

Examining the Link Between Futures Market Liquidity and Funding Liquidity: The Case of Cotton in 2008

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Motivation

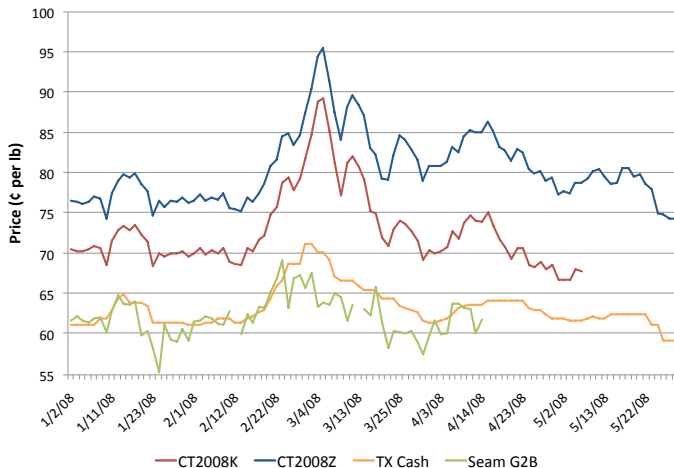
What happened to cotton prices in 2008?
How did this affect cotton merchants?
Why did prices move so high, so quickly?

Model

Theoretical models in the literature
A Stylized Hedging Model

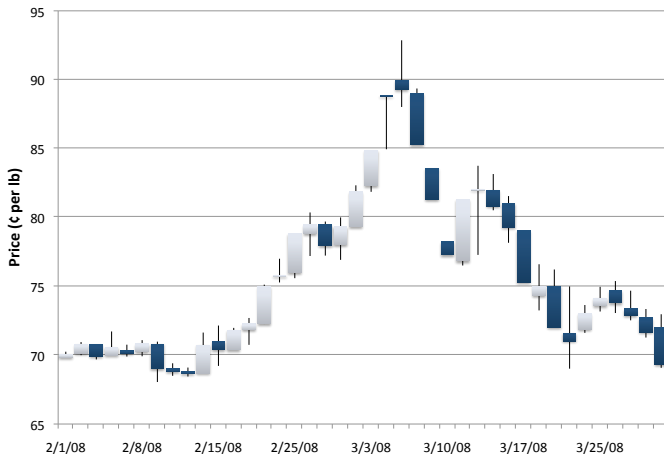
Implications

Cotton futures prices spiked in March 2008



Sources: Commodity Research Bureau, USDA-AMS, CFTC testimony of Woods Eastland

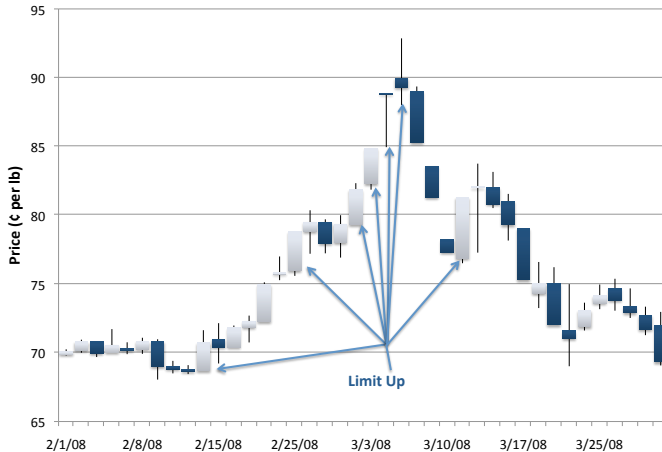
Cotton futures prices spiked in March 2008



