


James Pethokoukis

Blogging money and politics

[See all posts](#)

 You are here: [Home](#) > [Business & Finance](#) > [Markets](#) > [Markets News](#) > Article

 DJIA : **8473.49** **+196.17 +2.37%** | Nasdaq : **1750.43** **+58.42 +3.45%**

HOME

BUSINESS & FINANCE

Markets

[U.S.](#)
[U.K.](#)
[Europe](#)
[Asia](#)

Markets News

[Hot Stocks](#)
[Bonds News](#)
[Gainers & Losers](#)
[Most Actives](#)
[Indices](#)
[Calendars](#)

Deals

Small Business

Green Business

Industries

Industry Summits

Stocks

Funds

ETFs

Currencies

Commodities

Options

Economy

Bonds

Analyst Research

Portfolio

NEWS

Do More With Reuters

[RSS](#)
[Widgets](#)
[Mobile](#)
[Podcasts](#)
[Newsletters](#)
[Your View](#)

Partner Services

[CareerBuilder](#)
[Affiliate Network](#)

Professional Products

[Support \(Customer Zone\)](#)
[Reuters Media](#)
[Financial Products](#)

About Thomson Reuters

FACTBOX-Tools to predict market shocks

Sun May 24, 2009 8:04pm EDT

[Email](#) | [Print](#) | [Share](#) | [Reprints](#) | [Single Page](#)

[-] Text [+]

MARKET NEWS

[Asian shares hit seven-month high](#)
[Oil hovers above \\$62 on optimism about economy](#)
[Yen eases as investor confidence picks up](#)
[More Business & Investing News...](#)

Featured Broker sponsored link

are similar no matter what scale of observation. As applied to a market, the price graph of a day's trading can look the same on a smaller scale as one for a year's or 100 years' trading. Assessing extremes that are possible on a small scale can give a picture of potential extremes on a larger scale.

Mandelbrot's theories on fractals enabled Rachev to factor in "fat tail" risk or the chance of an event falling outside the classic Gaussian bell curve of probability, named after 19th century mathematician Carl Friedrich Gauss.

Rachev said he combined fractals with the work of U.S. mathematician Robert Engle on clustering of volatility.

Engle had developed models that take into account the tendency of stock prices to move between periods of low volatility, such as in 2003 to 2006, and high volatility -- 2007 to date.

"I combined the work of two geniuses -- Mandelbrot and Bob Engle -- because they are both right. You have to use a model that encompasses both the clustering of volatility and fat-tail distribution," Rachev said.

Another tool came from Andrey Nikolaevich Kolmogorov, Rachev's professor at Moscow University who analysed probabilities around earthquakes.

Neither an actual earthquake nor a market quake happen completely in isolation, Rachev said.

Kolmogorov's model takes into account that a big shock is preceded by smaller shocks and followed by aftershocks, and his theories can also be used to analyse the probabilities of shocks on the stock market, Rachev said.

For example, the standard statistical correlation of the behaviour of the Dow Jones industrial average and Nasdaq stock indexes began to break down around 80 days before the 1987 crash, he said. "These relations leave the Gaussian world before a crash happens."

He took his fourth tool, which he calls joint tail dependencies, from survival analysis of the late 1970s. This branch of statistics deals with the modeling of data on the time to events such as deaths in a population. These tend to cluster together during famines and epidemics.

In extreme situations in the financial markets, asset classes that are seen as normally independent or only marginally related start to move in tandem.

"We needed a structure that can capture the fact that huge losses tend

May 25 (Reuters) - How do you calculate the probability of an event that is unprecedented?

Zari Rachev, Bulgarian-born mathematician, says he uses a variety of mathematical and statistical tools. His company FinAnalytica runs scenarios that can incorporate each of these approaches separately or combine them.

One comes from the work of French mathematician Benoit Mandelbrot on fractals, complex geometric shapes that

MOST POPULAR ON REUTERS

1. GM bankruptcy nears as bondholders shun tender offer


- UPDATE 1-Singapore has first H1N1 flu case; woman quarantined
- UPDATE 6-Obama picks Sotomayor for Supreme Court
- U.S. economy at risk of double-dip recession
- WRAPUP 5-GM bondholders shun tender offer; bankruptcy nears
- Why Should I Have To Pay for My Employees' Health Care?
- Asian shares hit seven-month high
- Microsoft to launch new Zune later this year
- Oil hovers above \$62 on optimism about economy
- Malaysia Genting says open to acquisitions

[Most Popular Articles RSS Feed](#)

MORE MARKET NEWS

Moody's lowers Sony credit rating, outlook negative
 UPDATE 1-European truck sales plunge 42 pct in April
 Sonic Automotive sees strong used-car sales-report
 Romania - Factors to Watch on May 27
[More Market News...](#)

WE WANT TO HEAR FROM YOU

Join the Reuters Consumer Insight Panel and help us get to know you better

[Please take a moment to complete our survey](#)



Reuters.com: [Help and Contact Us](#) | [Advertise With Us](#) | [Mobile](#) | [Newsletters](#) | [RSS](#)  | [Labs](#) | [Archive](#) | [Site Index](#) | [Video Index](#)

Thomson Reuters Corporate: [Copyright](#) | [Disclaimer](#) | [Privacy](#) | [Professional Products](#) | [Professional Products Support](#) | [About Thomson Reuters](#) | [Careers](#)

International Editions: [Africa](#) | [Arabic](#) | [Argentina](#) | [Brazil](#) | [Canada](#) | [China](#) | [France](#) | [Germany](#) | [India](#) | [Italy](#) | [Japan](#) | [Latin America](#) | [Mexico](#) | [Russia](#) | [Spain](#) | [United Kingdom](#) | [United States](#)

Thomson Reuters is the world's largest international multimedia news agency, providing investing news, world news, business news, technology news, headline news, small business news, news alerts, personal finance, stock market, and mutual funds information available on Reuters.com, video, mobile, and interactive television platforms. Thomson Reuters journalists are subject to an Editorial Handbook which requires fair presentation and disclosure of relevant interests.

NYSE and AMEX quotes delayed by at least 20 minutes. Nasdaq delayed by at least 15 minutes. For a complete list of exchanges and delays, please [click here](#).