SPECULATION AND COTTON PRICES[*]

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Cotton prices climbed to unexpected levels in February and March 2008 and the 2007/08 Cotlook A Index is now forecast at 74 US cents per pound. In September 2007, the ICAC Secretariat forecast an average Cotlook A Index of 68 US cents per pound for 2007/08. In July 2007, the World Bank forecast the calendar year 2008 average Cotlook A Index at 59.5 US cents per pound. In June 2007, the Australian Bureau of Agricultural and Resource Economics forecast an average Cotlook A Index of 59.2 US cents per pound for 2007/08, while FAPRI's forecast, as of January 2007, amounted to 66 US cents per pound. The present article attempts to shed some light on the causes of the unexpected increase in cotton prices by analyzing (1) the flow of investment funds to the cotton futures market, and (2) the composition of the cotton futures and options markets by traders, and their relation with cotton prices.

Investment Funds

Although the Standard & Poor's Goldman Sachs Commodity Index (S&P GSCI) is not an index fund, several institutional investor funds, such as the Oppenheimer Real Asset Fund or the iShares S&P GSCI Commodity-Indexed Trust, try to replicate or beat the returns calculated with the index. The S&P GSCI is designed as a benchmark for investment in commodity markets and as a measure of commodity market performance over time. The S&P GSCI is calculated primarily on a world production-weighted basis and is comprised of the principal physical commodities that are the subject of active, liquid futures markets. The quantity of each commodity in the index is determined by the average quantity of production during the most recent five years of available data. The production weights are designed to reflect the relative significance of each of the constituent commodities in the world economy while preserving the tradability of the index. The composition of the index is reviewed on a monthly basis.

Cotton is included alongside wheat, corn, soybeans, sugar, coffee and cocoa in the "agricultural commodities" category of the S&P GSCI. The other categories comprise energy, industrial metals, precious metals and livestock. Data on cotton lint production are obtained from the Food and Agriculture Organization of the United Nations (FAO), and the average of cotton production for 2007 is calculated over the 2000-2004 period.[2]

The estimated notional of benchmarked assets to the S&P GSCI, i.e. the estimated institutional investor funds tracking the index, grew from $60 billion in 2006 to $85 billion in 2007, and some analysts project they will grow to over $100 billion in 2008. The average share of the funds' assets channeled to cotton futures traded in the Intercontinental Exchange (ICE) is approximated in this article through the reference percentage dollar weight (RPDW)[3] of cotton disclosed on the S&P GSCI Index Methodology annual publications. Funds' investment in cotton futures is roughly approximated as the product of the

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RPDW multiplied by the benchmarked assets to the S&P GSCI. Funds' investment in cotton futures approached $522 million in 2006, increased by $243 million to $765 million in 2007, and might climb to $950 million in 2008 (Table 1). In order to put these figures in perspective, they are compared to estimates of the value of U.S. cotton futures contracts and options, which are approximated by the margin value of the maximum total open interest in cotton futures contracts and options traded in the ICE during the calendar year. The margin value is calculated as the product of the maximum total open interest in cotton futures and options over the year, multiplied by the price of the futures contract (in US cents/lb) on the date the maximum was registered, multiplied by the size of the contract (50,000 lbs), multiplied by 0.13.[4] The margin value of cotton futures and options more than doubled from $839 million in 2006 to $1.8 billion in 2007, and it has increased to $2.1 billion through February 26, 2008. Therefore, the ratio of funds' investments in cotton futures contracts to the margin value of cotton futures and options amounted to about 62% in 2006, but due to a significant increase in the margin value of cotton futures and options, it decreased to 42% in 2007. However, the ratio might increase in 2008. It must be noted that these figures only serve as a first approximation to the magnitude of the flow of investment funds to the cotton futures and options markets. In the next section, a more rigorous analysis of the effects of speculators on those markets and on the price of cotton is conducted.

Table 1. S&P GSCI Benchmarked Assets and Margin Value of Cotton Futures and Options

Year	Total Funds' Assets* ($ billion)	Cotton's share** (RPDW)	Funds' Assets in Cotton Futures Contracts ($ million)	Margin Value of Cotton Futures and Options ($ million)	Funds' Assets in Cotton Futures Contracts / Margin Value of Cotton Futures and Options (%)
2006	60	0.87%	522	839	62%
2007	85	0.90%	765	1,801	42%
2008f	102	0.93%	949	2,128	45%

Note: *Total Funds' Assets forecast for 2008 from Commodities Now.[5] **Cotton's share for 2008 is an extrapolation from 2006 and 2007.

