Who Benefits from High-Speed Trading?
By Michael Edesess
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Speed is a virtue in most competitive pursuits; the combination of speed and accuracy is almost always the ultimate advantage. No one knows this better than the purveyors of high-speed trading technology, who have profited mightily—not only by executing rapid-fire algorithmic trades, but also by exploiting the arcane rules that govern the stock exchanges. But at whose expense are they profiting, and how long is their advantage likely to persist?

Seeking to answer these important questions, Scott Patterson, a staff reporter for The Wall Street Journal, has authored a new book, *Dark Pools: The rise of A.I. trading machines and the looming threat to Wall Street*, which pulls together his superb investigative reporting on electronic communication networks (ECNs) and high-frequency trading. Patterson’s book offers a clear explanation of the inner workings of rapid-fire electronic trading and the networks that sustain it, and it’s an absorbing read from start to finish.

“Dark Pools” also draws a surprising conclusion. The huge profits accrue to high-frequency traders not because they can buy low and sell high at lightning speed; the high-frequency market is too competitive for that now. Rather, skill and insider knowledge allow them to exploit arcane order specifications and a fee-sharing arrangement commonly called the “maker-taker fee.”

In a nutshell, if a trader – or rather, his trading program – knows how to place orders so that it is always defined as the maker of the trade while the counterparty is duped into being the taker, the trader will share the fees paid by the counterparty to the ECN.

Patterson’s topic is timely; high-frequency trading has triggered growing concern about a range of its less-understood effects, including how such trading could negatively impact ordinary investors’ portfolio values and liquidity and whether it might one day bring down the entire financial system.

As with many corrupt practices involving a small band of elite insiders, high-frequency trading began with a rebellion against the corrupt practices of another small band of elite insiders. It is classic *Animal Farm* (George Orwell’s 1945 allegory for the takeover of Russia by the Communists): first the masses overthrow their rulers amid cries of equality for all; then, a small subset of the masses becomes “more equal than others”.

Electronic communications networks, or ECNs, were created by quants and computer jocks who viewed floor traders at the stock exchanges – the NASDAQ and the NYSE – as
an oligarchy that perpetuated their high fees by hoarding information. In Scott Patterson’s account, the anti-NASDAQ rebels’ mantra was “information wants to be free.”

The revolution for transparency was not only against the exchanges, NASDAQ and NYSE, but also against Instinet, the off-exchange system that matched buy with sell orders originated by large institutional investors (“whales,” in Patterson’s parlance). Instinet was the original Dark Pool; its bid and offer prices were not visible to outsiders. But when rebels shined a light on its prices, the doors were thrown wide open to swarms of ECN-based piranhas feeding on the lumbering whales, as well as on other dumb traders.

Thanks to their computer skills, these renegades succeeded in eclipsing the floor traders, creating ECNs with names like Island and Archipelago that made all posted prices transparent and let buyers and sellers connect with each other electronically, without human intermediaries. This spectacularly reduced the time it took to match buyers with sellers and close trades, so that literally thousands of trades could be completed in the time it once took to complete one.

**Hunting the whales and the fishes**

It has long been known that a broker can make a profit by front-running – placing an order quickly to buy or sell a security, just before placing a much larger order on behalf of his or her client. This practice exploits the broker’s knowledge of non-public information and takes unfair advantage of the client. Because of that, it is illegal.

It is not illegal, though, to use publicly-available information to detect that a whale – a large institutional investor like a mutual fund – is beginning to place a large order. Computerized trading programs operating on ECNs can distinguish the pattern of a whale beginning to make a large trade. Often, they can even tell which whale is doing it.

The whales take evasive action to mask the fact that they intend to place a large order. They place smaller orders on different exchanges; if the order moves the market too much they stop and wait to place the next chunk.

But the whales are too big for these maneuvers to work – a $50 billion mutual fund that decides to increase its long position in, say, GE by two-tenths of a percent must make a stock purchase of $100 million. To complete that purchase, the whale will buy more shares than there are sell offers at the current market price; hence, it will drive the price up. The front-runner knows that and buys first, then sells at the higher price when the large order is completed.

