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Coronavirus and Drawdown: Building decumulation portfolios that account for events like the coronavirus pandemic

Summary

Designing portfolios for drawdown customers that allow them to maintain a desired level of income for the rest of their lives is challenging. Sequencing risk—the risk of loss due to the order of returns earned in the market—matters greatly. But taking this risk into account when designing portfolios is not easy, and the typical approach of looking only at past market events is not helpful.

Moreover, a typical optimization approach that involves looking at a mean-variance efficient frontier might not be informative enough to help determine the best option for drawdown clients, or even to explain the risks associated with selecting different portfolios.

In this document, we explore how modeling customer outcomes with forward-looking data can be used to produce more robust analysis to help design drawdown portfolios or communicate risks involved with those portfolios. We will use the current COVID-19 pandemic and market data to put into perspective some of the decisions that must be made during the design process.

Any views presented in this document should not be considered financial advice.

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What Is Forward-Looking Data?

Despite the adage that past market performance is not indicative of future results, historical market data is being used widely on its own to produce analysis to support investment decision-making. In terms of designing a drawdown portfolio, this data tends to be used for estimating returns and volatilities related to portfolio optimization, and for various historical return time series windows—for example, around the credit crunch—for stress testing candidate portfolios.

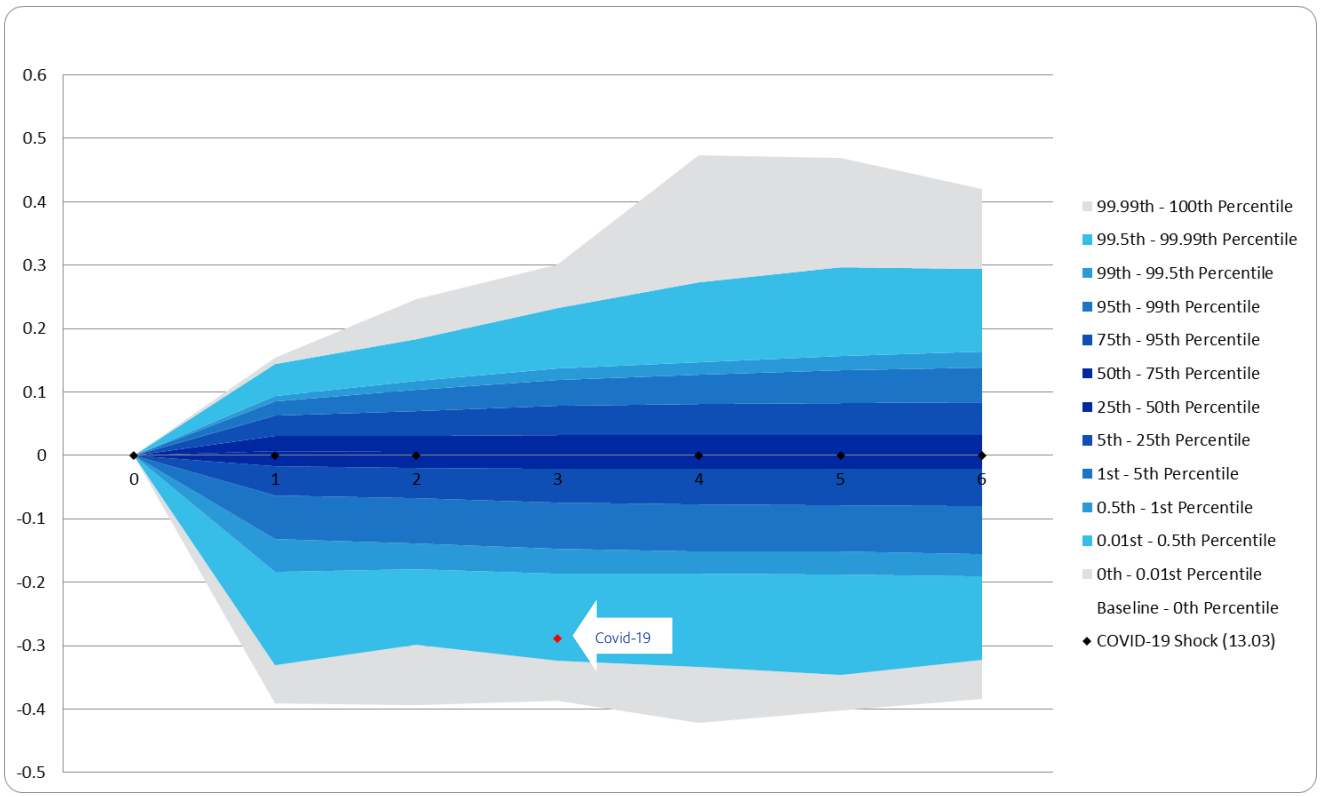
Although intuitive, these backward-looking approaches are limited. Historical estimates of returns and volatilities can vary significantly depending on the length of time series used. Also, they do not capture known future trends, such as the long-term impacts of climate change.