ICE Futures May 2008 Cotton Contract, February-March 2008

Source: Commodity Research Bureau

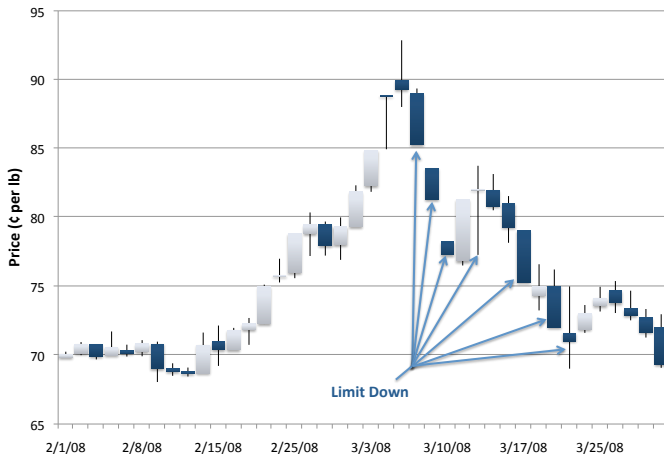
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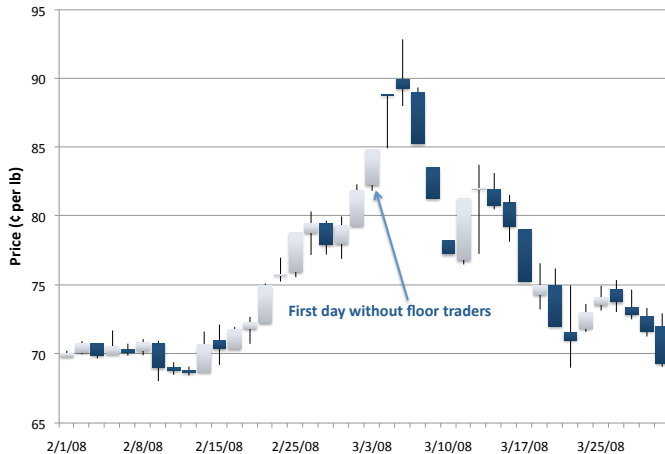
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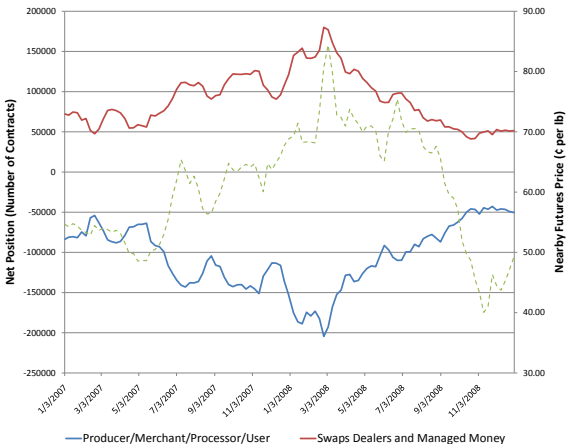
ICE Futures May 2008 Cotton Contract, February-March 2008

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Consequences for short hedgers: negative

- ▶ Short futures were mainly held by large cotton merchants
- ▶ Shorts faced repeated margin calls in the face of limit up moves that stopped trading
- ▶ Margin calls based on synthetic futures prices
 - ▶ Synthetic futures reached a high of \$1.09/lb on March 4
 - ▶ The implied price move meant 12 cent margin call (ICE price limits are 3-4 cents/lb)
- ▶ Short hedgers had three options:
 1. Ride out volatility by continuing to finance margin calls
 2. Close out futures positions
 3. Use options to limit further losses due to rising prices

Merchants held large short positions



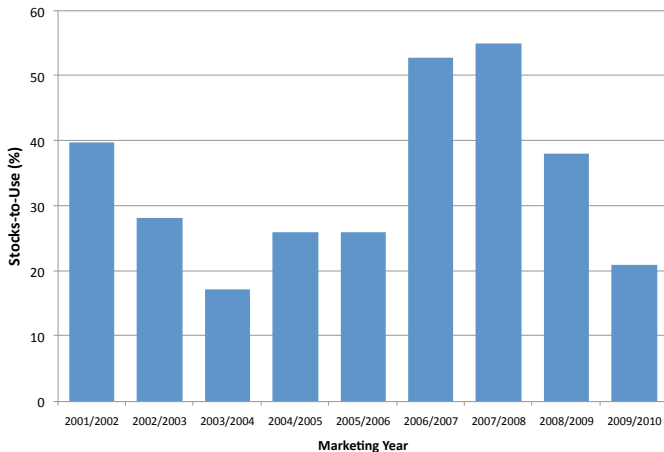
Weekly Net Positions of Trader Groups, January 2007-December 2008

