

# Study suggests banks could learn from monkeys to avoid collapse

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(Phys.org) —All jokes about monkey business aside, primate social networks provide valuable lessons that could help predict and prevent catastrophes like the global financial crisis of 2008, report researchers at the University of California, Davis.

The behaviors of captive [rhesus macaque monkeys](#) and the [banking industry](#) both comprise complex networks. In this study, the researchers propose that crises are sometimes caused by breakdowns in these internal networks rather than by disabling external forces. Catastrophic collapses could be avoided by monitoring changes in these key internal networks, they suggest.

The researchers report their findings online in the January issue of the

*International Journal of Forecasting.*

"Admittedly, comparing monkeys to a financial system is unconventional, however, we believe the comparison is compelling," said Fushing Hsieh, a professor of statistics and the study's lead author.

"We argue that it's possible to detect when a crisis is likely to set in—whether in a primate social group or an industry like banking—by modeling the evolution of the breakdowns across the system's networks," said co-author Óscar Jordà, a UC Davis economics professor and research adviser to the Federal Reserve Bank of San Francisco.

Hsieh and Jordà teamed up with UC Davis Professor Brenda McCowan and project scientist Brianne Beisner, both of the UC Davis School of Veterinary Medicine and California National Primate Research Center at UC Davis, to compare the two network systems.

The network models, developed from data collected on the large breeding societies of rhesus macaques housed outdoors at the primate center, are intended to help understand and subsequently prevent societal collapse in these natural monkey systems. The models were then applied, in principle, to the banking system.

The researchers first examined the power structure and significant points, or nodes, that comprise the networks in the monkey social group and applied them to comparable points and networks in the banking industry.

For example, the networks in a community of captive monkeys are based on behaviors such as mutual grooming, fighting, assisting in fights and displaying status signals such as teeth-baring. In the banking industry, the primary activities revolve around interbank lending, loan syndication, bond-issuing services and insurance.

The researchers determined that the most significant activities within each system are those that influence other relationships. In monkey society, for instance, teeth-baring and other status behaviors that signal who is the boss of whom comprise the fundamental, or keystone, network because they govern close, long-term relationships and aggression between individual monkeys.

"There may not be much teeth-baring in the banking industry, however we did determine that interbank lending would be the network in that system that is of comparable importance to subordination signaling in a monkey colony," McCowan said.

These keystone networks are critically important because they significantly influence the stability of other relationships or networks within each respective system, she said.

The researchers propose that by examining changes in the connectivity patterns within the keystone network as well as the dependence patterns between each keystone [network](#) and its subsidiary networks, it's possible to measure growing disturbances within the system, detect a mounting problem and intervene before it reaches a catastrophic tipping point.

**More information:** Computing systemic risk using multiple behavioral and keystone networks: The emergence of a crisis in primate societies and banks, *International Journal of Forecasting*. The paper is online here: [www.sciencedirect.com/science/ ... ii/S0169207013001465](http://www.sciencedirect.com/science/.../ii/S0169207013001465)

Provided by UC Davis

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