Using historical return series to stress test portfolios also has its limitations. First, market conditions (such as interest rate levels) during the credit crunch were different from current conditions; if an identical situation occurred now, the markets would not react the same way. Second, historical return series test only against so-called "known knowns" and fail to test for "known unknowns." And as recent market conditions caused by the coronavirus outbreak have shown, we are seeing unique and in some cases unprecedented market reactions (for example, the negative price for crude oil forwards).

Forward-looking data helps address these issues. Sophisticated Monte Carlo tools such as Moody's Analytics Scenario Generator take historical market data and combine it with economic expertise to calibrate models that can produce a distribution of realistic future projections. This forward-looking data can then be used to estimate relevant expectations of future returns and volatilities, and measures such as Value at Risk or Conditional Value at Risk that offer more robust estimates of downside risk. This helps to remove the anchoring bias of testing only known scenarios, and enriches the analysis by considering less obvious, potentially more damaging scenarios.

Exhibit 1 shows the COVID-19 market shock as of March 13 overlaid over a Moody's Analytics six-month projection of the Financial Times Stock Exchange (FTSE) 250 returns as an example. We can see that this level of return falls within the 0.01st to 0.5th percentile, which means that the model attributes a less than 0.5% probability of such an event occurring. Thus, according to the model, it is a rare event but entirely plausible. What's more important is that the model shows even more severe scenarios.

Exhibit 1 Forward-looking projection of FTSE 250 returns as of the end of December 2019