Finally, it should also be noted that although the S&P GSCI might be the commodity index with more benchmarked assets, it is not the only one. Other important benchmark commodity indexes are the Rogers International Commodity Index®, the Reuters/Jefferies CRB Index and the Dow Jones - AIG Commodity Index[SM], in which cotton represents, respectively, about 4%, 2.5% and 5% of all commodities included in the indexes.[6]

Cotton Futures and Options Markets

In order to get a broader picture of the cotton futures and options markets, we next analyze the evolution of open interest in the ICE disaggregated by traders' long positions. Data and definitions were obtained from the Commitments of Traders (COT) Reports by the U.S. Commodity Futures Trading Commission (CFTC).[7] Open interest is the total of all futures and option contracts entered into and not yet offset by an opposite transaction, nor fulfilled by delivery. Open interest does not include open futures contracts against which notices of deliveries have been stopped by a trader or issued by the clearing organization of an exchange. Open interest held or controlled by a trader is referred to as that trader's position. Clearing members, futures commission merchants, and foreign brokers (collectively called reporting firms) file daily reports with the CFTC. If, at the daily market close, a reporting firm has a trader with a

position at or above specific reporting levels set by the CFTC, the Commission reports that trader's entire position in all futures and options expiration months in that commodity, regardless of size. The aggregate of all traders' positions reported to the Commission (the "reportable positions") usually represents 70% to 90% of the total open interest in any given market. The other 10% to 30% are referred to as "non-reportable positions." When an individual reportable trader is identified to the Commission, the trader is classified either as "commercial" or "non-commercial" according to specific regulations set by the CFTC. All of a trader's reported futures positions in a commodity are classified as commercial if the trader uses futures contracts in that particular commodity for hedging. A third category of traders under the reportable positions is the "index traders" category. These traders are drawn from the non-commercial and commercial categories, and include positions of managed funds, pension funds, and other investors that are generally seeking exposure to a broad index of commodity prices as an asset class in an unleveraged and passively-managed manner (non-commercial category); as well as positions for entities whose trading predominantly reflects hedging of over-the-counter transactions involving commodity indices (commercial category), such as pension funds. Finally, in the Supplemental Reports to the COT Reports, traders are classified in one of the three categories: index traders, commercial traders, or non-commercial traders. Therefore, we will refer to commercial traders as "hedgers", to non-commercial traders as "non-index-traders speculators" and will keep the denomination of "index traders" in this report.

Open interest in cotton futures and option contracts more than doubled between January 2006 and February 2008 (Figure 1). The average daily open interest during 2006 amounted to 209,040 contracts, with a standard deviation of 30,890 contracts. The average daily open interest during 2007 was 59% higher than during the previous year, amounting to 332,561 contracts, with a standard deviation of 48,239. Finally, during the first two months of 2008, the daily average open interest amounted to 429,942 contracts, 29% higher than during 2007, with a standard deviation of 34,843 contracts. The average share of long positions held by speculators (index- and non-index traders) in total open interest increased from 69% in 2006 to 73% in 2007 and to 74% in 2008 (Table 2), indicating not only an increase in the absolute number of long positions held by speculators, but also a more rapid increase in speculators' long positions than in hedgers' long positions.

Figure 1. Open Interest in Cotton Futures and Option Contracts by Category of Trader
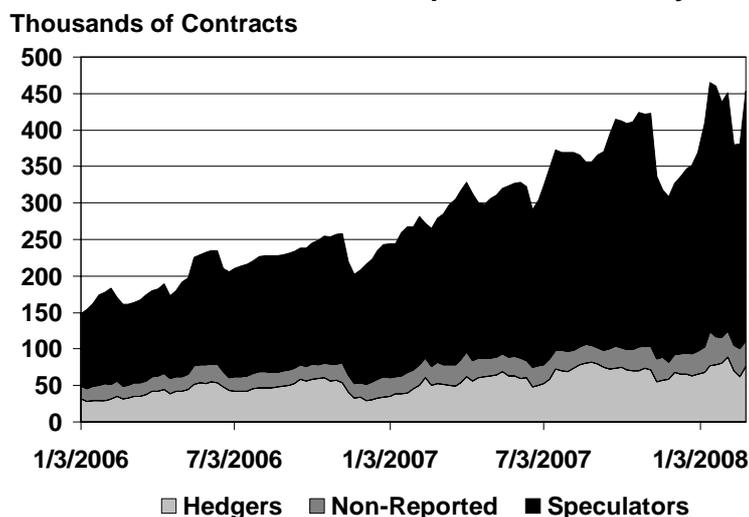
Table 2. Speculators' Long Positions and Total Open Interest (averages)

