# PriceVol™ A More Granular Measure of Market Volatility

#### PriceVol™ Overview

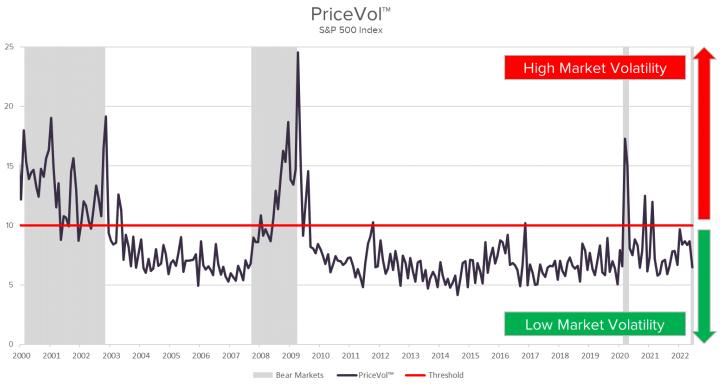
PriceVol $^{\text{\tiny M}}$  is a proprietary measure of market risk developed by ASYMmetric Investment Solutions. Engineered to provide what we feel is a more accurate measure of market volatility, PriceVol $^{\text{\tiny M}}$  measures realized — or price — volatility of the market. PriceVol $^{\text{\tiny M}}$  will never predict where volatility is headed, but it will accurately measure the current level of market volatility. We believe measuring realized marketing volatility, using PriceVol $^{\text{\tiny M}}$ , is an improvement to the current standard of measuring implied market volatility.

#### How does PriceVol<sup>™</sup> work?

PriceVol<sup>™</sup> captures the price movement of 100% of market constituents by measuring dispersion — the returns of individual securities relative to the return of the market. PriceVol<sup>™</sup> also quantifies investor sentiment. It captures the listed price movements of every buy-and-sell decision on every security in a market. As a result, PriceVol<sup>™</sup> quantifies the actions of all market participants in real time.

By seeking to accurately measuring market risk, we think  $PriceVol^TM$  can serve as a powerful risk management tool. It spikes during bear markets (the shaded areas in the graph below) and compresses during bull markets. In addition,  $PriceVol^TM$  allows for the precise measurement and comparison of volatility across markets and around the globe.

PriceVol<sup>™</sup> provides ASYMmetric with a unique perspective on the ever-changing surface of volatility across markets and around the globe. PriceVol<sup>™</sup> is a cornerstone of ASYMmetric Risk Management Technology<sup>™</sup> which powers the ASYMmetric ETFs suite of investment products.



Live Measurement of PriceVol™ on the S&P500® began on 12/31/16 prior to that calculations were not made in real-time.

## A More Granular Measure of Market Volatility

### **High Market Volatility**

PriceVol™ increases as market volatility increases. The higher the market volatility, the higher the level of PriceVol™. PriceVol™s level of granularity in measuring realized volatility allows us to examine different properties of volatility.

Mathematically, PriceVol™ measures dispersion, the returns of individual securities relative to the return of the market. If the difference between the price movements of the individual securities and market return is high, then dispersion, market volatility and PriceVol™ are all high.

PriceVol™ can be compared to states of matter: solid, liquid and gas. The price movements of the individual securities are the atoms. When market volatility is high, the price movements of the securities are like water atoms in a gaseous state (steam), spread out and fluctuating wildly.

High PriceVol<sup>™</sup> or Market Volatility is depicted graphically in the two charts on the right.

Dispersion of Returns, the top graph, shows the price returns of all the securities of the S&P 500® Index. Our first observation from the graph is that most of the returns are negative. The second observation is the range of returns is very wide. The best performing stock was up roughly 60% and the worst down roughly 80%. The range between the best and worst performing stock is 140%. This is graphical representation of high PriceVol™, or market volatility.

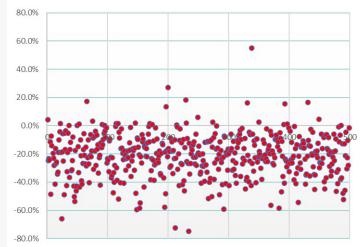
The Return Distribution graph, on the bottom right, takes another look at  $PriceVol^{\mathbb{M}}$  when market volatility is **high**. This graph shows a normal distribution of returns. The same two observations hold true in this graph: (i) returns are generally negative and (ii) the range of returns is wide.

When  $\operatorname{PriceVol}^{\mathbb{T}}$  is **high** it is generally a good time to be cautious, as stock returns are volatile and generally negative. **High**  $\operatorname{PriceVol}^{\mathbb{T}}$  readings generally occur in bear markets.

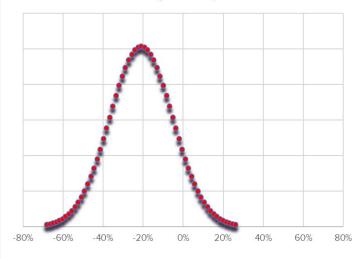
There is no guarantee the PriceVol indicator will be successful in finding bear and bull markets.

### **High Market Volatility**





### PriceVol™ Return Distribution High Volatility



PriceVol™ of the S&P500® on 10/31/08



# PriceVol™

## A More Granular Measure of Market Volatility

### Low Market Volatility

As you may expect,  $PriceVol^{TM}$  decreases as market volatility decreases. The lower the market volatility, the lower the level of  $PriceVol^{TM}$ .

Remember, PriceVol™ measures dispersion, the returns of individual securities relative to the return of the market. If the difference between the price movements of the individual securities and market return is low, then dispersion, market volatility, and PriceVol™ are all low.

Again, let's compare  $PriceVol^{\mathbb{M}}$  to states of matter (solid, liquid and gas). When market volatility is low, the price movements of the securities are like water atoms in a solid state (ice), tightly packed and moving together.

Low  $PriceVol^{\mathbb{M}}$  or Market Volatility is depicted graphically in the two charts on the right.

Dispersion of Returns, the top graph, shows the price returns of the securities of the S&P 500<sup>®</sup> Index. Our first observation is that most of the returns are positive. The second observation is the range of returns is very tight. The best performing stock was up roughly 40% and the worst down roughly 10%. The range between the best and worst performing stock is 50%. This is graphical representation of low PriceVol<sup>TM</sup>, or market volatility.

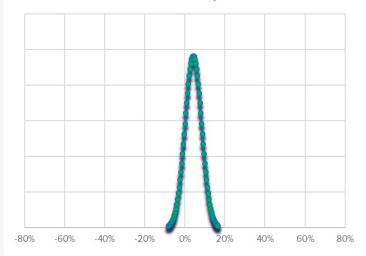
The Return Distribution graph, on the bottom right, takes another look at  $PriceVol^{\mathbb{M}}$  when market volatility is low. This graph shows a normal distribution of returns. The same two observations hold true in this graph: (i) returns are generally positive and (ii) the range of returns is narrow.

When PriceVol™ is low, it is generally a good time to be invested, as stock returns are less volatile and returns are generally positive. Low PriceVol™ readings generally occur in bull markets.

### Low Market Volatility



#### PriceVol™ Return Distibution Low Volatility



There is no guarantee the PriceVol indicator will be successful in finding bear and bull markets.

PriceVol™ of the S&P500® on 8/29/2014

## PriceVol™

### A More Granular Measure of Market Volatility

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