Essays in Financial Econometrics

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Information Arrival in Financial Markets

This article introduces a new high-frequency analysis of six years of data for options written on the S&P 500 and traded on the Chicago Board of Exchange. We quantify in real-time the information contained in the probability measure implied by option prices, using concepts developed in information theory. Here information is analogous to a reduction in uncertainty surrounding the future price of the underlying security. A simple nonparametric estimator allows us to measure the amount of information gained as an option approaches maturity. We then test for structural breaks in the expectation of said future price. We find the intraday flow of information in a large and important market is not continuous, and often increases in discrete intervals. This fact is used to identify events in which a large amount of information is revealed to investors.

Information in Risk-Neutral Probabilities

with W. Ploberger

Implicit in the prices of financial options are Arrow-Debreu prices and their continuous equivalent, the risk-neutral probability density function. Intuitively, this probability measure represents the market's expectation of the future price of an underlying security. In this paper, we examine the evolution of the density function as an option approaches maturity. Information theory is used to quantify the information gained as the distribution becomes more and more concentrated. We propose an estimator of the density which does not bias our measurement as an alternative to other nonparametric approaches. We then estimate the density for options with the same expiration date and compute measures of information. Our parametric analysis shows the majority of information in our approximate risk-neutral measure accrues near maturity according to a logarithmic or power law. No existing theoretical model describes this process.

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