

# HOW WELL DOES VOLATILITY MEASURE RISK



In 1952, Harry Markowitz published a 15-page essay, “Portfolio Selection” in the *Journal of Finance*, that introduced what later became known as Modern Portfolio Theory and forever changed how investors build, monitor and evaluate their portfolios. The Modern Portfolio Theory is a theory on how risk-averse investors can construct portfolios to maximize expected returns based on a given level of market risk. This concept is also known as the mean-variance analysis. By showing investors how to use mean-variance analysis to construct portfolios, Markowitz laid the foundation for quantitative finance.

Today, mean-variance analysis has become one of the most important quantitative tools used by the financial industry, and volatility has become the widely accepted industry standard for measuring and expressing the level of risk in an investment portfolio.

However, volatility is a very simple – and backward-looking – measure of what are very complex phenomena. It can be argued that its limitations make it an inadequate measure of risk, particularly in connection with alternative investments.

# EIGHT REASONS WHY VOLATILITY IS A POOR MEASURE OF RISK

- 1 Volatility is backward-looking.** It is based only on historical returns. A long and steady climb can look great on this risk metric, but at the same time, reflect an asset that has become priced too high, and which therefore has a high level of risk.
- 2 Volatility penalizes upside as much as downside.** Since volatility measures the dispersion of a dataset relative to its mean, large upside returns increase volatility just as much as large downside returns. The potential for large gains should be welcomed by investors, not penalized.
- 3 Volatility rewards exposure to illiquid assets.** Illiquid assets tend to be priced using some form of model or appraisal that could cause a “smoothing” of their returns. Using volatility to measure the risk of these assets may underestimate their risk, as compared with liquid assets that are priced based on recent trades.
- 4 Volatility ignores skew.** “Negative skew” describes investments that provide frequent small gains and occasional large losses (like picking up nickels in front of a steamroller). Volatility ignores skew, and as a result, underestimates the heightened risk of extreme losses for portfolios that have negatively skewed returns.

## EIGHT REASONS WHY VOLATILITY IS A POOR MEASURE OF RISK (CONTINUED)

**5** **Volatility ignores kurtosis.** “Positive kurtosis” describes investments that more frequently have extremely high or extremely low returns. Volatility ignores kurtosis, and so underestimates the risk of portfolios that have fat tails<sup>1</sup>.

**6** **Volatility ignores autocorrelation.** High autocorrelation describes investments whose returns are correlated to the returns experienced in previous time periods. Ignoring autocorrelation causes investors to overestimate or underestimate the volatility of investment strategies when annualizing the volatility of daily, weekly or monthly returns.

**7** **Volatility is not directional.** Volatility simply describes the variance in returns. Two portfolios that behave completely opposite to one another can have the exact same volatility.

**8** **Volatility does not account for changing market conditions and economic regimes.** A portfolio that on average has moderate volatility might nevertheless be extremely volatile in certain economic or market scenarios.

## LOOKING BEYOND VOLATILITY

Given the limitations of volatility as a measure of risk, it is important to incorporate other tools, such as risk factor models, scenario analysis and conditional analysis, to get a more complete view of portfolio risk. In the next article in this series, we will discuss some of these tools and how they help provide additional insight.

<sup>1</sup>Fat tails are a statistical phenomenon wherein a probability distribution has a large Kurtosis and therefore has a greater likelihood of extreme events happening than would be expected from a normal probability distribution.

# HOW CAN WE HELP?

## PORTFOLIO CONSTRUCTION CONSULTATION SERVICES (PCCS)

We believe that portfolio construction is one of the great differentiators in the Canadian investment industry. Through PCCS, advisors get access to unique data, analytics and insights to help design portfolios that aim to achieve better outcomes and help clients stay invested in all market conditions.

Your Model  
Portfolio

+

Our Risk Factor, Stress Testing  
& Scenario Analysis

=

Risk Awareness  
& Insights

We help advisors clearly define their investment goals, diagnose unintended risks, and design portfolios that offer the potential to more efficiently and consistently achieve desired outcomes.

Our experienced portfolio consulting professionals are a multi-disciplinary team with backgrounds in asset allocation, risk management, quantitative research and portfolio management.

Our analytics focus on four key areas:



Strategic asset allocation



Tactical asset allocation



Factor analysis



Evaluation for alpha sources

### GET STARTED.

Contact Robert Wilson to request a review.



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