Taking the Market's PULSe in the Coronavirus Era

Introducing a new indicator for turbulent markets.

May 2020

KEY INSIGHTS

- The Global Multi-Asset team has constructed a new financial indicator, PULSe, to help investors navigate today's turbulent markets.
- PULSe includes four key factors or risks: the (P)andemic outbreak, the (U)ncertain economic outlook, financial market (L)iquidity, and investor (Se)ntiment.
- As part of an ongoing, dynamic research project, we will look to modify the PULSe index as appropriate as the global crisis unfolds.

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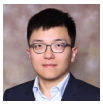

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After a quiet start to the year in January, the first quarter of 2020 later turned into the most tumultuous, volatile quarter for global financial markets in modern history, leaving investors confused and shellshocked. A pandemic-driven sudden stop to the global economy is an event without parallel for financial markets. The global spread of the coronavirus has sparked the fastest bear market in the history of the S&P 500 Index with an altogether new type of catalyst for an economic recession. Faced with the unenviable choice between saving lives or protecting jobs, governments in many countries were forced by the rapid spread of the coronavirus pandemic to follow China's example and introduce national lockdowns, travel restrictions, and strict quarantine. The economic cost of the infection prevention measures has been sudden and severe, with the full impact still to be seen in the months ahead.

The disruption to economies from the lockdowns—equivalent to a full stop in activity in some cases—has, indeed, been extreme. Measures to combat COVID-19, the disease caused by the coronavirus—while vital from the point of view of gaining control over the pandemic—were also the trigger for the world economy falling rapidly into a short but deep recession. In March, global stock markets lost over 30% of their value (MSCI World Index) in what is the sharpest, steepest bear market on record. Indicative of the extreme turbulence in financial markets, the absolute daily price changes in the MSCI World Index averaged over 4% in March, an all-time high that suggests a market desperately seeking liquidity. As a second example of the extreme volatility, at one point in March, the U.S. was outperforming Europe by 10%, yet a few days later, it was underperforming by over 10%.

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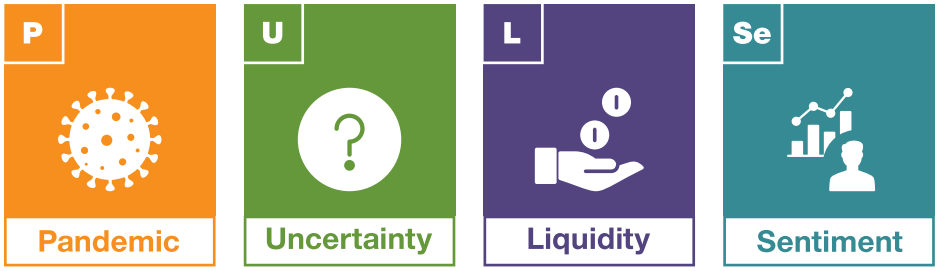


> Our clients asked whether we had a financial dashboard or suite of indicators to help gauge where we stand in the crisis.

In April, markets reversed much of the first-quarter losses, rallying in the face of the massive fiscal and monetary policy support provided by governments around the world. Yet there is a lack of conviction among investors due to the uncertainty about the course of the coronavirus pandemic and the depth and duration of the global recession. The strong rebound in equities since the March lows might seem to discount a fairly orderly restart to economic activity in the second half of 2020. But there is still great uncertainty as to the depth and severity of the global recession has yet to reveal itself in the data. As such, equity markets currently appear stretched given the many challenges that lie ahead.

A New Indicator Is Needed to Shed Some Light on Turbulent Markets

We were asked by our clients whether we had a financial dashboard or suite of indicators to help gauge where we stand in the crisis and whether things are improving or deteriorating at the margin. So, to help in understanding and navigating markets in these troubled times, the Global Multi-Asset team has constructed a new composite indicator called PULSe. We chose the name PULSe, which stands for (P)andemic, (U)ncertainty, (L)iquidity, and (Se)ntiment—four major factors that we believe are responsible for much of the market turbulence in post-coronavirus markets.

Essentially, PULSe is a metric to monitor the state of global financial markets in real time by employing mid- to high-frequency data. We stress that the PULSe indicator is directional only, meant to show whether the key factors underlying the market turbulence are strengthening or weakening over time. It is not meant to be the basis for making market or asset allocation decisions and is not designed to be a market timing indicator. No backtesting on the investment efficacy for this indicator has been completed yet.

Designing Our PULSe Indicator

The speed with which the coronavirus crisis is developing in 2020 is simply unprecedented. So we needed an index based mainly on available daily data, though a couple of data series with weekly frequency were also included. Since the pandemic outbreak first became a major concern for global investors in the second half of January, we have seen how quickly market participants can digest new information. Once the shock of the bad news is out, markets process it, accept it, and then move on in a matter of weeks. We saw this when the VIX index (a measure of volatility for the S&P 500) soared above 40, its highest level since August 2011, when new jobless claims in the U.S. began to report in millions and when high yield spreads in the energy sector widened to more than 1,000 basis points. Most of these developments were unprecedented, and many more examples could be quoted.

