A new perspective on economic bubbles and crashes and how to avoid them

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(Phys.org) —By using methods developed to study the interactions of particles and applying them to economics, researchers at the University of Sydney have shown that small changes can create a tipping point and lead to catastrophic changes for the whole economy.

"We have shown that when many economic agents are interacting, all while trying to get the most out of their dealings with each other, a point can emerge which tips the whole economy into a sudden downturn," said Dr Michael Harré, from the University's Faculty of Engineering and Information Technologies.

"For example, if car manufacturers are competing against each other to sell electric or petrol-powered cars and there is a sudden shift from electric to petrol-powered it would drastically shift the demand for petrol with subsequent economic knock-on effects.

"On the upside if we know how to reward individual market sectors within an economy it is possible to steer the economy around these changes to avoid potential economic disasters."

Dr Harré is lead author, with colleagues from the University's Complex Systems Research Group, of a paper recently published in the *European Physical Journal B*.

The article is based on previous research on how economic agents making strategic decisions in an economy behave like physical particles

in a closed system.

"It has become increasingly clear that economic theory is not able to sufficiently explain the unexpected bubbles and crashes occurring in economies throughout the world. These are not only sudden plunges in share markets, but also in housing markets which have a direct and immediate impact on many of us," said Dr Harré.

"Alternative models such as ours can contribute to our understanding of such events."

The researchers have previously shown how the interaction of tax rates can unintentionally drive an economy towards a tipping point. Their current paper looks at average net profits.

"Using this interpretation we were able to show that as an industry sector's profitability varies over time small changes can result in the industry sector and all of the interconnected industries collapsing at the same time," Dr Harré said.

"On the positive side, we showed that if we are able to mildly tweak the incentives and profitability of each industry sector, these tipping points can be avoided, essentially steering the economy around catastrophic collapses."

Being able to successfully navigate such tipping points depends on improving our understanding of the economic interactions that drive economies, the researchers claim.

"Encouragingly, there are a number of key areas currently being studied such as economic resilience and flexibility that will help us understand how close we are to a tipping point and what to do about it."

More information: epjb.epj.org/articles/epjb/abs … b121064/b121064.html

Provided by University of Sydney