

# A Dynamic Model of Financial Markets: Catastrophes, Cycles, and Capacity Constraints

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## **Abstract**

A dynamic model of cash flows for an insurer is constructed in this paper to study the source of underwriting cycles. The model analysis shows that the effect of a one-time loss shock on the insurer's cash flows could spread out and amplify over time according to the dynamic interaction between underwriting and capital rising. The simulation results show that the interaction can generate the non-cyclical behavior of output market changes under capacity constraint. Thus, this paper casts doubt on the existence of so-called "underwriting cycle" defined as symmetric and predictable, but views the unpredictable underwriting cycles as temporary responses of outputs to loss shocks under capacity constraint. In addition, the model results in different experimental economies indicate that the fluctuation of output markets will be larger if the loss shock is more volatile, if the external capital market is tighter, and if the solvency regulation is more relaxed.

*Keywords:* property-liability insurance market; capacity constraints; capital structure; dynamic model