Trading Pennies Into $7 Billion Drives High-Frequency’s Cowboys

By Kambiz Foroohar

Oct. 6 (Bloomberg) -- A cowboy-hat-wearing robot with “Sell” emblazoned across its chest adorns a wall-length mural in the lounge of RGM Advisors LLC in Austin, Texas. Another robot, with “Buy” on it, wobbles toward a green Wall Street sign as two machines tote spark-emitting high-speed cables.

“We explained to a local artist that we wanted a mural that represented our business, and he came up with the design,” RGM Chief Executive Officer Richard Gorelick says in an airy 16th-floor office that calls to mind a Scandinavian design firm rather than a company that trades hundreds of millions of shares a day, Bloomberg Markets magazine reports in its November issue.

As a cue to RGM’s staff of 120 mainly scientists, software developers and information technology graduates that their job is to eke out a fraction of a cent profit on each of those trades, five stone urns in the lobby are stuffed with pennies.

“It’s a lot easier for us to teach really smart scientists about markets and trading than to teach traders about programming,” Gorelick, 39, says.

High-frequency firms such as Gorelick’s are the rebellious new force in U.S. securities markets. Armed with algorithms and computers that shave milliseconds off the speed of a trade, programmers, math whizzes and even some former dot-commers like Gorelick have set up shop from Austin to Chicago to Red Bank, New Jersey. These firms don’t analyze a company’s value or bet on financial news. They use computers to scour public and private markets for deviations from historical prices and leap on discrepancies, rather than betting on the value of a company, currency or commodity.

All About Speed

“Speed is now the defining characteristic of the market,” says Adam Sussman, the New York-based director of research at Tabb Group LLC, who has researched the
role of high-frequency firms in financial markets.

Fast-paced trading played a role in the 10-minute U.S. stock market crash on May 6. The automatic execution of a sale of futures contracts valued at about $4.1 billion helped trigger the plunge, according to an Oct. 1 report by the U.S. Securities and Exchange Commission and Commodity Futures Trading Commission. The initial sales of the contracts led to a burst of trading among high-frequency firms, the report said.

Some high-frequency companies set themselves up as market makers, offering prices to buy and sell shares. Others exist specifically to profit from mismatches among stocks.

‘Quick Killing’

Nanex LLC says some activities are underhanded. Researchers at the Winnetka, Illinois, data firm have found instances in which thousands of quotes a second in a particular stock are fired and canceled immediately, overwhelming trading systems. This process has added the term “quote stuffing” to the lexicon.

“High-frequency traders are not interested in the fundamental worth of a company,” says George Feiger, CEO of Contango Capital Advisors Inc., a San Francisco money management firm with $2 billion in assets. “They are only interested in making a quick killing and moving on.”

Regulators are fumbling with how to rein in the HFT crowd and its computers that generate more than half of all U.S. stock trades each day. The SEC is looking into establishing and then enforcing a minimum time period, such as 50 milliseconds, that a quote to buy or sell a stock would have to remain valid, according to firms who have met with the SEC. Such a move could limit the number of cancellations. The SEC also is considering whether to require high-frequency firms to remain in a market, rather than pulling out when times get tough, to maintain a supply of stock.

‘Wild Wild West’

Democratic Senator Ted Kaufman of Delaware wants the SEC to limit the number of quote cancellations. The SEC has proposed rules to monitor firms that trade more than 2 million shares a day.

Such changes assume that enforcers are as agile as high-frequency firms.

“Technological advances have outstripped our ability to regulate them,” says Andrew Lo, director of Massachusetts Institute of Technology’s Laboratory for Financial Engineering and chief scientific officer of quantitative-analysis hedge fund AlphaSimplex Group LLC. “It’s like the Wild Wild West.”

