



OECD Reviews of Risk Management Policies

Systemic Financial Risk



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Foreword

The report by Stefan Thurner - *Systemic Financial Risk* - is part of a series of five case studies published within the framework of the OECD Project on Future Global Shocks (2009-2011). These papers were commissioned in the aftermath of the “subprime crisis” that started in 2007-2008. They served as a basis for the main report: *Future Global Shocks: Improving Risk Governance* (OECD, 2011). The other four case studies are:

- *Pandemics*
- *Reducing Systemic Cybersecurity Risk*
- *Geomagnetic Storms*
- *Social Unrest*

The OECD/IFP project team invited the authors and research teams to focus on the mechanisms of propagation of shocks from the local to the global level for a given risk area, particularly in the case of rapid-onset shocks. Researchers were also asked to provide fresh views about the impact of globalisation on the risk area. For example: the growing mobility of people, goods, information, money, and viruses; increasing networking and interdependences; heightened concentration of assets and population; the rapid pace of technological advances; interconnectedness; and the likelihood and contours of propagation pathways, be they geographical, time-bound, or cross-sectoral in their domino effects. Authors were also encouraged to use less conventional approaches or tools, such as inputs from network and complexity theories, agent based models or other behavioural sciences in order to maximise the potential value added to the understanding of propagation mechanisms.

Although the five case studies selected by the project steering group in conjunction with the OECD and IFP Secretariats offer only a limited sample of potential global shocks, we believe it is sufficiently broad in coverage to allow valid conclusions, messages and policy options to be distilled from the analysis. These are set out in the main report, *Future Global Shocks*. Additionally, the OECD Secretariat decided to publish each case study separately, as they each represent a new focus on propagation mechanisms and as each may be of interest to various communities with sector-specific concerns (e.g. policy analysts in departments of corporations, scholars, NGOs).

This case study was authored by Prof Stefan Thurner, of the Section for Science of Complex Systems, Medical University of Vienna, Austria, and of the International Institute for Applied Systems Analysis (IIASA) Laxenburg, Austria

Guidance to the authors and teams of researchers was provided by the project team (Barrie Stevens, Pierre-Alain Schieb, Jack Radisch, David Sawaya and Anita Gibson).

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Executive summary

What is at stake in a financial crisis?

This report analyses the results of simulations using an agent based model of financial markets to show how excessive levels of leverage in financial markets can lead to a systemic crash. In this scenario, plummeting asset prices render banks unable or unwilling to provide credit as they fear they might be unable to cover their own liabilities due to potential loan defaults. Whether an overleveraged borrower is a sovereign nation or major financial institution, recent history illustrates how defaults carry the risk of contagion in a globally interconnected economy. The resulting slowdown of investment in the real economy impacts actors at all levels, from small businesses to homebuyers. Bankruptcies lead to job losses and a drop in aggregate demand, leading to more businesses and individuals being unable to repay their loans, reinforcing a downward spiral that can trigger a recession, depression or bring about stagflation in the real economy. This can have a devastating impact not only on economic prosperity across the board, but also consumer sentiment and trust in the ability of the system to generate long-term wealth and growth.

To do something about financial crises you need to understand them

There is no global consensus on how best to manage or prevent financial crises from happening in the future. Nonetheless, policymakers need to develop strategies that are designed to at least reduce the severity of their impacts. In order to strengthen the financial system, making it more resilient to potential abuses in the future, it is critical that we understand the mechanism by which pervasive practice like excessive leverage can present system-wide danger. Unlike forest fires or other sudden-onset natural disasters, financial markets are complex social systems, built on the repeated interaction of millions of people and institutions, and are subject to systemic failure, currency crises, bank runs, stock market collapses, being just a few of the terms indicative of the recent fallout. Often, this risk arises not through the failure of individual components in the system, such as the closing or collapse of a single bank or major financial institutions, but rather due to the “herd behavior” and network effects contained in the actions of large fractions of market participants. Such synchronization in behavior leads to many people undertaking the same actions simultaneously, which can exacerbate price movements and the overall level of volatility in the system. This can significantly weaken a well-functioning financial market, potentially causing the booms, busts, and bankruptcies that are now familiar.