The cat-and-mouse game becomes a duel of warring computer programs. The whales try to program their trading to evade the piranhas, while the piranhas program and re-program – even using “machine learning,” a programming procedure that trains the machine to re-educate itself from its own experience – in order to negate the whales’ evasive tactics and
go in for the kill. What’s more, the piranhas are increasingly programmed to detect the machinations of other piranhas, in order to beat them in the pursuit of the whale. Sometimes, the programs use their espionage about other piranhas’ programs to take advantage of them directly.

It was in this hyper-competitive atmosphere that one of Patterson’s informants, Haim Bodek, discovered that – program as expertly as he might (and he thought that was as expert as you could get) – he still couldn’t beat the other piranhas to the money he hoped to win. That is when he discovered – though only by happening to pick the right bar stool, next to a highly knowledgeable exchange rep – that his problem was that he wasn’t submitting the right kind of orders. Says Patterson, “The orders Bodek had been using were child’s play, simple declarative sentences sent to exchanges such as ‘Buy up to $20.’ These new order types were compound sentences, with multiple clauses, virtually Faulknerian in their rambling complexity.”

To take one of the simplest of examples, you could place an order to buy security A and sell security B, but only if security A’s price goes 10 points higher than security B’s. Beyond that are complex multi-legged orders called bracketed orders or conditional orders with odd names like long condor, short iron butterfly, and married call, with complex sentence structures, such as to buy this and to sell that, but only if this other thing happens, and also to cancel a certain part of the order otherwise.

The purpose of these esoteric orders? For the new expert traders, according to Patterson, it was to trap counterparties into “taking” the order that Bodek would “make,” if he used the right locution. (The “taker” is the one who crosses the bid-ask spread to take the price offered.) This would entitle Bodek to the small “make” fee, while the counterparty would pay the slightly larger “take” fee, for taking the order that Bodek had “made” (with the difference going to the ECN). That, Bodek discovered, was how you made money as a high-frequency trader in today’s competitive environment.

High-frequency traders pursue gains not only by feeding off whales, but also by feeding off fishes that are too inattentive to realize that an order specification they placed yesterday was now “stale” because the market had moved. In Patterson’s words, a trader (or his computer program) would “hunt for a dealer who was asleep at the switch – or caught in traffic on the way to the office – and hadn’t updated his quote from the previous day’s session.”

All of this created an advantage for those high-frequency traders who were in the best position to siphon masses of data as rapidly as possible from the ECNs – competing even by placing their computers as physically close to the ECNs’ servers as they could, for a fee paid to the ECNs, in order to minimize communication times.

These practices eventually sparked outrage – a great example being a particularly articulate anonymous letter, sent in response to an SEC concept release inviting public
comment on the structure of the stock market. Patterson could not identify the writer – whose pseudonym was R. T. Leuchtkafer (“firefly” in German) – but was moved to quote at length from his letter nonetheless:

Leuchtkafer’s greatest ire was directed against the electronic data feeds that exchanges provided to high-speed firms. The feeds contained so much information about what was going on inside the market – about the huge elephant or whale orders to buy and sell stocks by institutional firms, such as mutual funds – that they gave their users a huge advantage. “A classic short-term strategy is to sniff out an elephant and trade ahead of it,” Leuchtkafer wrote. “That is front-running if you are a fiduciary to the elephant but just good trading if you are not, or so we suppose.”

The Flash Crash

High-frequency trading came under increased scrutiny after the so-called “Flash Crash” of May 6, 2010. For a short period that afternoon, after a large order to sell S&P 500 E-mini futures briefly discombobulated the markets, stocks began selling at absolutely crazy prices. Patterson writes that “Accenture, a global consulting company that normally traded for about $50 a share, swapped hands for a penny a share at 2:47.53. Boston Beer, the maker of Sam Adams brews, also hit a penny. … At the other end of the scale, Apple, which normally traded for about $250, sold for nearly $100,000 a share.”

Patterson provides the simple explanation. Those who naively believe that securities trade continuously and are thus perfectly liquid will be disillusioned, having been blinded to the truth by financial theories derived from the mathematics of continuous stochastic processes, like option pricing theory.

