Modeling Financial Markets Using Concepts From Mechanical Vibrations and Mass-Spring Systems (https://stars.library.ucf.edu/cgi/viewcontent.cgi?article=2637&context=honorstheses1990-2015)

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Abstract

This thesis describes a method of modeling financial markets by utilizing concepts from mechanical vibration. The models developed represent multi-degree of freedom, mass-spring systems. The economic principles that drive the design are supply and demand, which act as springs, and shareholders, which act as masses. The primary assumption of this research is that events cannot be predicted but the responses to those events can be. In other words, economic stimuli create responses to a stockâ€™s price that is predictable, repeatable and scientific. The approach to determining the behavior of various financial markets encompassed techniques such as Fast Fourier Transform and discretized wavelet analysis. The researched developed in three stages; first an appropriate model of causation in the stock market was established. Second, a model of steady state properties was determined. Third, experiments were conducted to determine the most effective model and to test its predictive capabilities on ten stocks. The experiments were evaluated based on the modelâ€™s hypothetical return on investment. The results showed a positive gain on capital for nine out of the ten stocks and supported the claim that stocks behave in accordance to the natural laws of vibration. As scientific approaches to modeling the stock market are beginning to develop, engineering principles are proving to be the most relevant and reliable means of financial market prediction.

Notes

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