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How to forecast a financial crisis

By Clive Cookson

A scientific understanding of the global economy requires better access to and analysis of data



Financial economists believe a forecasting system could help avert crises such as this on the NYSE in 2008

As memories of the 2007-2009 financial crisis recede, scientists are becoming increasingly vocal in their criticism of traditional economists for failing to predict that upheaval – or the current global debt overload.

At a meeting in London this month, three leading financial scientists advocated fundamental reforms to lay the foundations for what Philip Treleven, director of the financial computing centre at University College London, calls a “new economics based on computing and science”.

Key to a scientific understanding of the global economy is better access to and analysis of vast amounts of financial data. These data need to be tackled with new models, based on computing techniques such as data mining, non-linear dynamics, simulation-based analysis, statistical physics and machine learning.

“Everything needs to be rebuilt on the basis of observations alone, without any of the

assumptions of classical economics,” says Edward Tsang, director of the centre for computational finance and economic agents at the University of Essex.

The most useful outcome from this analysis would be the financial equivalent of a weather-forecasting system, warning of crises in time to head them off. “If we had had a financial forecasting system four or five years ago, we would have been able to detect that Lehman was in a dangerous situation before it collapsed,” Treleven says.

Deadly downturn



Death rates among Japanese men in managerial positions have increased since the 1980s as a result of stress caused by Japan's economic stagnation, according to a BMJ study.

How much would a financial-storm-warning system cost? “We could build something miraculous with \$1bn,” says Richard Olsen, a visiting professor at Essex University. “But we could do something useful with \$20m.”

In the absence of global action, Treleven says the UK could set an example to the rest of the world if the Financial Services Authority set up a local financial forecasting system. “But this requires Britain's banks and other financial institutions to get a better grip on what level of risk they are carrying.”

Many observers believe that the growth of computer-based trading on foreign exchange and share markets has increased instability, but Olsen, who has built up a financial trading and research company in Zurich, takes the opposite view. He believes that the instabilities result from constraints

on full-blooded computer trading – and global finance would become more stable if speed and volume were greatly increased.

“If you take the circulation of blood in a healthy human body as a model, the financial markets need to increase their speed of circulation by a factor of about 2,000,” Olsen adds.

Treleven is not convinced by Olsen's argument but would like to build a computer model of the global financial system to find out.

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Why hominids became upstanding citizens

Evolutionary biologists love to speculate about how and why particular human characteristics evolved in our ancestors.

The latest study, published in *Current Biology*, looks at why early hominids started to walk on two legs. It concludes that this helped them to grab and carry as much food as possible.

Researchers from Cambridge and Kyoto universities investigated bipedalism in modern chimpanzees as they competed for food. The findings suggest that chimps switch from