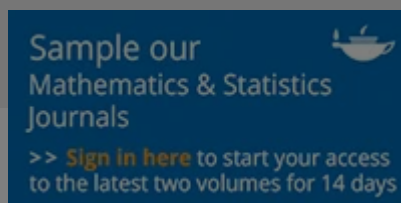


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Abstract



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Keywords: Systemic risk Clustered volatility Fat tails Crash Margin calls Leverage

JEL Classification: E32 E37 G01 G12 G14

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For previous equilibrium-based analyses of leverage that show that prices crash before default actually occurs, see Geanakoplos ([1997](#), [2003](#)), Fostel and Geanakoplos ([2008](#)), Brunnermeier and Pedersen ([2009](#)) and Geanakoplos ([2010](#)).

†The nonlinear feedback that we describe here, which is driven by investors selling into a falling market, is in this sense similar to the model of hedging by Gennotte and Leland (1990).

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‡The failure of Long Term Capital Management in 1998 was an example of a near-crisis caused by the precise mechanism discussed here. Some other types of investment strategies, such as trend-following or portfolio insurance, cause nonlinear feedback in prices, which is further amplified by leverage.

†Using a positive survival threshold for removing funds avoids the creation of ‘zombie funds’ that persist for long periods of time with almost no wealth.

‡Some of the references that document or discuss the flow of investors in and out of mutual funds include Chevalier and Ellison ([1997](#)), Remolona et al. ([1997](#)), Sirri and Tufano ([1998](#), Busse ([2001](#)) and Del Guercio and Tka ([2002](#)).

†We measured γ using a Hill estimator (Hill [1975](#)) based on the largest 10% of the returns. The value of γ when $\lambda = 1$ should be infinite, in contrast to the measured value. Large values of γ are difficult to measure correctly, whereas small values are measured much more accurately.

†This actually happened when the Bear-Stearns hedge funds went out of business; the bank attempted to sell the underlying assets, but the liquidity was so low that they gave up and simply held them.

†There are two reasons why aggressive funds grow faster than passive funds. The superior returns achieved by using leverage both make the funds already under management grow faster and attract new investors. As the wealth of the funds grows sufficiently large, their market impact also grows, decreasing returns. This can drive the returns of the less aggressive funds below the benchmark return r^b and cause them to lose investment capital. This explains the pattern seen in [figure 2](#), in which less aggressive funds grow in the period right after a crash but then eventually shrink.

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