Year	Total Open Interest	Speculators' Long Positions (Index- and Non-Index Traders)	
		Long Positions	Share of Total Open Interest
2006	209,040	144,679	69%
2007	332,561	243,682	73%
2008	429,942	317,420	74%

Further insight is gained by disaggregating speculators' positions into index traders' and non-index-traders speculators' positions (Table 3). Although both types of traders increased their long positions over the last two years, non-index-traders speculators' long positions grew faster than index traders' long positions. While the average share of non-index-traders speculators' long positions in total speculators' long positions was 50% in 2006, it climbed to 65% in 2008. This suggests that **index traders have not been the main force behind the increase in open interest for cotton futures and options, but non-index-traders speculators have.** Furthermore, using the spread as a measure of the extent to which each speculator holds equal long and short positions, it can be inferred that non-index-traders speculators were increasingly bullish in recent months, since the average share of spreads in total long positions for non-index-traders speculators decreased from 64% in 2006 and 2007 to 59% in 2008 (Table 3, last column). Put it another way, non-index-traders speculators increased their share of long positions not matched with short positions over the last months. Figure 2 shows the evolution of speculators' long positions since January 2006.

Figure 2. Speculators' Long Positions, by Category of Trader

Thousands of Contracts

■ **Non-Index-Traders Speculative Spread**
■ **Non-Index-Traders Speculative Long Positions**
□ **Index Traders Long Positions**
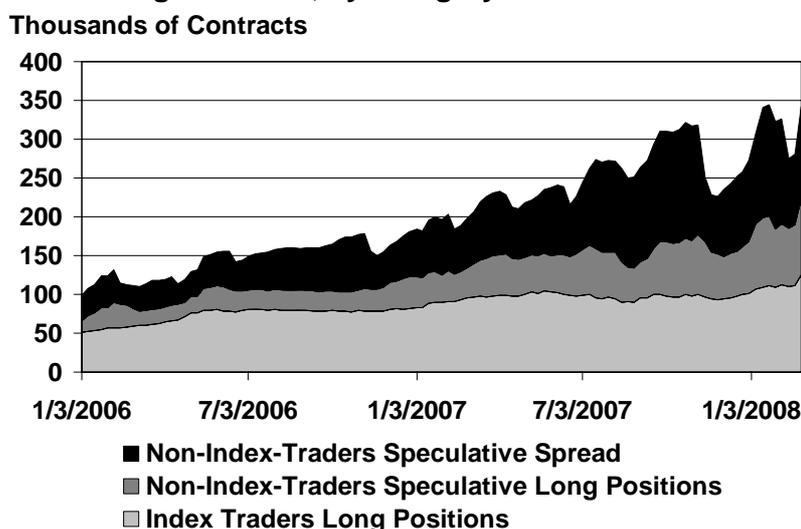
Table 3. Speculators' Long Positions, by Trader (averages)

Year	Speculators' Long Positions					Traders' Long Positions			
	Total	Index Traders	Non-Index-Traders			IT / Total Spec.	Non-IT / Total Spec.	Non-IT Long / Non-IT Total	Non-IT Spread / Non-IT Total
			Total	Long	Spread				
2006	144,679	72,813	71,866	26,098	45,768	50%	50%	36%	64%
2007	243,682	96,149	147,533	53,458	94,075	39%	61%	36%	64%
2008	317,420	111,782	205,638	83,471	122,167	35%	65%	41%	59%

Another indicator of the sentiment of speculators is the net position, which is calculated as the difference between total long and total short positions. Figure 3 illustrates the evolution of speculators' net positions. Net positions held by index traders remained positive and more than doubled between January 2006 and February 2008. On the other hand, net positions held by non-index-traders speculators showed greater variability and turned from positive to negative in March 2006, to remain negative for most of the time until June 2007, to return to positive and increasing values thereafter. Therefore, **non-index-traders speculators have been instrumental in increasing total net speculative positions contributing to bullish sentiments after June 2007.**

Using a simple linear regression between nearby futures prices and net speculative positions, we find that these measures are positively correlated: a 1% weekly increase (decrease) in total speculators' net speculative positions was associated with a 0.18% weekly increase (decrease) in nearby futures prices (Table 4).

