



## The path matters: Predicting economic recovery and asset returns

### Which paths to recovery are statistically most likely?

It is often said that in life, the journey matters more than the destination. This may be good advice for scenario analysis, too. For one thing, investors must (financially) survive their journey well enough to profit at the end. But beyond that basic concern, it is also easier to analyze distant outcomes with an understanding of how the situation will evolve to that point. Some outcomes require particular sequences of events, and some sequences are much more likely than others.

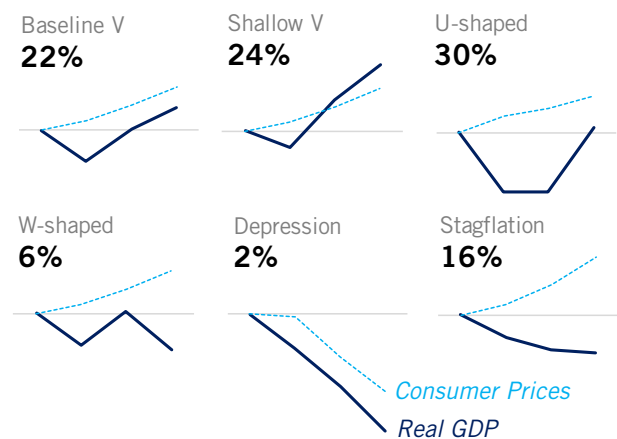
We define scenarios as paths of economic variables, which we relate to the historical patterns for those variables. We apply a very useful formula known as the Mahalanobis distance to analyze the paths. First, we evaluate how likely a path is to occur based on the comovement of the variables over time. Second, we project asset returns onto the paths using a novel technique called Partial Sample Regression, which generalizes from a subset of the most relevant paths that occurred historically.

Our research paper has a very practical focus as scenario analysis is a common tool for portfolio management. We illustrate our technique in the context of the current environment, evaluating alternative scenarios for the aftermath of the Covid-induced economic downturn. Of the options we consider, drawing from the most relevant historical tendencies, a U-shaped recession and recovery appears the most probable for the next 3 years with a 30% chance, followed by around 20% each for V-shaped recoveries (see chart above). A deep depression registers at a 2% chance, while stagflation shows 16%. It is important to recognize that these estimates extrapolate from history, though in an intelligent fashion. Clearly, the current experience is unprecedented in many ways, so it is perfectly reasonable to disagree with these figures. The key is that they provide an objective baseline, a departure point for discussion and debate.

The extreme flexibility of scenario analysis is also its curse: almost anything is possible. Moreover, the accuracy of forecasted probabilities can't even be verified after the fact, let alone in advance. Specifying paths and evaluating them against history offers a useful and objective guide.

For more on this topic, see our 2020 [journal article](#): “Portfolio Choice with Path-Dependent Preferences” by Mark Kritzman, Ding Li, Grace (Tiantian) Qiu, and David Turkington, *Financial Analysts Journal*, Vol. 77, No. 1, December 2020.

### Implied probabilities of 2020-2022 U.S. economic paths, given conditions in 2017-2019



Source: “Portfolio Choice with Path-Dependent Preferences,” see reference at bottom of page. Implied probabilities are based on U.S. economic data since 1927, are derived from statistical likelihoods of path sequences, and are scaled to sum to one for the set of six scenarios considered.

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