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More on “Flash Crash, or Flash in a Pan?”

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In [an earlier *farmdoc daily* article](#) we showed how Navinder Singh Sarao, a London-based trader, allegedly “spoofed” the E-mini S&P 500 market, made \$40 million in profits, and played role in the sudden collapse of the stock market in May 2010. Today’s article examines other details about Sarao’s actions and the government’s two cases against him.

Is Spoofing New?

Placing orders that a person has no intention of actually executing for the purpose of misleading other traders is neither new nor unique to electronic trading. This practice also occurred in the trading pits, but with an important difference: when a pit trader would fail to honor prices that he/she quoted, the other traders would simply refuse to trade with that individual. This served as a powerful deterrent because everyone in the pit could see and hear what every other trader was doing and respond accordingly.

In electronic trading the identity of any trader posting bids and offers is unknown to the other traders. The exchange can identify the person behind each order by what is known as a “Tag 50 ID,” but other traders cannot. All bids and offers at a particular price are combined and appear as a single entry in the order book. Going back to Figure 7 from our earlier article (reproduced below), it is impossible to know whether the 127 contracts bid at a price of 99.98 consist of a single order for 127 contracts, or 127 separate orders for 1 contract each, or something else.

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Figure 7. Order Book with Cancelled 5,000-Contract Sell Order at 100.03 and New 10-Contract Sell Order at 100.00

Bid Quantity	Price	Ask Quantity
	100.05	0
	100.04	0
	100.03	112 (= 5,112 – 5,000)
	100.02	89
	100.01	12
	100	36 (= 26 + 10)
	99.99	52
127	99.98	
154	99.97	
19	99.96	

What Is Spoofing, and Is It Illegal?

Section 4c(a)(5)(C) of the [Commodity Exchange Act](#) bans a number of disruptive practices including spoofing:

(5) Disruptive practices

It shall be unlawful for any person to engage in any trading, practice, or conduct on or subject to the rules of a registered entity that—

...

(C) is, is of the character of, or is commonly known to the trade as, “spoofing” (bidding or offering with the intent to cancel the bid or offer before execution).

In addition, the Commodity Futures Trading Commission (CFTC) issued an [Interpretive Guidance and Policy Statement on Disruptive Practices](#) document which further defines spoofing:

“Spoofing” includes, but is not limited to: (i) submitting or cancelling bids or offers to overload the quotation system of a registered entity, (ii) submitting or cancelling bids or offers to delay another person’s execution of trades, (iii) submitting or cancelling multiple bids or offers to create an appearance of false market depth, and (iv) submitting or canceling bids or offers with intent to create artificial price movements upwards or downwards... The Commission interprets that a CEA section 4c(a)(5)(C) violation requires a market participant to act with some degree of intent, or scienter, beyond recklessness to engage in the “spoofing” trading practices prohibited by CEA section 4c(a)(5)(C).

Scienter, according to Wikipedia, is “a legal term that refers to intent or knowledge of wrongdoing. This means that an offending party has knowledge of the ‘wrongness’ of an act or event prior to committing it.” Therefore, determining whether spoofing actually occurred also requires a determination that the person knew what they were doing, and knew that it was wrong.

Demonstrating Intent

While it is impossible to know what Sarao might have been thinking at the time, his actions appear to have violated spoofing examples (iii) and (iv) in the CFTC’s [Interpretive Guidance](#) presented above. Regarding

example (iii), “submitting or cancelling multiple bids or offers to create an appearance of false market depth,” Sarao’s layering strategy caused him to cancel and replace orders for 7.4 million futures contracts on just one day in 2010, and engage in similar heavy trading on multiple other days over the five-year period.

Regarding example (iv), “submitting or canceling bids or offers with intent to create artificial price movements upwards or downwards,” Sarao’s layering strategy seems designed to “trap” other traders, as we described in detail in our earlier article.