Therefore, we believe that market participants are more sensitive to the trend relative to recent history rather than

> Pandemic, uncertainty, liquidity, and sentiment are four key factors underlying turbulent markets.

the absolute levels. We focus on how the latest market data are different from the recent past using a z-score, where each data point is expressed in terms of the number of standard deviations above or below the mean, or average, of the series. We use a relatively short look-back period, as we are interested in changes in short-term trends. By standardizing each series as a z-score, we can easily combine multiple input series into one composite metric: the PULSe indicator. We also wanted the PULSe indicator to be relatively simple and transparent. So we used a simple average of our selected indicators. This allows us to easily drill down to see which of the subcomponents explains the majority of the increase or decrease in the composite index at each point in time.

Our aggregate PULSe indicator is composed of four subcomponents or factors that are themselves composite indices. We believe each factor and its components contain useful information that can help investors gauge the current state of the market and how or when conditions are starting to improve or normalize.

Pandemic, Uncertainty, Liquidity, and Sentiment

Our four key factors or subcomponents underlying turbulent markets can be summarized as follows:

Pandemic—We believe the crisis will only end when the COVID-19 outbreak is globally under control (i.e., very few new cases) and an effective treatment appears.

Uncertainty—We believe it is uncertainty around the future pace of economic growth that will be key in evaluating when market participants start to look beyond the trough.

Liquidity—A lack of liquidity sparked investors' rush for cash. Market liquidity needs to improve and remain stable for a sustainable recovery to occur.

Sentiment—Market sentiment indicators such as VIX, currency safe havens, and demand for hedging need to decrease in order to move beyond the trough.

The Pandemic factor or score differs slightly from the other three factors in terms of its underlying principles and, thus, the manner of its construction. We believe that financial markets won't truly recover until the pandemic aspect is under control. This is because major countries and regions will be able to resume their economic activity only when the public health situation is back under control, which is crucial for consumer spending, business profits, global trade, and, thus, for the many smaller, open economies. The coronavirus outbreak has shown no respect for national borders, geographical distance, or level of development. Hence, our Pandemic series is measured focusing on the largest economies such as the G-7. We calculate the rate of increase in the number of COVID-19 cases for each country in our sample, and we take the maximum number to account for the ability of the global trade activity to resume. We overlay this with a penalty score if one of the major countries is also showing an alarming growth rate of new cases.

Our Uncertainty factor focuses on economic data and how they differ from market expectations. Examples of underlying data include the Bloomberg economic surprise indices, changes in oil supply and demand, yield curves, and earnings per share growth forecasts.

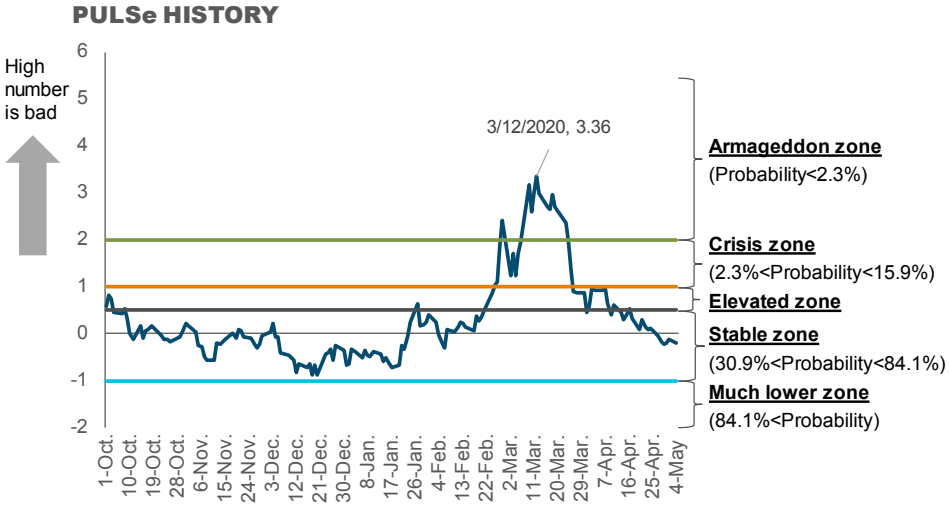
The Liquidity indicator aims to identify any stresses in the credit market. Spreads on credit typically widen when liquidity dries up. Our Liquidity gauge uses commercial paper spread, the financial sector spread, the high-yield energy and ex-energy spreads, and ratio.

