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Buffeted "quants" are still in demand

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By Phil Wahba

NEW YORK (Reuters) - Last week, New York University and Carnegie Mellon sent a new class of math whizzes out into a profession that is both blamed for the financial collapse and charged with preventing it happening again.

Many of these so-called quantitative analysts, or "quants," graduating from elite financial engineering courses will end up writing computer programs that handle an ever greater share of market trading.

Because some of their mathematical models failed to take into account factors that later turned out to be crucial, quants have been blamed for compounding risk and exacerbating the crash in financial markets.

But far from going into decline, those with financial engineering degrees are still in demand as hedge funds and banks seek ways to measure previously unforeseen risks and factor them into their models.

The profession's reputation took a beating in August 2007, when some quant funds -- which try to beat the market by crunching vast amounts of data at lightning speed -- lost a third of their value in a matter of days.

Many blamed the math commandos for failing to factor in extreme events, in this case unprecedented numbers of home mortgage foreclosures.

Critics and practitioners alike agree they need to improve their modeling, and that begins at the elite financial engineering programs, which have come to be known as "quant farms."

Both New York University and Carnegie Mellon University in Pittsburgh, which between them minted about 100 new quants this month, have tweaked their curricula, lest their graduates miss another brewing disaster.

Meanwhile, at Columbia University, the masters of financial engineering program has tried to give its students a wider view of the market outside mathematical models, said program director Emanuel Derman.

"You have to understand you are dealing with people and markets, and they don't respond the way physical systems do," said Derman, a former managing director at Goldman Sachs.

PLUS CA CHANGE

As the mortgage crisis gathered steam last year and financial markets became volatile, quant funds, which make up about 7 percent of the hedge fund universe, were caught flat-footed.

To raise cash, they started selling stocks, which created unusual moves in stock prices, throwing other quant models off. Finally, the selling snowballed into a full market panic.

"Before you know it, you have a chain reaction and the whole market dives on the basis of what amounts to a mathematical prediction," said Peter Morici an economics professor at the University of Maryland.

"You create a mathematical herd. That's why so often these schemes based on math models end in tears."

Among those in tears were investors in Goldman Sachs' Global Opportunities Fund, which lost a third of its value, or \$1.8 billion, in a single

week in August 2007. Other big quant funds also hemorrhaged that month.

In his book "A Demon of Our Own Design," published in April 2007, hedge fund manager Richard Bookstaber made the case that financial innovation actually adds to risk because it fails to take emotion into account.

The models increasingly assume rational behavior, instead of the way humans really behave, he wrote.

Some institutional investors have said quants become too enamored of their creations to notice when they turn into mathematical Frankensteins, especially in new, untested markets such as securities based on bundled mortgages.

"They get caught up in their religion -- they keep going merrily along on autopilot," said Matt McCormick, an analyst and portfolio manager with Bahl & Graynor Investment Counsel in Cincinnati. "There's no substitution for grey hair and your gut when you see valuations that are out-of-whack."

Nassem Taleb, a former trader who wrote the best seller "Black Swan: The Impact of the Highly Improbable," is even more outspoken. "Quants and quant programs are dangerous to society," he said.

The failure last year to foresee that subprime borrowers might default on their mortgages is only the latest example of mathematical models that rule out possible sets of circumstances because they were highly unusual.

In 1998, Connecticut hedge fund Long-Term Capital Management collapsed because its mathematical model failed to foresee the Russian debt crisis.

"And LTCM was constructed by Nobel laureates," Morici said.

Those laureates, Robert Merton and Myron Scholes, along with Fischer Black, are considered the fathers of quantitative analysis for the Black-Scholes model, developed in 1973, for predicting option prices.

That model has underpinned countless portfolio management strategies, including portfolio insurance, which combines options and market indices to protect a portfolio's value, and which some blame for worsening the spiral that led to the 1987 market crash.

In that episode, critics charged, the model failed to factor in the difficulty of selling stocks as required by the strategy. As selling grew harder, more stocks were sold, feeding the panic.

But defenders of the profession say at least some of the criticism should be directed at the fund managers who come up with the strategies, rather than the quants who implement them.

And, as long as the strategy is working, no one wants to question it.

"It's an arms race where no one has an incentive to pull back on their own," said Andrew Lo, director of the Massachusetts Institute of Technology's Laboratory for Financial Engineering, another quant farm.

"When people are making money, it's virtually impossible to get them to take their hand out of the fire."

TWEAKING CURRICULUM

Quant farms started appearing at leading engineering schools in the United States in the mid 1990s, with Carnegie Mellon first out of the gate with its master's in computational finance in 1994.

Now there are more than 20 programs from Cornell University in Ithaca, New York, to University of California at Berkeley.

Abroad, they have sprouted at schools such as HEC Montreal, City University in London and Bocconi University in Milan.

"Quants need to question their own assumptions," said Gregg Berman, co-head of RiskMetrics Group's risk management business and a former

quant. "Unfortunately in quantitative finance, there are many who come from a schooling that's very theoretical."

One suggestion he has is to teach students more about how interconnected the various players in finance are. "We have to understand how contagion can spread between strategies. Risk management should not be divorced from investment management."

New York University, for example, is planning to introduce more classes aimed at reducing mispricings, which have wreaked havoc with models. It will also beef up its teaching of "crash risk," said Petter Kolm, the quant program's deputy director.

Kolm defends this field of study against critics.

"Quant finance is bringing a scientific method into finance," he said. "Fifty years ago it was more of an art, more about a qualitative assessment and experience, and now it's a more vigorous framework."

TIGHT JOB MARKET

The bloodbath on Wall Street has dimmed the job prospects of the new batch of baby quants leaving programs this month.

"This is the toughest market I've ever seen," said Rick Bryant, executive director of the quant program at Carnegie Mellon. "Right now we're 69 percent placed."

Columbia and NYU are seeing the same thing.

"The job situation is going to be worse for a while, that's for sure," said Columbia's Derman. "Historically, quants have worked at investment banks, and in the past few months there has been a mass evaporation of investment banks."

Kolm said about 55 percent of half of New York University's class of 2008 has been placed. Normally that rate would be between 80 and 90 percent at this point.

But that's not to say there are no high-paying jobs waiting for them.

"Risk management is still a growth area, and pension funds, hedge funds and mutual funds are still looking for talent," Carnegie Mellon's Bryant said.

Some jobs, such as those in investment banks' structured credit desks, are largely gone, but there are areas where quants remain in high demand. Such as hedge funds.

"If they've survived, they're hiring and are looking for people to who can sniff through the toxic waste and price CDOs (collateralized debt obligations)," Bryant said.

Even the former investment banks are still hiring for certain jobs, he said. For example, one student has been hired by Morgan Stanley to price and assess counterparty risk, something that was "hardly on anyone's radar last year."

For all the lashing the profession has taken, it is still hard to get into.

Columbia admits only about 10 percent of students who apply and the schools collectively only churn out about 2,000 new quants per year worldwide.

Bryant said his graduates from 2007 commanded a mean base salary of \$96,000, with an large majority getting signing bonuses that averaged \$37,000.

Listings at the job search site quantfinancejobs.com shows how well paid they continue to be. One New York based electronic trading fund last week was advertising for a quant trader for between \$150,000 and \$500,000, while a London-based hedge fund was offering between 90,000 pounds and 200,000 pounds for a PhD quant trader.

"The quest for the holy grail goes on," Bryant said. "People will continue to try to beat the market using quantitative models and the latest technology."

(Reporting by Phil Wahba; Editing by Eddie Evans)

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