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A NONLINEAR DYNAMIC MODEL FOR BANK DEFAULT RISK

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In this paper, we consider the credit risk transfer market, where several financial agents interact with each other and generate complex nonlinear relations. All these market participants are defaultable and when one of them defaults, the credit risk contagion can be described by a nonlinear dynamic problem. We propose a particular time delay Susceptible-Infected-Recovered (SIR) model to investigate and describe the credit risk contagion in the credit risk transfer market. The time delay represents the temporary immunity time lag before a bank becomes defaultable. For this scope, we consider a nonlinear time delay incidence rate. We analytically study the model and find the steady states according to different values of time delay and different bank support policies. Numerical simulations are used to investigate the global stability of the equilibria. Finally, we carry out a parameter sensitivity analysis in order to investigate the variability of equilibria according to different values of the most significant parameters.

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