Events in the real world of securities trading – indeed most real-world events – occur, of course, only at discrete, not continuous, times. As with the portfolio insurance-related crash of October 19, 1987, and similar events, the problem was that while the theoretically-derived and automated market trading programs expected – and depended on – smooth price movements, the market occasionally consists only of cliffs and ledges.

It is worth quoting in full Patterson’s simple explanation of the drastic price surges:

The explanation for this insanity went back to Nasdaq’s integration of algo trading. Years before, high-speed market makers operating on Nasdaq were told that they always needed to stay in the market. But there was a loophole: They didn’t need to post bids or offers close to the price of a stock. Instead, they could put up wildly wide quotes, such as an offer to buy for a penny or sell for $99,999. The trick allowed the firms to stay in the market without actually trading. On May 6, after a number of high-frequency traders cut and ran, those quotes – called stub quotes – became the only live bids or offers
left on many stocks and ETFs. Other investors putting in “market orders,” a
direction to sell at any price, hit those trades.

As an aside, investors should recognize the dangers of placing such market orders. One
never knows where the market might be, and a better practice is to trade only at a known
and specified price.

Rent-seeking – guilty or not guilty?

The term “rent-seeking” is used pejoratively to describe any activity that seeks to profit one
individual or group at the expense of others – a profit accruing to winners of a zero-sum
game that does not increase the size of the whole pie.

Rent-seeking is often achieved through targeted interference in government or political
processes, but it can also occur in the private sector. High-frequency trading and other
financial machinations – like some of those that preceded the global financial crisis of
2007-2009 – are vulnerable to the charge that they increase the profits of some, but only at
the expense of others, while creating no net benefit for society as a whole.

High-frequency traders, of course, argue the opposite – that their activities add to the
market’s efficiency and liquidity, and that they therefore benefit everyone.

So who’s right? One can certainly argue that high-frequency trading, as currently
practiced, can indeed – or at least should – enhance the market’s beneficial
characteristics.

That is not to say that by so doing, high-frequency trading will itself continue to thrive. It
has long been understood that the exploitation of any particular market inefficiency may be
beneficial in the short term but is ultimately a self-limiting activity.

Will high-frequency trading and the maker-taker fee follow this well-worn course to
irrelevance? And, if so, how?

The maker-taker fee essentially functions as a Tobin tax on the market taker. (For those
unfamiliar with the term, a Tobin tax is a tax on financial transactions, named for the
Nobelist in economics James Tobin, who once proposed such a tax.) The maker-taker fee
is a tax paid not to government, however, but rather to the exchange and to the adroit
high-frequency traders who exploit it.

One of the purposes of the Tobin tax as originally proposed is to put a brake on the
turnover of capital. It was proposed after the 1997 “Asian flu” crisis precipitated by rapid
movements of capital into and then out of certain Asian countries, such as Thailand,
Indonesia and South Korea. The Tobin tax has been proposed again recently as a brake
on high-frequency trading itself and its presumed dangers.
But, as we have seen, the fee structure of the ECNs is already imposing a tax – a tax on the "whales" and dumb traders that are lured into, or can't avoid, paying the taker fee.

Such a tax should have the effect that the Tobin tax is intended to have – the whales should reduce their transactions, in order to reduce the amount they pay in tax.

But average mutual fund turnover is now over 100%, compared to 16% four decades ago, a change that has already increased the costs of hyperactive mutual fund management. It is already well known that high-turnover mutual funds’ trading costs are not compensated by superior performance; now the taker fees that are mostly imposed on the institutional whales are adding their Tobin-like tax to that too.

Doesn't it stand to reason, then – if markets are indeed even somewhat efficient – that the whales will realize that their high turnover costs them much more than they benefit? In an ideal world, they would drastically reduce their level of trading any day now, perhaps even to the low levels of the 1950s and 1960s.

But don't hold your breath. In spite of the fact that the revered Warren Buffett’s favorite holding time is “forever,” the current atmosphere of rampant investment misinformation makes ordinary – and even sophisticated – investors believe that frenetic trading makes money more effectively than inaction.

Thus, it's more likely that the high-frequency traders that don't kill each other off will continue to eat the whales – and their unwitting middle-class investors – for the foreseeable future.

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