standard deviation change in the VIX. We use the Newey and West (1987) construction for standard errors with four lags. */**/*** denotes significant at the 10%, 5% and 1% levels, respectively.

		CITs		**Hedge Fund**		**Hedgers**		**All Financials**	
		Sum of Lags	t-statistic	Sum of Lags	t-statistic	Sum of Lags	t-statistic	Sum of Lags	t-statistic
Grains	Chi W	-1.086	[-3.12]***	0.213	[0.13]	0.214	[1.39]	-0.336	[-1.73]*
	Corn	-1.142	[-3.75]***	0.329	[0.23]	0.255	[1.00]	-0.193	[-1.11]
	KC W	-1.132	[-2.98]***	0.992	[1.43]	-0.427	[-0.28]	0.382	[0.21]
	Soybeans	-1.268	[-3.12]***	0.029	[0.40]	0.512	[1.30]	-0.368	[-1.16]
	Soyb Oil	-0.789	[-1.48]	-0.183	[-0.85]	0.630	[1.34]	-0.465	[-1.40]
Livestock	F Cattle	0.113	[0.19]	0.350	[0.49]	-0.277	[-0.14]	0.341	[0.53]
	L Hogs	-1.185	[-3.08]***	-0.303	[-1.32]	0.449	[1.85]*	-0.711	[-3.01]***
	L Cattle	-0.478	[-1.73]*	0.131	[0.06]	0.378	[1.48]	-0.102	[-0.86]
Softs	Cocoa	-0.061	[-0.49]	0.548	[1.16]	0.080	[0.39]	0.499	[1.07]
	Coffee	-0.814	[-2.81]***	-0.228	[-1.18]	0.816	[2.91]***	-0.467	[-2.37]**
	Cotton	-0.639	[-1.32]	-0.774	[-2.59]**	0.586	[1.95]*	-0.882	[-3.10]***
	Sugar	-1.116	[-3.08]***	-0.466	[-1.79]*	0.725	[2.92]***	-1.222	[-4.64]***

Table A.11: Active and Inactive Commercial Hedgers

We test whether active commercial hedgers behave differently than inactive commercial hedgers in aggregate by constructing a weekly panel of aggregate position changes for these two groups. This table reports the coefficients from regressing these weekly changes as the left-hand side variable on changes in the VIX, an indicator for the active group, and an interaction between the two, controlling for lagged commodity returns, percentage changes in the BDI index, changes to the Baa credit spread, and changes to break-even inflation compensation. For wheat, corn, soybeans, soybean oil, and cotton, we also include the 12-month percentage change in projected world demand, US stocks, and US production. Each row reports coefficients for a different commodity. The sample period is September 15, 2008 through June 1, 2011. Coefficients are standardized to standard deviations in flows per one standard deviation change in the VIX. For brevity, the term on the lagged commodity return is omitted. Standard are clustered at the week level (T=142). */**/*** denotes significant at the 10%, 5% and 1% levels, respectively.

		Active Trader Flag		**Change in VIX (1-σ)**		**Interaction**		**R-Squared**
Flows (σ)		Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic	
Grains	Chi W	-0.027	[-0.28]	0.077	[1.65]*	0.347	[4.36]***	0.130
	Corn	0.019	[0.20]	0.094	[1.82]*	0.005	[0.08]	0.092
	KC W	-0.051	[-0.50]	0.102	[1.47]	0.110	[1.13]	0.087
	Soybeans	-0.030	[-0.29]	-0.006	[-0.21]	0.243	[2.50]**	0.100
	Soyb Oil	-0.045	[-0.43]	0.075	[1.47]	0.140	[1.70]*	0.077
Livestock	F Cattle	0.028	[0.27]	0.104	[1.21]	0.077	[0.92]	0.141
	L Hogs	-0.002	[-0.02]	0.043	[0.87]	-0.099	[-1.00]	0.021
	L Cattle	0.026	[0.26]	0.071	[1.24]	0.123	[1.09]	0.085
Softs	Cocoa	-0.170	[-1.66]*	0.136	[1.63]	-0.186	[-1.93]*	0.165
	Coffee	0.020	[0.30]	0.227	[2.66]***	-0.056	[-0.89]	0.269
	Cotton	0.008	[0.08]	-0.007	[-0.11]	0.268	[2.76]***	0.100
	Sugar	0.045	[0.39]	-0.008	[-0.19]	0.205	[1.91]*	0.033

Table A.12: Cash Commitments

Panel A presents summary statistics for the accounts providing monthly data on cash commitments for the period Jan 2006 - May 2011. Panel B presents results from a panel regression of changes in cash and changes in cash plus futures as left-hand side variables, and the contemporaneous plus one lag of changes in the VIX as right-hand side variables, with a control for the lagged futures return. Changes in the VIX are measured in units of basis points and changes in cash positions are converted to an equivalent number of contracts and normalized to a dollar value (in millions) by multiplying the quantity of contracts by fixed prices on December 15, 2006. We use clustered standard errors in panel regressions where we cluster at the monthly level. */**/*** denotes significant at the 10%, 5% and 1% levels, respectively.

