

Abstract Submitted  
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**Crises as instabilities in an effective theory model of market response**<sup>1</sup> NIMA DEHMAMY, Northeastern Univ, SERGEY BULDYREV, Yeshiva University, SHLOMO HAVLIN, Bar-Ilan University, EUGENE STANLEY, IRENA VODENSKA, Boston University — We show that effective Lagrangian modeling of fluctuations in a market network plus dissipation explains a phenomenological model previously introduced by us. Our results suggested that the model identified the time-line of the 2009-2011 Eurozone crisis correctly. Assuming sparsity of connections – which holds for Eurozone crisis – we derive analytically the phases and where the phase transition happens. We show that this model has three distinct phases that can broadly be categorized as “stable” and “unstable”. Based on the interpretation of our behavioral parameters, the stable phase describes periods where investors and traders have confidence in the market (e.g. predict that the market rebounds from a loss). We show that the unstable phase happens when there is a lack of confidence and seems to describe “boom-bust” periods in which changes in prices are exponential.

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Nima Dehmamy  
Northeastern Univ

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