



THINKSPACE

FUNDAMENTALS

Portfolio Choice with Path-Dependent Scenarios

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This research is a collaboration between GIC, Windham Capital Management and State Street Associates. For more information on the full research report, please reach out to the contributors.

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CONSTRUCTING PORTFOLIOS WITH SCENARIOS IN MIND

Executive Summary

Given today's uncertain environment, scenario-based analysis and portfolio construction have gained huge popularity among institutional investors. As outlined in the new research paper "portfolio choice with path-dependent preferences", we have developed a new systematic approach to scenario analysis that enables investors to consider their sequential impacts on portfolio risk and performance.

We illustrate the technique by evaluating alternative scenarios for the aftermath of the COVID-19 induced economic downturn. Extrapolating from relevant historical data, a U-shaped recession appears the most probable for the next 3 years with a 30% probability, followed by V-shaped recoveries at around 20% each, and 16% for a stagflation scenario. The least likely outcomes are a deep depression and W-shaped recession (see fig. 1). As the COVID-19 crisis has been unprecedented in so many ways, agreeing on these results will be challenging. The key is come up with an objective baseline and alternatives for discussion and debate.

In this framework, we proposed investors to first define their prospective scenarios, not as average values of the economic variables, but as paths for these variables. Second, measure the likelihood that these paths will prevail in the future based on their statistical similarity to the historical sequences of these variables, using a statistic called the Mahalanobis distance. Third, employ a forecasting technique called partial sample regression to map the economic outcomes onto the asset class returns. With a rich set of results generated from this systematic, consistent and coherent evaluate and construct portfolios tailored to their preferences.

Given an outlook of uncharted policy making, changing capital market dynamics, globalization headwinds and rising geopolitical tensions, investors recognize the importance of using scenarios to address the increasing uncertainty and wide range of investment outcomes.

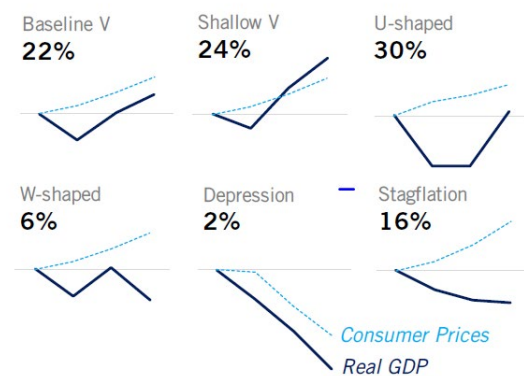
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Scenarios are not just about destinations, they are also about paths leading to these destinations. Our innovation framework, investors can better of modeling paths of scenarios, instead of average values, offers a quantitative, data-driven and objective evaluation on return opportunities, downside risks, and their probabilities. This will help improve the quality of debate and discussion that have often taken place only qualitatively and subjectively, and assist investors in their assessment of risk return trades-offs and preferences in portfolio design.

Fig. 1

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.