The burgeoning HFT industry has spawned legions of jeans-wearing techies who arm their machines to outwit rivals. Programmers write formulas to sniff out the buy and sell intentions of mutual funds and jump in ahead of them in a practice called gaming. Institutional investors use strategies such as iceberging: breaking a single large order into chunks, and leaving just a small order, or the tip, visible. The gamers, also called sharks, unleash small buy and sell orders to uncover the hidden ones.
May 6

The event that triggered the intense interest of regulators was the crash on May 6. The Dow Jones Industrial Average -- already down about 350 points on concern that Greece would default on its 210 billion euro ($290 billion) debt -- nose-dived 600 points in less than 10 minutes. Just as quickly, it rebounded to finish the day 347 points lower. The plunge temporarily erased $862 billion from U.S. equities in the Dow’s biggest-ever intraday drop.

In a May 18 report, the SEC and CFTC said they’re focusing on six areas -- including whether declines in index futures and exchange traded funds may have created waves of share sales.

In the Oct. 1 report, the regulators said an unidentified firm set off the plunge by selling 75,000 contracts on the Standard & Poor’s 500 Index known as E-mini futures. Two people with knowledge of the findings identified the firm as Waddell & Reed Financial Inc., an Overland Park, Kansas-based mutual-fund company. The automated sales of the contracts created a flurry of trading among HFT firms, according to the report.

‘Hot Potato’

“HFTs began to quickly buy and then resell contracts to each other, generating a ‘hot-potato’ volume effect as the same positions were rapidly passed back and forth,” according to the report. Between 2:45:13 and 2:45:27, “HFTs traded more than 27,000 contracts, which accounted for about 49 percent of the total trading volume, while buying only about 200 additional contracts,” the report says.

The report is unlikely to end the debate over the role of high-frequency firms. “If there is a time advantage, there is a monetary advantage,” says Nanex founder Eric Scott Hunsader.

In a run-up to the crash, some high-frequency traders submitted and then canceled tens of thousands of buy and sell orders a second, overloading trading systems, Hunsader says. The SEC hasn’t accused any firm of quote stuffing and no firm has owned up to unleashing their computers on the day of the crash.

Quote Stuffing

Quote stuffing hasn’t gone away. On an average day, 15 to 20 stocks get more than 5,000 quotes a second that never turn into a trade, Hunsader says.

“If the number of quote-stuffing incidences continues, one or more systems will get saturated,” he says.

After May 6, the SEC and CFTC sought advice from traders, investors, academics, exchange officials and HFT executives on what to do.

“This is truly the brave new world we are trying to regulate,” CFTC Commissioner Scott O’Malia says.

SEC Chairman Mary Schapiro said in a September speech to the Economic Club of New York that the agency may impose rules on high-frequency traders.

During the past decade, the SEC moved to lower trading costs and create competition between exchanges. Some SEC changes, such as electronic
communications networks, automated computer trading systems that match buyers and sellers, have virtually eliminated traditional market makers -- the people who used to stand on the floors of exchanges and offer buy and sell prices for a stock. That has left market-making activity dominated by HFT firms with few rules to govern them.

Boost the Economy

“The function of the capital markets is to facilitate capital formation and boost the overall economy, not to assure the profitability of any group of market professionals,” says Daniel Gray, assistant director of the SEC’s division of trading and markets.

Proponents of high-frequency trading -- and the companies themselves -- say they lubricate the gears of capitalism, making markets more efficient and slashing trading costs.

“The equity market has created an intense and healthy competition in providing liquidity,” says Liam Connell, CEO of Allston Trading LLC, a Chicago high-frequency firm that deals in options, futures contracts and foreign exchange. “We’re ripping each other’s throats for fractions of a penny.”

$7.2 Billion Profit

They deny quote stuffing. In fact, most HFT firms say they slowed trading -- or shut down altogether -- as May 6 unfolded because they were unsure of whether the quotes they were seeing were accurate. Now some are balking at any requirement that would force them to remain in the market during such times.

For all of their impact, there aren’t all that many high-frequency traders. HFT firms, some with just a handful of employees, make up about 2 percent of the 20,000 hedge funds, brokers and mutual funds active in U.S. equities, according to Tabb Group.

Last year, they accounted for 60 percent of the daily U.S. stock market volume of 9.8 billion shares and about 40 percent of futures and foreign-exchange trading, according to Tabb. Their trading profit: about $7.2 billion in 2009, Tabb says. By contrast, just one investment bank, Goldman Sachs Group Inc., made $13.3 billion in net profit last year. Goldman traders generated more than $100 million on 17 separate days during this year’s second quarter.