Source: Commodity Futures Trading Commission

Supply and demand fundamentals don't explain the spike

- ▶ Cotton prices were linked to a broad commodity price boom
- ▶ US acres planted to cotton were declining
- ▶ BUT...
 - ▶ US and World stocks were at very high levels; Certificated stocks were plentiful and growing
 - ▶ Global productivity gains were reducing the need for more acres
 - ▶ Domestic use was falling, global demand growth was slowing
 - ▶ Cash prices remained relatively stable

Supply and demand fundamentals don't explain the spike



US Stocks-to-Use by Marketing Year

Source: USDA-FAS PS&D Online

Little evidence for market manipulation

- ▶ CFTC Division of Enforcement conducted official investigation
- ▶ Criteria for proof:
 - ▶ Manipulator has ability and intention to affect price
 - ▶ Prevailing price artificial and caused by manipulator
- ▶ Largest long traders did not engage in significant futures or options trading during March 3-5
 - ▶ "Eight of ten largest longs were inactive during critical time periods (of price movement)" (CFTC 2010)

Examining outcomes for merchant firms may provide alternative explanations

- ▶ Lenders limited credit availability to cotton merchants
- ▶ Major firms sold out or declared bankruptcy
- ▶ e.g. Paul Reinhart Inc.
 - ▶ Filed for bankruptcy protection on October 15, 2008
 - ▶ Needed to meet approximately \$100 million in margin calls
 - ▶ Closed some futures positions and entered into “various options trades”
 - ▶ Sought takeover bids; lenders vetoed Allenberg bid
 - ▶ As prices fell, lenders swept \$180 million in gains from its brokerage accounts.

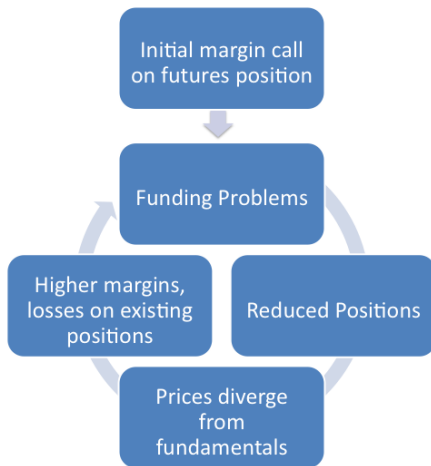
Examining outcomes for merchant firms may provide alternative explanations

- ▶ Apparently prudent firms incur extraordinary costs to finance their hedging activity
- ▶ The existence of this funding liquidity problem is not problematic in isolation, but there is concern that it there may be knock-on effects

Previous work has examined market and funding liquidity issues

- ▶ Adam-Muller and Panaretou (*J. of Futures Markets*, 2009)
 - ▶ Solves hedgers optimization problem when firm faces borrowing costs when require to meet margin calls
 - ▶ Obvious result: If the hedger is liquidity constrained, then the optimal hedge ratio is lower than if hedger is unconstrained
- ▶ Brunnermeier and Pedersen (*Rev. of Financial Studies*, 2009) and Pedersen (*NBER Working Paper*, 2009)
 - ▶ Equilibrium model that considers liquidity constrained speculators/market makers
 - ▶ Provides evidence for liquidity/loss spirals and fragility of market prices when speculators are liquidity constrained

Liquidity/Loss Spirals



Source: Brunnermeier and Pedersen (2009)