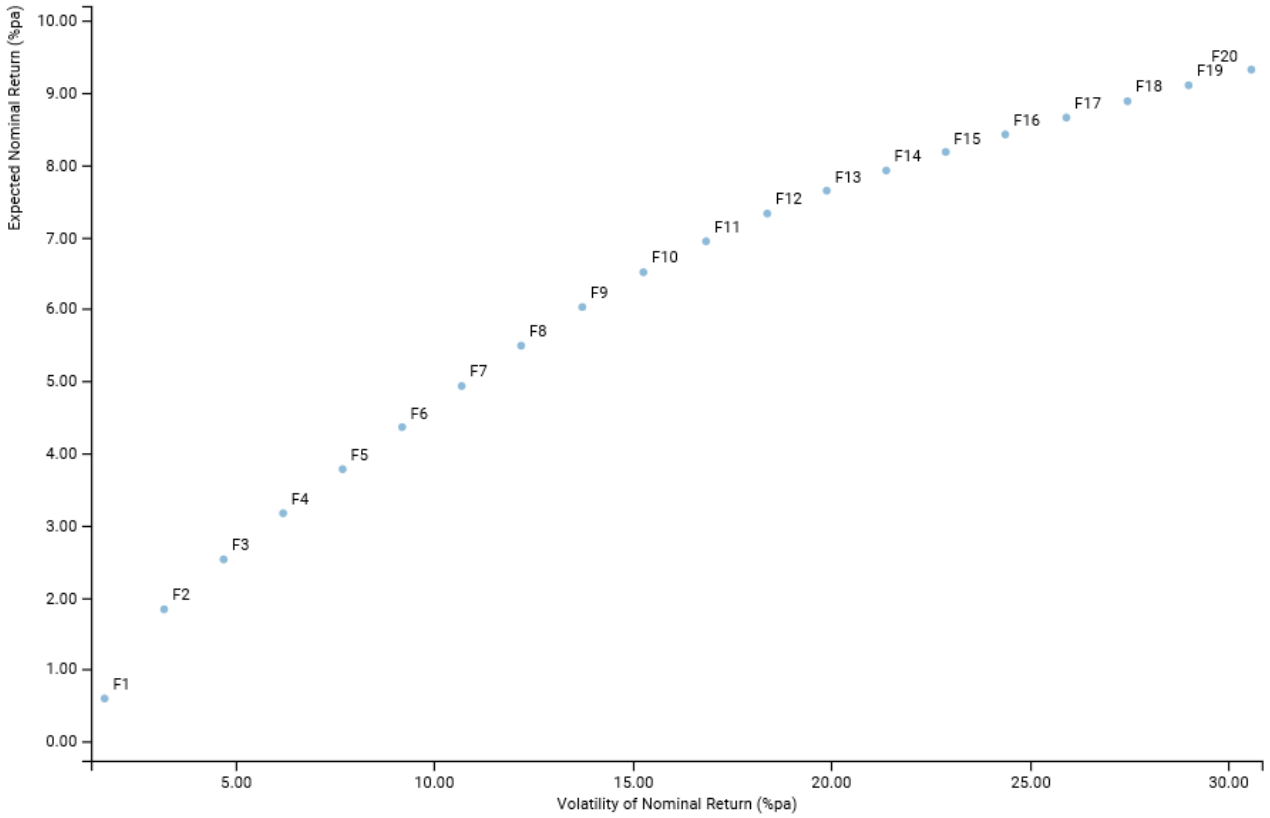
Designing Drawdown Portfolios using Forward-Looking Data

Designing a portfolio that can protect customers from market impacts such as the COVID-19 pandemic is simple. A hundred percent investment in cash should offer sufficient protection. However, designing a drawdown portfolio that can not only protect from market shocks, but also deliver an income that grows at least in line with inflation for the next 20-30 years is much more challenging.

In this section, we will look at how forward-looking projections can produce robust analysis that can help make better decisions when designing drawdown portfolios, especially when combined with customer cash flow profiles.

The typical first step when building portfolios is to run some form of optimization (mean-variance optimization being the most popular approach), based on an initial asset mix, to derive a range of candidate multi-asset portfolios. Exhibit 2 shows an efficient frontier consisting of 20 portfolios (F1 to F20), with the expected nominal return (%pa) on the y-axis and volatility of nominal return (%pa) on the x-axis. In this example, the portfolios were created by running an unconstrained optimization, that is, without any minimum or maximum limits or other constraints being imposed on any asset class. We used a selection of asset classes that included the following: cash, global high-yield bonds, UK equity, global equity (ex UK), emerging market equity, UK property, gilts, corporate bonds, commodities, hedge funds, and private equity. In practice, both the asset mix and constraints require careful consideration. However, for the purpose of this document, these points are irrelevant.

Exhibit 2 Efficient frontier: expected nominal return (%pa) vs. volatility of nominal return (%pa)