Panel A: Summary Statistics

		% Futures		Time Series Average of Aggregate:		
	Number of Accounts	Positions Covered	Panel $\rho(\Delta C,\Delta F)$	Cash	Futures	C+F
				($ MM, Prices as of Dec 15 2006)		
Wheat	21	51.48	-0.1218	1795.3	-1,046.00	749.3
Corn	31	30.25	-0.1814	3,432.60	-2,519.80	912.8
Soybeans	27	47.95	-0.3162	5,122.60	-2,173.80	2,948.90
Cotton	61	71.02	-0.2053	1,510.00	-623.80	886.20

Panel B: Sensitivity to VIX, September 2008 - May 2011

	Change in Futures				**Change in Cash Commitments**				**Change in Cash + Futures**			
	Wheat	**Corn**	**Soybeans**	**Cotton**	**Wheat**	**Corn**	**Soybeans**	**Cotton**	**Wheat**	**Corn**	**Soybeans**	**Cotton**
ΔVIX (t)	0.0178	0.0016	0.0108	0.0031	-0.0126	-0.0118	-0.0144	-0.0057	0.0022	-0.0028	-0.0035	-0.0026
	[1.7380]	[0.1927]	[0.8274]	[3.3189]***	[-1.1332]	[-2.3788]**	[-1.0785]	[-2.1601]**	[0.7968]	[-0.5674]	[-0.1265]	[-0.9338]
ΔVIX (t-1)	-0.006	0.0201	-0.0018	-0.0005	-0.0164	-0.0076	-0.0044	-0.0023	-0.0175	0.0071	-0.0096	-0.0028
	[-1.5446]	[2.4080]**	[-0.4371]	[-0.3928]	[-1.4253]	[-0.6354]	[-0.1460]	[-2.4373]**	[-1.0919]	[0.7667]	[-0.2902]	[-1.6048]
Futures Return (t-1)	0.0069	0.0168	0.0071	0	0.0051	0.0178	0.0034	0.0009	0.019	0.035	0.0096	0.0008
	[2.7665]**	[1.6810]	[1.6433]	[0.0343]	[0.9803]	[1.0969]	[0.3996]	[0.6985]	[2.7304]**	[1.5588]	[0.6175]	[0.5655]
Constant	1.1279	-7.0638	2.3633	0.4337	1.3908	-7.0064	3.2247	-1.6757	1.1362	-8.2319	-5.138	-1.2949
	[0.3841]	[-2.1187]*	[0.3583]	[0.9161]	[0.6146]	[-0.9006]	[0.8756]	[-1.2173]	[0.3950]	[-2.7427]**	[-0.7824]	[-0.9520]
Observations	137	146	142	532	137	146	142	532	137	146	142	532
R-Squared	0.0687	0.046	0.0094	0.0189	0.0406	0.0547	0.0072	0.04	0.0688	0.0778	0.008	0.0147

Table A.13: US Production

We report coefficients from a monthly regression of the 12-month percent change in projected US production for the upcoming harvest as the left-hand side variable on contemporaneous and one lag of changes in the VIX as right hand side variables, controlling for lagged commodity returns. We use the Newey and West (1987) construction for standard errors with one lag. */**/*** denotes significant at the 10%, 5% and 1% levels, respectively.

	Forecasted US Production for Upcoming Harvest 12 Month Percent Change							
	Sep 2008 - May 2011				**Jan 2006 - Aug 2008**			
	Wheat	**Corn**	**Soybeans**	**Cotton**	**Wheat**	**Corn**	**Soybeans**	**Cotton**
ΔVIX (t)	0.165	-0.0455	-0.0366	-0.0305	0.3428	0.1771	0.2039	0.0028
	[0.4390]	[-0.1919]	[-0.2861]	[-0.0503]	[0.3684]	[0.2157]	[0.2336]	[0.0058]
ΔVIX (t-1)	0.6243	-0.0592	-0.2044	1.0067	0.263	0.4268	0.1475	0.1203
	[1.3206]	[-0.2351]	[-1.1429]	[1.4480]	[0.3191]	[0.5332]	[0.2035]	[0.2243]
Futures Return (t-1)	0.1221	0	-0.2695	1.6459	0.2802	0.0264	-0.2583	-0.1177
	[0.6493]	[-0.0003]	[-1.7434]*	[3.7236]***	[0.9135]	[0.1131]	[-0.9410]	[-0.6895]
Constant	114.31	48.23	863.48	239.16	92.03	562.38	-293.73	-871.48
	[0.3987]	[0.2733]	[6.1402]***	[0.3975]	[0.2457]	[1.8766]*	[-1.0591]	[-4.3851]***
Observations	33	33	33	33	32	32	32	32
R-Squared	0.0301	0.00423	0.0339	0.257	0.041	0.00161	0.031	0.00764