Figure 3. Net Speculative Positions

Thousands of Contracts

Index Traders — Non-Index Traders — Total Speculators
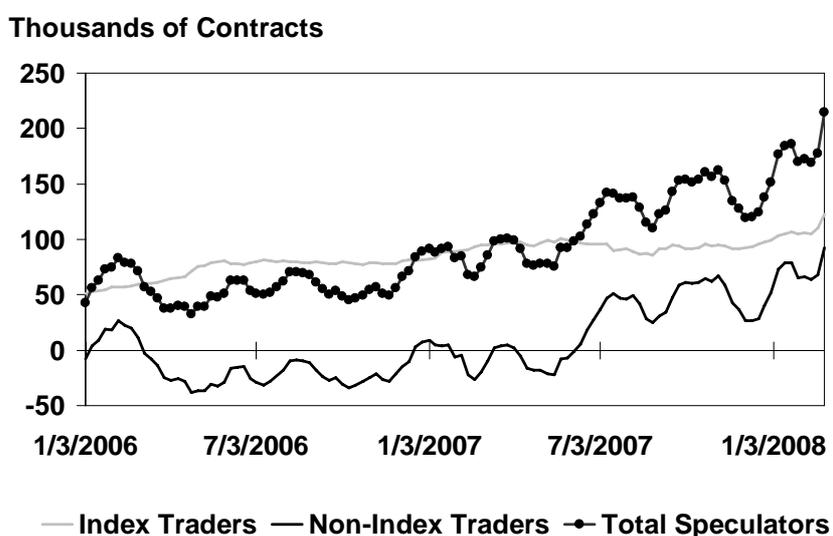
Table 4. Results from Linear Regression between Nearby Futures Prices and Net Speculative Positions.

Independent Variable: ***Nearby Futures Prices***				
Dependent Variable	*Coefficients*	*Standard Error*	*t Stat*	*P-value*
Net Speculative Positions	0.175364	0.027047	6.483594	0.0000
Adjusted R Square	0.267184			
Durbin-Watson statistic	1.910600			

Note: Nearby Futures Prices and Net Speculative Positions expressed in differential natural logarithms, which approximate weekly proportional changes in the variables.

Finally, given the positive and significant correlation between nearby futures prices and the Cotlook A Index observed between January 2006 and February 2008,[8] we conduct an analysis of the effect of the net speculative positions on the Cotlook A Index. A simple linear regression indicates that a 1% weekly increase (decrease) in total speculators' net speculative positions was associated with a 0.14% weekly increase (decrease) in the Cotlook A Index (Table 5). Furthermore, using Granger causality tests on the levels of the variables, it can be inferred that the direction of causality goes from the change in the net speculative positions to the change in the Cotlook A Index (over short periods of time, i.e. weekly), and

not the other way around.[9] Since changes in total net speculative positions were dominated by changes in non-index-traders speculators' net positions after June 2007, we can infer that the **bullish sentiments among non-index-traders speculators have contributed to pushing cotton prices up, above and beyond what cotton supply and demand fundamentals suggest** (Figure 4). According to the ICAC Price Model 2007, which forecasts the Cotlook A Index based on expected and past stocks-to-mill use ratios, the average index for 2007/08 would be 67 US cents per pound. However, the A Index climbed to 70 US cents per pound in December 2007, to 80 cents in February 2008, and to 90 cents in March, resulting in an average to-date of 71 US cents per pound (as of March 10, 2008). Given these observed values of the Cotlook A Index, it is highly likely that the forecast of the ICAC Price Model 2007 will fall below the actual season-average for 2007/08.

Table 5. Results from Linear Regression between Cotlook A Index and Net Speculative Positions.

Independent Variable: *Cotlook A Index*				
Dependent Variable	*Coefficients*	*Standard Error*	*t Stat*	*P-value*
Net Speculative Positions	0.139156	0.017048	8.162698	0.0000
Adjusted R Square	0.362067			
Durbin-Watson statistic	1.855294			

Note: Cotlook A Index and net speculative positions expressed in differential natural logarithms, which approximate weekly proportional changes in the variables.