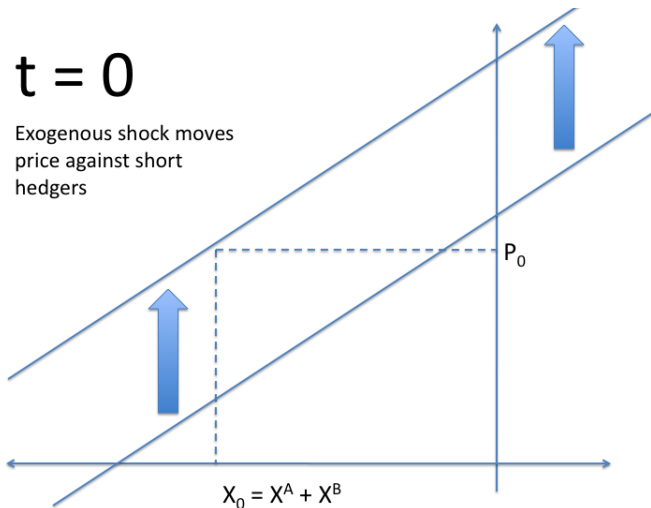
Model setup

- ▶ Suppose two hedgers, A and B , hold short futures positions, $x^A = x^B$, but vary in their ability to finance margin calls
- ▶ An exogenous price shock occurs in the initial period, $t = 0$
- ▶ Trade in the futures market occurs in periods 1 and 2
- ▶ Hedgers trade with an aggregated group of speculators
- ▶ Naive speculators give rise to a “supply of speculation” curve with a constant slope, x
 - ▶ i.e. If hedgers want to buy one contract, price must rise by $\$x$

Initial condition

$t = 0$

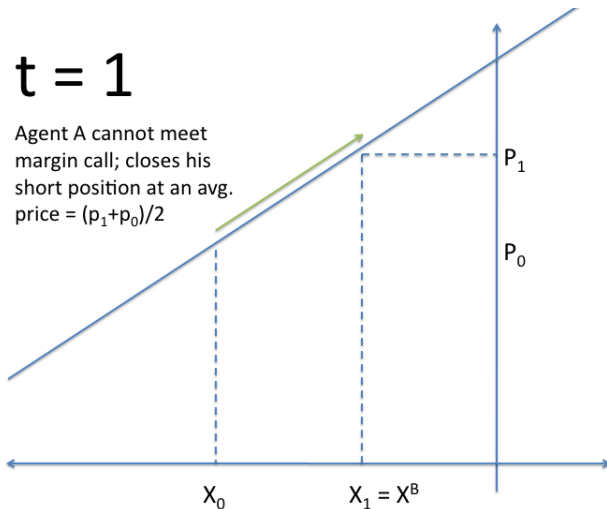
Exogenous shock moves price against short hedgers



Scenario 1: Agent B unaware of A's distress

t = 1

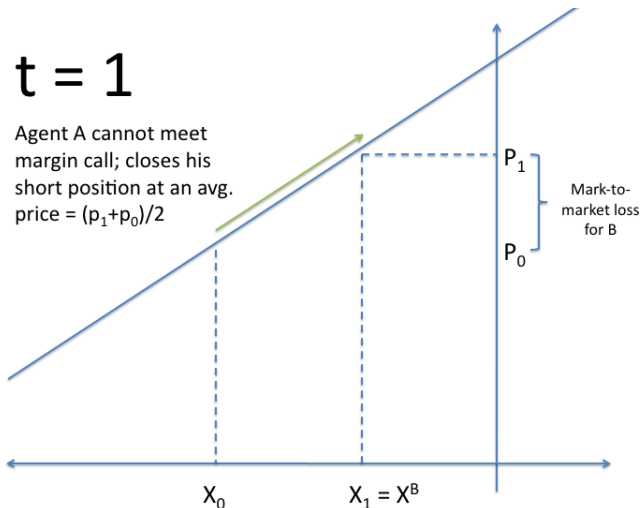
Agent A cannot meet margin call; closes his short position at an avg. price = $(p_1 + p_0)/2$



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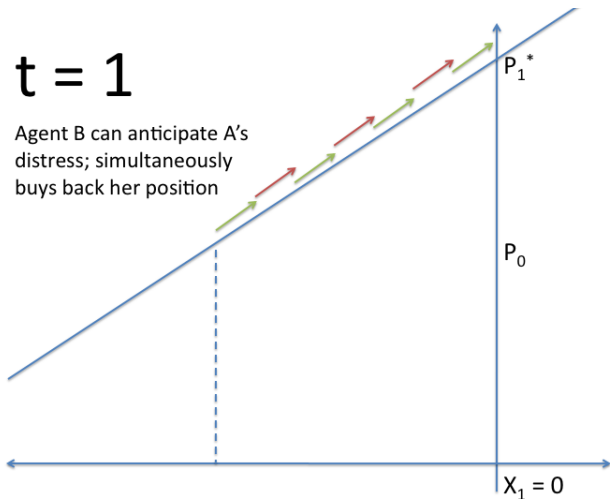
Agent A cannot meet margin call; closes his short position at an avg. price = $(p_1 + p_0)/2$