Warp-Speed Trading

This warp-speed universe is eons away from the days when traders in colorful jackets convened at the premier trading marketplace, the New York Stock Exchange. Today, the Big Board is one of 11 U.S. exchanges that display quotes publicly. Two more are coming this month. More than 30 dark pools, which allow buyers and sellers to operate without showing their actions to others, and 200-plus venues operated by banks and brokerages match buyers and sellers privately.

Five years ago, almost 80 percent of the shares of NYSE companies were traded on that exchange. Today, the NYSE controls 26 percent of the shares traded on its trading platforms. (Bloomberg LP, the parent of Bloomberg News, owns Bloomberg Tradebook, an ECN that operates a dark pool.)
On a broiling August afternoon in Austin, about 30 T-shirt- and jeans-wearing RGM engineers 1,700 miles (2,700 kilometers) away from Wall Street watch a map of network traffic flowing across major markets on a 52-inch (132-centimeter) screen. Long equations scribbled in red and blue markers decorate glass office dividers. Outside, shops sell “Keep Austin Weird” souvenirs.

Algorithmic Models

RGM’s researchers build models for all of the stocks, futures and options the company trades to continuously determine a fair price. To value oil giant Chevron Corp., a high-frequency program might monitor not only Chevron’s stock price but compare it with crude oil, a basket of oil company shares and interest rates. Computers would monitor bid and ask spreads, the gap between the price that a buyer wants to receive and what a seller will pay, across all trading venues to gauge demand.

“High-frequency firms work to tighten the spreads,” Gorelick says. “If the price has moved away from fair value, traders try to push it back.” That means buying or selling, depending on the direction of the move.

Another strategy, called pairs trading, is based on the idea that prices of related stocks should be correlated. Soda rivals Coca-Cola Co. and PepsiCo Inc. tend to fluctuate around the same news. When that relationship breaks down so that the price of one stock increases while the other falls, it means opportunities to profit.

Dot-Com Heritage

“Think of prices of different correlated instruments as being held by rubber bands,” Gorelick says. “Once these rubber bands get stretched, that’s how we make our money.”

High-frequency traders didn’t have their HFT acronym when Gorelick started RGM in 2001 with Robbie Robinette and Mark Melton, the R and M of the firm.

Gorelick, who has a law degree from Georgetown University in Washington, had been general counsel and later chief strategy officer for message board search and shopping-comparison website Deja.com Inc. After the technology bubble burst in 2000, Deja.com shelved its IPO plans and sold its shopping service to EBay Inc. and its newsgroup search archives to Google Inc.

“Not one of us was a trader,” Gorelick says. He met Robinette, a software developer, at Deja.com; Melton, who specialized in data mining and pattern recognition, was Robinette’s cycling buddy.

The three started a company to apply mathematical models to detect trading patterns. “We liked a business where solving difficult technical problems led very directly to business success,” Gorelick says.

‘Three Guys From Texas’

The trio thought they could beat technical traders, who rely on charts to identify historical price patterns. They pored over trading books and wrote their first program. Gorelick headed to Wall Street to meet brokers. People didn’t understand what they were doing, he recalls.

“We were three guys from Texas, with no trading experience and little money,”
Gorelick says over a Cobb salad lunch. “It probably looked pretty flaky.”

Finally, a New York day-trading firm let them open an account. The partners loaded their program, which looked at statistical relationships among stocks, on a Compaq computer.

“Our first day, we did four trades and made $17,” Gorelick says. “Our second day, we lost a few hundred dollars and had to make adjustments.” By the spring of 2002, their strategy was working well enough to allow them to rent offices and recruit programmers and researchers.

Rise of Computers

RGM was preceded by a line of firms conceived by computer-savvy mavericks. Portfolio insurance traders were the early whiz kids of the 1980s until they got blamed for the 1987 stock market crash, says Bernard Donefer, who ran Fidelity Investments’ electronic trading desk from 1996 to 2002 and is now a professor at Baruch College in New York.

