Market Prices Versus the Bell Curve
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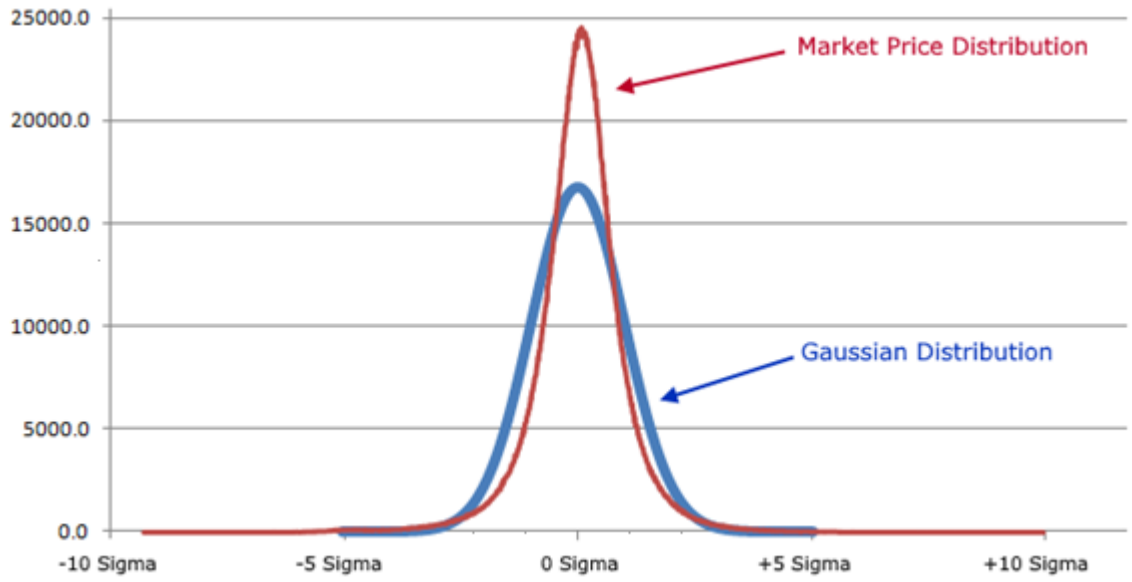
Many people believe that market price movements follow a bell curve. The "bell curve" is a common term for a "Standard", "Normal", or "Gaussian" distribution. This chart shows the actual distribution of market prices plotted against a Standard Distribution curve.



There are several important differences between the two curves. The market price distribution is higher and narrower at the center. The bell curve effectively reaches zero at ±5 Sigma (±5 Standard Deviations). The actual market distribution sometimes reaches ±10 Sigma.

Conclusions

1. The bell curve is useful as an illustration or a quick-and-dirty estimate of price movement, provided you stay within ±2 Sigma where the two distributions are similar in shape.
2. As soon as you move outside ±2 Sigma then the bell curve will consistently underestimate risk. For example, 4-Sigma events should occur in market price movements about once every 39 years, but in reality they happen every year or two.

As such, "sigma" is a poor tool for measuring market risk.

Failure to realize that markets are not "normally" distributed is what destroyed LTCM in 1998 and vaporized the $220 billion dollars they had under management. (Do a web search for "LTCM collapse" for further details on the LTCM debacle.)

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Technical Notes

The market price movement probability distribution curve on the chart was calculated using 4.2 million price samples from stocks whose prices were above $10. The two curves on the chart were normalized by adjusting the height of the bell curve so it had the same total area under it as the market price movement curve. For all intents and purposes, it appears that the distribution of market price movements are, in fact, Cauchy. (See *Searching for Certainty* by John Casti, pages 192-252)