Finally, our gauge of market Sentiment looks at risk appetite from market participants. This includes put/call ratio, implied volatility, a measure of extremes in daily returns, currency sentiment, and some commodity prices.

Visualizing the PULSe Indicator

(Fig. 1) Expressed as an Average of the Four Subcomponent Indicators

	PULSe	Pandemic	Uncertainty	Liquidity	Sentiment
Current	-0.21	-1.11	0.68	-0.82	0.41
Zone	Stable	Much Lower	Elevated	Stable	Stable
5-Day Trend	-0.18	-0.06	-0.48	-0.26	0.09
1-Month Trend	-1.16	-2.41	-1.39	0.06	-0.89



As of May 4, 2020.
Source: Haver Analytics/Bloomberg Finance L.P. Analysis by T. Rowe Price.
The division of PULSe into zones is subjective, based on historical data and statistical assumptions. Probabilities are not implying any views on the future outcomes. It is for illustrative purposes only.

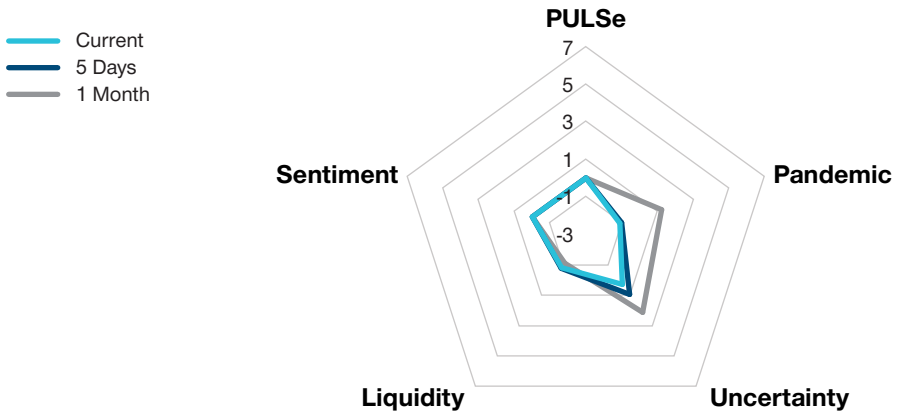
Interpreting the PULSe Indicator

A chart of the PULSe indicator is shown in Figure 1. Interpretation is straightforward—just like the VIX "greed and fear" volatility index that investors are used to, a high number for PULSe is a sign of market stresses and, thus, potential turbulence. Similar to other risk indicators, a high number is bad, and a low number is good. There are certain thresholds that are more important than others. Using our z-score, we can define certain levels or regions for the PULSe indicator in Figure 1 that conceptually correspond to different market environments: Much Lower, Stable, Elevated, Crisis, and Armageddon. This division into regions is based on the probability of occurrences, assuming a normal distribution for the underlying data series.

In interpreting Figure 1, we regard the trend in PULSe as being more important than the absolute value. We want to gauge when things stop getting worse and markets are likely to become less turbulent. Figure 1 shows that the PULSe indicator peaked on March 12 at an extremely elevated 3.36. It has since trended lower and currently has moved back into the "Stable" zone. This reflects a number of developments, notably a lower Pandemic reading, as the number of new COVID-19 cases in major countries has reached a plateau. At the same time, by acting as the "central bank" to a dollar-based world, the Federal Reserve in March succeeded in significantly reducing liquidity concerns, with risk premia in short-term funding markets falling back to more normal levels. Our gauge of market sentiment has also improved,

Radar Chart Showing the PULSe Index and Its Subcomponents

(Fig. 2) Radial Axes Expressed as Z-Scores (Number of Standard Deviations From the Mean)



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> A lower PULSe reading over the past month reflects a reduced score for the Pandemic component.

falling back into the top part of the "Stable" zone. The biggest concern, currently, is Uncertainty, which remains elevated and is trending higher. This is not surprising, as the global economic recession is still in its early stages. There is much uncertainty as to whether fiscal and monetary policies can effectively address the sharp shock to real economies created by the coronavirus containment measures.

An alternative way to show the PULSe indicator is given in Figure 2. In this radar chart, the aggregate index and four major subcomponents each appears as an arm of the chart. A move outward over time along any axis, away from the origin, implies a higher z-score and, thus, a less favorable market environment. The radar chart gives us a more dynamic picture of which factors are driving the aggregate PULSe index over time. Figure 2 shows clearly that the biggest contributor to the improved (lower) reading for PULSe over the past month comes from a reduced score for the Pandemic component.

Lastly, we would stress that PULSe is part of an ongoing, active research project that is evolving over time as new observations and new data sets become available. As the global economic, market, and coronavirus crises unfold, we will look to modify and improve the construction and constituents of our PULSe index where appropriate.

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