Sarao also made misleading statements to investigators, suggesting that he tried to hide and deny the true nature of what he was doing. In [his response](#) to UK regulators in 2014, who contacted Sarao on behalf of the CFTC, Sarao said:

- “I am an old school point and click [proprietary] trader, that is how I always have traded, admittedly very fast because I have always been good with reflexes and doing things quick.”
- “I am a trader who changes his mind very quickly... This is what is unique about my trading. I trade very large but change my mind in a second.”
- “This is why I do so much volume, in and out, big trades, intra-second, all day.”
- “I don’t like the [high frequency trading] arena and have complained to the exchange numerous times about their manipulative practices, please BAN IT.”
- “The other orders I sometimes place during the day are slightly away from the market price and move up and down as the market moves with it... These orders are placed rarely and only when I believe the market is excessively weak or strong.”

Regulators also have records and correspondence showing that Sarao hired programmers over a two-year period to develop software that would carry out his layering strategy. His misleading statements to regulators, plus the paper trail showing his efforts to develop a spoofing system, may provide sufficient proof of intent to make the charges stick.

How Much Profit Did Sarao Actually Make?

One interesting point is the matter of the \$40 million that Sarao allegedly made. While \$40 million is certainly an impressive amount, it becomes a little less impressive when expressed in terms of the average profit per contract traded. Using details gleaned from the Justice Department complaint, we constructed Table 1 for the eight dates for which the complaint provided complete details.

Table 1. Per-Contract Trading Profits

Date	Number of Contracts Bought	Number of Contracts Sold	Net Profit	Average Profit Per Contract Traded
27-Apr-10	95,229	95,229	\$821,389	\$8.63
4-May-10	65,015	65,015	\$876,823	\$13.49
5-May-10	74,380	74,380	\$435,185	\$5.85
28-Jan-11	87,736	87,736	\$862,048	\$9.83
22-Feb-11	84,252	84,252	\$330,381	\$3.92
4-Mar-11	74,978	74,978	\$296,373	\$3.95
29-Jul-11	57,945	57,187	\$254,128	\$4.44
4-Aug-11	16,695	16,926	\$4,095,771	\$245.33
Total	556,230	555,703	\$7,972,098	\$14.35

The profits for these eight days, which accounted for approximately 20% of Sarao's total profits, were mostly due to the sheer numbers of contracts traded, and not the average profits per trade. Thus, Sarao was much like the typical algorithmic trader, and less like one who gains from creating and then capitalizing on large market distortions.

To put these average profits into perspective, the smallest price movement or "tick" in the [E-mini S&P 500 futures](#) is \$12.50 per contract. With the notable exception of August 4, 2011 – when the number of trades was unusually small and the net profit was exceptionally large – average daily profits per contract traded were in the neighborhood of, and usually less than, one tick.

Sarao's layering strategy may have allowed him to be more consistently successful at picking up a tick (more or less) on each trade. But this is a far cry from the popular impression that Sarao caused huge distortions in the market. On most days the impact of his strategy, on average, was close to the minimum price move. Only by trading massive numbers of contracts over an extended period of time was Sarao able to accumulate the alleged \$40 million in profits.

Did Sarao Cause the Flash Crash?

These results also should put to rest the notion that somehow Sarao "caused" the sudden collapse of the stock market on May 6, 2010. Simply put, it is difficult to imagine how a trader who moved the E-mini S&P 500 futures by such small amounts could have triggered a selloff that caused the Dow Jones Industrial Average to drop nearly 600 points in just five minutes.

Sarao's actions may have "contributed to" – borrowing the phrase used in the [CFTC press release](#) – the market crash, but there is a big difference between "contributed to" and "caused," as in "[Guy Trading at Home Caused the Flash Crash](#)" and similar news reports that created such a frenzy following Sarao's arrest.

What Happens Next?

Sarao is sitting in jail in England, fighting extradition to the US to stand trial on these charges, but at this point two things seem clear. First, Sarao did not single-handedly cause the "flash crash" in 2010.

Second, despite Sarao's small average profits, there is a zero threshold for market manipulation. Artificially influencing the market by any amount is illegal, and if Sarao is found guilty the penalties could be severe. The CFTC's civil case calls for injunctions, fines, and disgorgement of Sarao's \$40 million in profits; the Justice Department's criminal case adds jail time to the mix. Market manipulation is a serious offense, and additional details will become available as these cases move forward.

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