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### Computer algorithms increasingly call shots in stock trades

Thomas Lee, Star Tribune

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Wall Street has gone robo.

An increasing number of stock trades are being done not by traders yelling into phones or writing on slips on paper but by sophisticated computers embedded with advanced mathematical equations known as algorithms.

Firms such as Credit First Suisse Boston, Goldman Sachs and Minneapolis-based Piper Jaffray & Co. use algorithms to quickly find the best prices to buy or sell stocks on behalf of their institutional clients, such as money managers and mutual funds. Hedge funds use even more advanced algorithms to seek out investment opportunities in the market.

" 'Algorithmic model' is the buzzword today," said Mary McDermott-Holland, senior vice president of trading for Boston-based Franklin Portfolio Associates, which manages \$700 million for Minnesota's pension board.

Algorithmic-based stock trading will increase to 25 percent of overall trading volume in 2008 from 14 percent today, according to a report by Celent, a research consulting firm in Boston. During the next four years, the so-called buy-side firms -- institutional investors such as mutual and pension funds -- will increase their use of algorithms at a compound annual rate of 28 percent.

Hedge funds, which are known for their aggressive investment strategies, pioneered the use of algorithms in stock trades. But in recent years, buy and sell investors alike have embraced the technology for a couple of reasons, experts say.

The first, fittingly, involves a decimal point. Since the New York Stock Exchange in 2000 shifted from pricing stocks in fractions of 16 to decimals (stock price then,  $12\frac{1}{8}$ , price now, 12.14, for example), the average trade size has dropped from 1,200 shares to about 500 shares in 2003, the Celent report says.

Throw in a hodgepodge of stock exchanges and investors can find it hard to make large stock trades without putting heavy upward or downward pressure on the shares, and at the best price. The alternative, buying or selling stocks in small chunks on different exchanges, can be tedious and time-consuming, at least for human traders.

What algorithms offer is speed and efficiency. Robo trading allows investors to instantly access several markets simultaneously to look for the best deals.

Trading stocks piecemeal isn't inefficient when a computer can do several transactions within seconds. Plus, investors get the added bonus of anonymity. Trying to dump 2 million shares of Microsoft at once is not particularly stealthy. Breaking up that sale into smaller trades can prevent other investors from sniffing out your strategy.

Mindful of the bull market that began in 2002, investment firms have turned to algorithms to boost sagging returns for investors by

making it cheaper to conduct trades. For most individual investors, the main benefit comes in lower trading costs, and better prices, for trades conducted by their mutual funds.

The commission on a stock trade has fallen to 1 or 2 cents a share from 4.5 cents a share three years ago, said Mark Donahoe, managing director and head of equity trading for Piper Jaffray, which bought Vie Financial Group Inc., a developer of algorithmic services, in 2002.

"Mutual funds want to drive costs down," Donahoe said. "They want to squeeze as much return as they can for the investor."

Unhappy with their returns in recent years, investors are shunning traditional company-focused stock research in favor of "alternative" investment tools such as algorithms, said Michael Covel, author of "Trend Following: How Great Traders Make Millions in Up or Down Markets."

In other words, if your stock broker isn't bringing home the goods, why not try a computer program?

Hedge fund managers, for instance, are using sophisticated programs to analyze the movement of a stock price, identify trading patterns, and explore relationships between different stocks.

"You don't have to be an expert in eBay," Covel said. "You can trade in so many more markets."

So will robo traders replace humans?

"There is always a need for a talented sales trader," just not as many, Donahoe said.

And algorithms aren't suited for small- to mid-cap stocks that have a small "float," meaning there are not lot of shares available to trade.

Algorithms also can't figure out how to respond to major world events such as natural catastrophes and terrorist attacks, said Harrell Smith, Celent's manager of securities and investment practices.

Nevertheless, Wall Street firms are in hot pursuit of the mathematicians and scientists who can create the bigger and better algorithm. Some hedge funds are even developing software that can analyze press releases and/or live news feeds.

Eventually, investors will use algorithms to trade in futures, bonds and international equities.

"This will revolutionize trading," Smith said.

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