In the 1990s, day traders using the Small Order Execution System, a computer network that automatically executed trades of up to 1,000 shares, were called the SOES bandits because they swooped in before market makers could update prices. “It was not economical to use a human market maker when computers can do it much cheaper,” Donefer says.

SEC Innovations

The SEC paved the way for today’s high-frequency traders in 1998. Then-Chairman Arthur Levitt authorized Regulation ATS, which spawned ECNs to match buyers and sellers. (Levitt is on the board of Bloomberg LP.)

The SEC ordered the introduction of decimalization in 2000, lowering the minimum spread between what a seller will accept and what a buyer wants to pay to a penny from an eighth of a dollar, or 12.5 cents. The SEC’s aim was to reduce the cost of trading for retail investors.

In the 1990s, if you had wanted to buy a share of International Business Machines Corp., the price would have been $129, $129.125, $129.25 and so on. Today, the gap between the buyer and seller of a popular stock is often around a penny.

In another attempt to make markets more democratic, the SEC’s Regulation NMS in 2007 stipulated that orders be posted electronically and immediately executed at the best price available nationally. The combination of lower spreads and greater competition sent traditional market makers fleeing. Market making on the NYSE moved to computer screens from exchange floors.

Fleeting Opportunities

“Opportunities that in the past would last three days now last only five minutes or less,” says Irene Aldridge, author of “High-Frequency Trading: A Practical Guide to Algorithmic Strategies and Trading Systems” (Wiley, 2009). “There is too much information for a human trader to process.”

Automation introduced normally staid institutional investors to the high-frequency
world. For mutual funds that deal in blocks of stock, there’s always danger in having rivals detect a trade. Once a high-speed firm discovers a fund’s large buy order, HFT computers may instantly move to snap up the available stock on other exchanges, expecting to sell it to the institution at a higher price.

The massive volumes generated by HFT firms scouring various markets can also send false trading signals.

“I am not sure if the quote at any time accurately reflects the balance of supply and demand,” says Kevin Cronin, director of global equity trading at Atlanta-based mutual fund firm Invesco Ltd., which has $560 billion under management.

“I see a quote, and many times it disappears in an instant without anything trading,” adds Cronin, who spoke at the SEC hearing and wants the commission to restrict HFT activities.

HFT Backers

High-frequency trading has won supporters, even in the $12 trillion mutual fund industry. George Sauter, chief investment officer at Vanguard Group Inc., the biggest U.S. mutual fund manager, with $1.4 trillion in assets, says HFT has lowered costs. Decimalization, the absence of middlemen and competition sparked by high-frequency traders have shrunk spreads.

“My transaction costs have fallen by 50 percent over the past 10 years,” says Sauter, who also spoke at the SEC hearing and disagrees with curbs on HFT. “You cannot throw out high-speed trading with the bath water.”

Institutions have to adapt to reality, says Jose Marques, who joined Deutsche Bank AG as global head of electronic equity trading this year from Credit Suisse Group AG.

“We have gone from machines looking for patterns to machines looking for other machines looking for patterns,” says Marques, who fends off high-frequency players for the bank’s electronic trading clients.

Hide-and-Seek

“We take the very techniques the high-frequency crowd use to detect activity and use that knowledge to defend our clients,” he says. “If we make a trade and see prices start to move, we’ll stop trading. High-frequency players will lose interest and move on. At that stage, we resume our trading.” The aim is to keep trading without attracting attention.

It’s still a struggle to trade without being detected, says Henri Waelbroeck, research director at New York-based electronic brokerage Pipeline Financial Systems LLC.

“Over time, all algorithms will leave a signature, a footprint that could be read by others,” he says.

Manoj Narang became interested in faster trading when he suspected somebody was deciphering his trades. Narang, 40, an MIT graduate who’d worked for Goldman Sachs and Credit Suisse, was running a $200 million hedge fund above a Restoration Hardware store in Red Bank. He speculated that companies with similar
strategies were firing off trades faster than he was.