Scenario 2: Agent B is aware A's distress

 $t = 1$

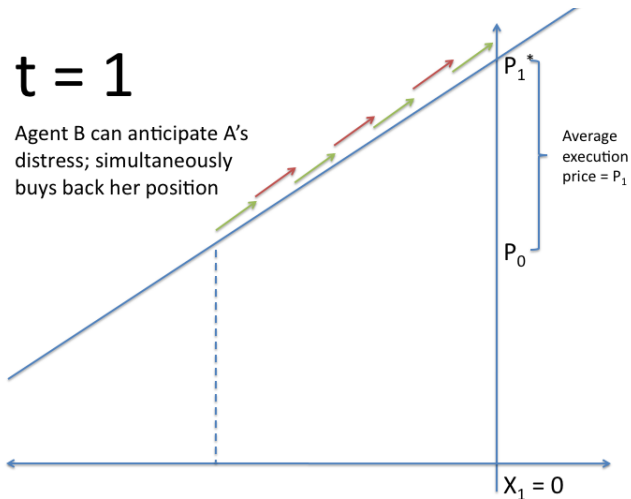
Agent B can anticipate A's distress; simultaneously buys back her position



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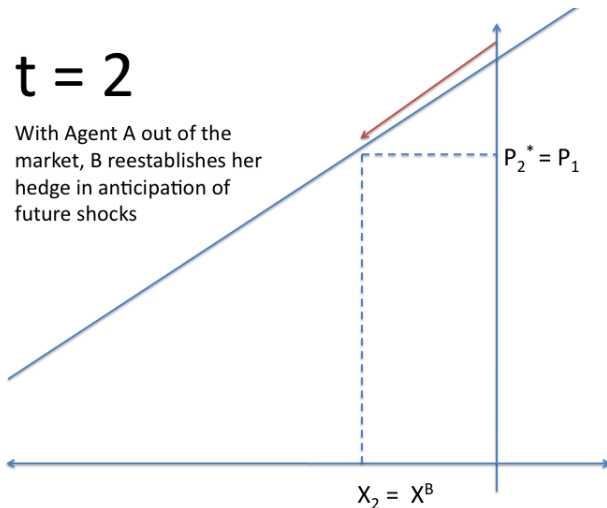
Agent B can anticipate A's distress; simultaneously buys back her position



Scenario 2: Agent B is aware A's distress

$t = 2$

With Agent A out of the market, B reestablishes her hedge in anticipation of future shocks



Outcomes for hedgers, market and funding liquidity

- ▶ Having bought at average price P_1 and sold at average price $(P_1 + P_1^*)/2 > P_1$, Agent B is better off
- ▶ B's action implies that A's lack of funding liquidity can lead to illiquid markets
 - ▶ Market is illiquid when liquidity is needed most, distressed traders cannot limit losses
- ▶ If the model is extending to include additional hedgers, the observed “running for the exit” effect can spur funding liquidity problems for other hedgers

Merchants place greater emphasis on funding liquidity

- ▶ Prior to the liquidity event of 2008, there was a significant group of firms who dealt solely in cotton
- ▶ Even the largest of these firms was pushed to cease operations
 - ▶ Dunavant, formerly second largest US merchant, is merging with Allenberg Cotton
 - ▶ Weil Brothers & Stern folded and Paul Reinhart declared bankruptcy; both top ten merchants
- ▶ Implications:
 - ▶ Merchants must be larger and more diversified to survive in volatile markets
 - ▶ Potential concern of buyer market power and negative effects on growers

New tools may be necessary to manage risk

- ▶ How can firms avoid the risk posed by margin calls?
 - ▶ Additional options trading to hedge margin call risk
 - ▶ Swap transactions
 - ▶ For some additional fee, hedger can replicate futures contract without daily mark-to-market margining requirements
 - ▶ OTC markets for agricultural commodities are thin, subject to regulatory uncertainty