EXTENDED ABSTRACT FOR: *ERODING MARKET STABILITY BY PROLIFERATION OF FINANCIAL INSTRUMENTS*

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Within Arbitrage Pricing Theory (APT), the expansion of the repertoire of financial instruments – assets, derivatives, securitized loans, etc – provides more means for risk diversification, thus making the market more efficient and closer to the theoretical limit of complete markets, where risk can be eliminated altogether. This picture relies on the assumptions of perfect competition and full information – which means that prices are fixed and are not affected by trading, and that their statistics is known to all participants.

We contrast this picture with a simple model of the market as an interacting system, where prices in the underlying market are affected by trading on the underlying and on derivatives. In this simple setting, the application of statistical mechanics of disordered systems, shows that the proliferation of derivatives leads the market to a state which closely resembles the picture of the efficient arbitrage free complete market described by APT. However, the same region of the phase space is also characterized by a phase transition between a supply limited equilibrium to a demand limited one. Close to the transition, small perturbations on the risk perception of banks can provoke dramatic changes in the volume of traded derivatives and large fluctuations are observed in response functions.

The uncontrolled proliferation of financial instruments, as shown in Fig. 1, has two main consequences: *i)* it erodes systemic stability, driving the market to a critical state characterized by large susceptibility, strong fluctuations and enhanced correlations among risks, and *ii)* it provokes a sharp rise in trading volumes in derivative markets.

This suggests that market completeness, often assumed in APT, may not be compatible with a stable market dynamics. In this perspective, financial stability acquires the properties of a common good, which suggests that appropriate measures should be introduced in derivative markets, to preserve stability.

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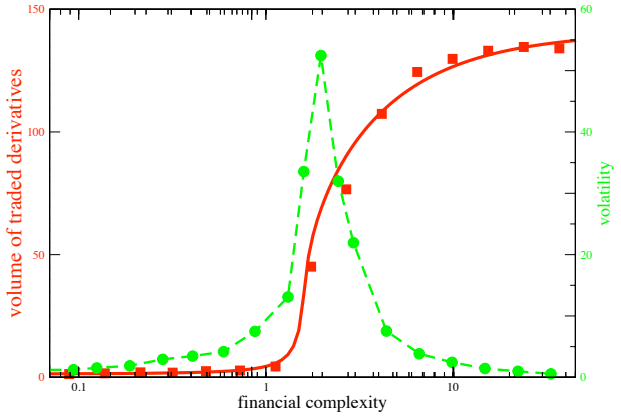

FIGURE 1. Trading volume in derivative market (left axis) as a function of financial complexity (which is proportional to the number of different derivatives traded). Analytical results from the theory of disordered systems (full line) are compared to numerical simulations (red squares). The steep growth of volumes arises as a consequence of a phase transition, in the statistical mechanics approach. The same plot also shows that market volatility (right axis) has a pronounced peak at the phase transition point.