‘Taking Opportunities’

“Firms were jumping ahead of us in trades, taking opportunities,” says Narang, dressed in a blue T-shirt, jeans and a Yankees cap as about 25 people, mostly men in their 20s, work at computers in near silence. Narang measured his holding time in three or four days, not seconds or even minutes, and was missing out on profits.

Narang, who had founded Tradeworx Inc. to sell trading software in 1999 and had started his hedge fund in 2001, hired engineering and math graduates. He began a $5 million high-frequency operation in January 2009. Today, he trades as many as 60 million shares a day, with an average holding time of 2 minutes, compared with 10 minutes in the summer.

Narang walks to a whiteboard to explain one of his strategies. All he needs is the price relationship between two stocks. Once his computers detect that the price of one stock is moving more than others, the machines go into action. If the price of Microsoft Corp. is rising, Tradeworx sells Microsoft shares and buys the SPDR S&P 500 ETF Trust.

“You don’t need to look at anything other than the price of Microsoft to determine if it is rich or cheap,” he says.

Low Risk, Low Reward

There are plenty of chances to scalp a penny or two. A fluctuation in Microsoft shares will change the price of Microsoft options, as well as indexes that track Microsoft and the Standard & Poor’s 500 futures contract. Narang’s machines sell the SPDR ETF fund and buy Microsoft, closing the trade for a profit.

“This is not a swing-for-the-fences strategy but a low-risk, low-reward operation,” he says.

The trick is to generate enough volume to make it a sustainable business. Allston’s Connell left behind 14 years on Wall Street to join the Chicago firm in 2004, a year after it was formed. A native of Dublin who, with his rumpled white shirt and steel-gray hair, resembles actor Dennis Quaid, Connell won a 1988 U.S. Green Card lottery, a government program that offered permanent residency. He headed to Salomon Brothers Inc. in New York to set up fixed-income-trading systems.

Price Discrepancies

Connell says he quit Salomon in 1998 because he felt destined for a life in middle management. He joined Chicago-based Hull Trading Co., which was a pioneer in electronic trading in options and futures. Goldman Sachs bought Hull for $531 million in 1999, making him managing director for equities derivatives trading systems. He spent four years there, took a year off and then joined Allston.

Seated in an office in the Chicago Board Options Exchange building with the blinds drawn against the glaring August sunlight, Connell says his team constantly looks for ways of identifying price discrepancies.

One approach would be to look at a stock’s historical trading pattern and buy or sell whenever the stock moves out of its range. Another is comparing a stock’s movement to a basket of related stocks. By contrast, a traditional asset
management firm may look at year-ahead earnings, price-earnings ratio and cash-flow expectations to determine fair value.

Without knowing anything about Goldman Sachs’s profit or cash flow, a firm could still make money trading the shares. To illustrate how this might be done, Connell shows a spreadsheet with two days of Goldman Sachs price movements.

Buy and Sell Spikes

He points out where sudden spikes go back to an average price. These spikes are most likely short-term discrepancies in buy and sell orders, he says. By selling when the stock rose sharply and buying when the price fell sharply, a firm could theoretically make a profit. A company could apply this rule to spreads between similar stocks or baskets of stocks, says Connell, who declines to discuss Allston’s strategies.

At RGM, Gorelick has the same reticence. When asked about profits, he’s tight-lipped.

“That’s one of the benefits of being a private company,” he says.

From RGM’s first operating day when it did four trades and made $17, it now trades hundreds of millions of shares a day. If it makes 0.1 cent to 0.2 cent a share, or 1 to 2 mil in industry parlance, that could mean $75 million to $150 million a year in revenue from its trades. With options, futures and foreign exchange, trading profit could top $200 million.

“We’re not Goldman Sachs, but this is a good business,” he says.

Genie Out of Lamp

Supporters and opponents agree on one thing: High-frequency trading is here to stay.

“You can’t put the genie back in the lamp,” says Tim Sargent, CEO of Quantitative Services Group LLC, a Naperville, Illinois, company that analyzes trading costs.

The trick for regulators will be to weave some magic of their own to keep financial markets humming without letting fast computers bent on quick profits get the upper hand.

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