

New software to simulate future financial crises

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(PhysOrg.com) -- Can economics better predict how banks will react to future credit crunches and their impact on the wider economy? Breakthrough simulation software by European researchers could hold the answers to this question and more.

How will economic policies adapt in 2020 when a quarter of the EU population is over 65 and natural resources are dwindling? Can economists better predict future banking crises or economic turmoil? This week, the European Commission unveiled breakthrough research that could help answer questions like these by using economic simulation software.

Produced by the EU-funded EURACE research project that came to a successful end in November, the software applies simulation technology

also used for computer generated images (CGI) in movies. The EURACE software platform runs on simulation technology called FLAME (Flexible Large-scale Agent Modelling Environment).

The simulation software predicts the interaction between large populations of different economic actors, like households and companies, banks and borrowers or employers and job-seekers who trade and compete like real people.

By giving each simulated agent individual and realistic behaviour and interactions that show how markets will evolve, these massive-scale simulations can better test new policies tackling future societal challenges.

"This first class European research can help us make the move from the economics of pen and paper to the economics of super-computers," said Viviane Reding, EU Commissioner for Information Society and Media.

"The results of this research project will complement traditional economic statistics and assumptions about how economic actors react by enabling better testing of a policy's effects on people while still on the drawing board. I expect government researchers and national research institutes will act quickly to put this tool at the disposal of decision-makers as soon as possible," noted the Commissioner.

This simulation technology uses computer-based experiments to focus on the relationship between large populations of different economic actors across many interconnected markets. It is the first time this sort of technology is applied on such a big scale using high-powered computing.

Each simulated household (or business, or bank) will make different decisions in reaction to various monetary, fiscal or pro-innovation policies including, for example, whether to remain in a job or seek a new

one, how much of a wage is saved, spent or invested. This means that the impact of one policy in one market at one point in time is no longer assessed in isolation from other factors.

Predicting the unpredictable?

Traditional economics failed to predict the scale of the knock-on effect of the credit crunch on the world economy. The new software shows how banks react in different ways by looking at a wide range of factors like how much reserves they must keep compared to investments, their savers' consumption/investment and saving patterns, and psychological factors like confidence in the market. It can then give policy-makers - who want to know how fiscal and monetary reforms will affect banks and customers - a better warning of the scale of a financial crisis' impact on the real economy. The software can also simulate the same scenario with an older demographic to help plan for an older Europe, or with limited energy supplies.

Designed to run on supercomputers that allow simulation to be carried out on a massive scale but accessible to any connected desktop PC, the software can be used by economists and policy-makers with no knowledge of computer programming. By connecting hundreds of thousands of small simulated actions and reactions across the economy, the software can give policy-makers better and bigger pictures of their policy impact on people's life and work.

Igniting the flame

The three-year project was carried out by economists and computer scientists from eight universities (in Italy, France, Germany, Turkey and the UK), brought together by the EU and financed from the European Commission's technology research budget.

The €2.5 million project which started in 2006 was co-funded with €2.1 million under the Commission's Sixth Framework Programme for research. It was part of the European Commission's initiative to boost high-risk research in future and emerging information technologies.

The Commission recently called on EU countries to increase high-risk research investment to catch up with the US, China and Japan. The Commission will lead by example, boosting the current €100 million annual funding 70% by 2013.

More information: [EURACE project](#)

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