Figure 4. Cotton Prices and Net Speculative Position of Non-Index-Traders Speculators
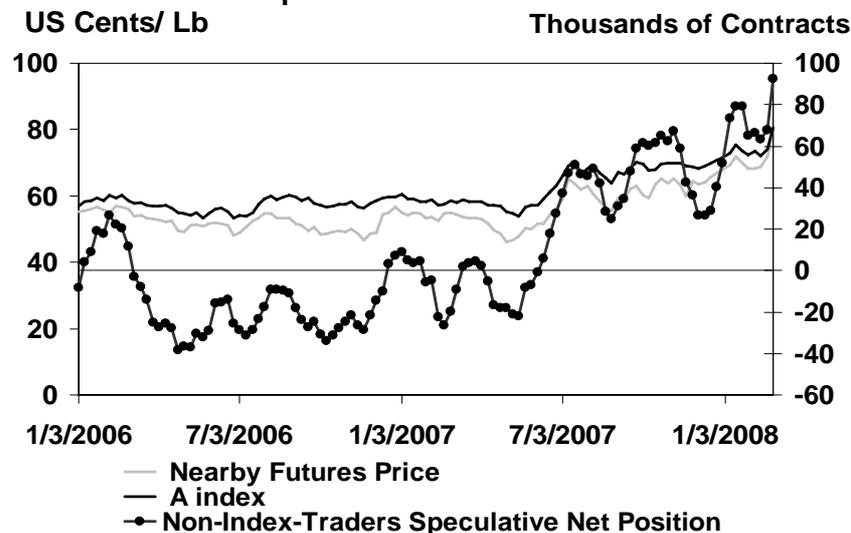
Conclusions

Speculation has been a major contributor to the formation of cotton prices in the short run over the last two years. In particular, non-index-traders speculators seem to have played a greater role than index traders in driving cotton prices higher since June 2007. Therefore, the evolution of cotton prices has not corresponded to what was expected from the available information on cotton production, consumption, trade and stocks.

ENDNOTES:

1. I am grateful to Erik Kolts, Vice President of Product Management at S&P, John Robinson, Associate Professor at Texas A&M University, and Andrei Guitchounts, Economist at the ICAC, for their comments and suggestions. However, errors in the present analysis are my responsibility.

2. Standard&Poor's S&P GSCI™ Report, June 30, 2007.

3. The reference percentage dollar weight of cotton is the quotient of the reference dollar weight of cotton divided by the sum of the reference dollar weights of all commodities included in the index. The reference dollar weight is the product of the contract production weight multiplied by the average contract reference price. (S&P GSCI™ Index Methodology 2008, available online at http://www2.standardandpoors.com/spf/pdf/index/SP_GSCI_Index_Methodology_Web.pdf)

4. Margins are assumed to represent, on average, 13% of the price of the nearby futures contracts.

5. Available online at http://www.commodities-now.com/content/market-news/market-news-2008022263741.php?PHPSESSID=17247847f09b3e705087727f98a032cf.

6. RICI® Handbook 2007, available online at http://www.worldcommodityfunds.com/files/RICI_Index_Manual.pdf. The Dow Jones - AIG Commodity Index[SM] 2008 Commodity Index Percentages, available online at http://www.djindexes.com/mdsidx/index.cfm?event=showAigWeightings. CRB Reuters/Jefferies Calculation Supplement 2005, available online at http://www.jefferies.com/pdfs/RJCRB_Index_Calculation_Supplement.pdf

7. Available online at http://www.cftc.gov/marketreports/commitmentsoftraders/index.htm.

8. A 10% increase (decrease) in the nearby futures price is associated with a 4.4% increase (decrease) in the Cotlook A Index, according to a linear regression in differential natural logarithms over the observed period with weekly observations (R^2 = 0.398; Durbin Watson statistic = 2.34). Furthermore, Granger causality tests between the Cotlook A Index and the nearby futures price in levels suggest that changes in the nearby futures prices cause changes in the Cotlook A Index, and not the other way around.

9. The null hypothesis "The Cotlook A Index does not Granger cause Net Speculative Positions" cannot be rejected at the 10% significance level with 1-6 lags. The null hypothesis "Net Speculative Positions do not Granger cause the Cotlook A Index" is rejected at the 5% level of significance with 2, 4, 5 and 6 lags, and at the 10% level of significance with 1 and 3 lags.