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Mathematical modeling and optimal control of the impact of rumors on the banking crisis.
(English) Zbl 1491.91159

Summary: The bank run phenomenon, mostly due to rumor spread about the financial health of given financial institutions, is prejudicial to the stability of financial systems. In this paper, by using the epidemiological approach, we propose a nonlinear model for describing the impact of rumor on the banking crisis spread. We establish conditions under which the crisis dies out or remains permanent. We also solve an optimal control problem focusing on the minimization, at the lowest cost, of the number of stressed banks, as well as the number of banks undergoing the restructuring process. Numerical simulations are performed to illustrate theoretical results obtained.

MSC:
91G45 Financial networks (including contagion, systemic risk, regulation)
91G80 Financial applications of other theories
91D30 Social networks; opinion dynamics

Keywords:
nonautonomous differential equation; banking crisis; rumor spread; optimal control

Full Text: DOI

References:
2195-2230.


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