F I X E D   I N C O M E

On the Distribution of Financial Futures Price Changes

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Among the victims of the October 1987 market crash were the popular and convenient assumptions of nearly continuous and normally distributed price change processes. Because these assumptions underlie many sophisticated risk assessment, option pricing and trading models, these models should be reconsidered in the light of more realistic characterizations of price change distributions.

This article presents graphic evidence and statistical tests suggesting that Treasury bond, 10-year Treasury note and Eurodollar futures price changes are non-normally distributed, exhibiting greater central tendency as well as greater extreme behavior than expected from normal distributions. Moreover, both long and short-term fluctuations in bond, note and Eurodollar futures prices are non-normal.

Empirical price change distributions have fat tails, quite unlike the vanishing tails of normal distributions. Therefore the frequency of extreme observations cannot be ignored in characterizing the expected behavior or futures prices. Evidence suggests that very large (three or more standard deviations from the norm) price changes can be expected to occur two to three times as often as predicted by normality.

Finally, the abundance of "catastrophic" events evident in the data suggests that such events are unavoidable. If so, the task in dealing with extreme volatility should be to identify those technical or fundamental aspects of markets that make them precarious, rather than to attempt to eradicate catastrophes through regulation.

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