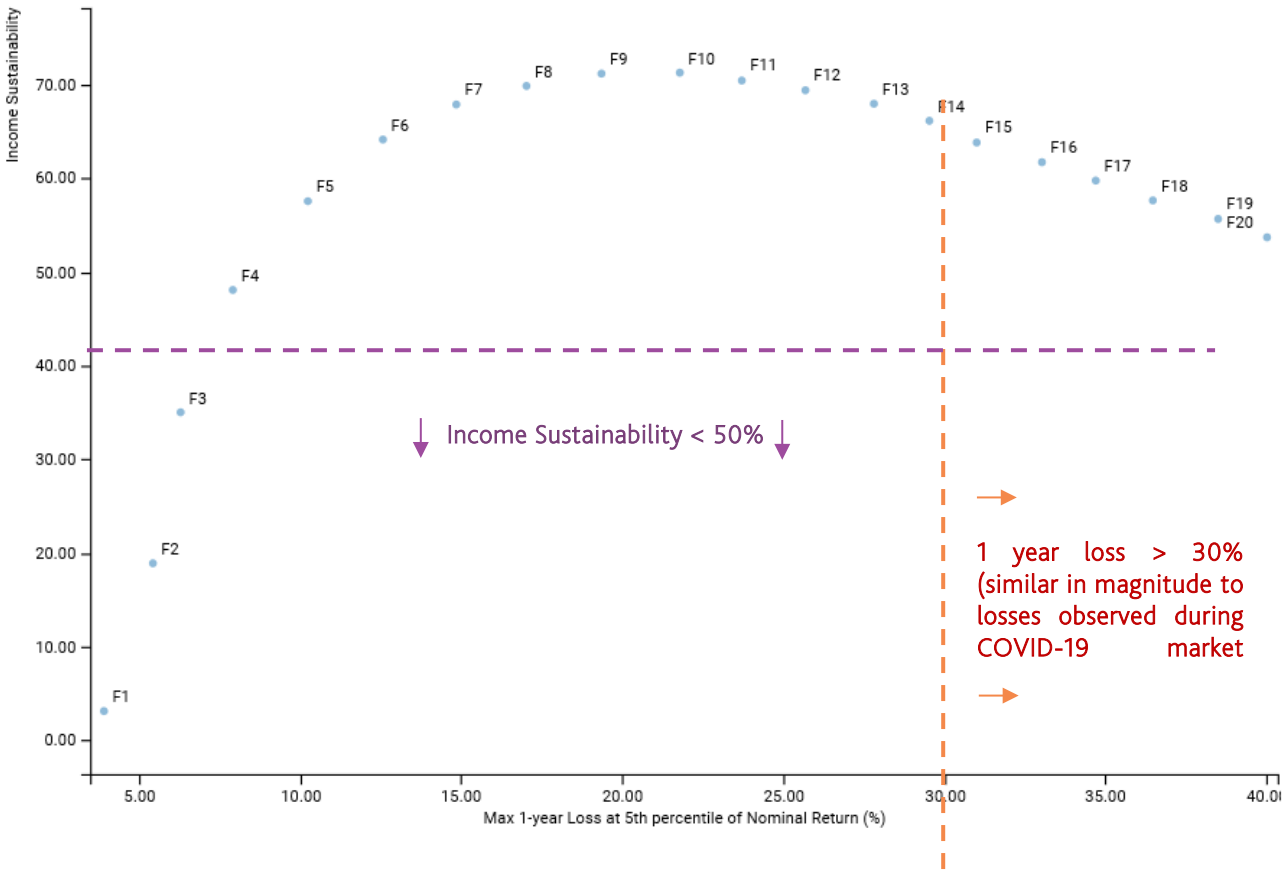
The optimization approach tends to be the same for designing drawdown portfolios as designing accumulation portfolios. Once a range of candidate portfolios is established, they are typically divided into different buckets based on the volatility (the measure of riskiness) of the portfolio. Thus, all portfolios in the range of 0-5% might be labeled "cautious" and portfolios in the range of 5%-10% might be labeled "moderately cautious." Subsequently, 10%-15% might be "moderate," 15%-20% "moderately adventurous," 20%-25% "adventurous," and 25%+ "very adventurous."

Typically, some form of attitude-to-risk survey is used to help customers select an appropriate risk bucket. However, it is not a simple process to match peoples' preferences to an appropriate volatility range. And in many cases, customers end up somewhere in the middle. For accumulation portfolio customers, this might be a safe and balanced option, especially if they have a long investment horizon. Even with a market fall like the one seen recently with the COVID-19 outbreak, their portfolios have a chance to recover before they get drawn down. Many lifestyle investment strategies are available that involve moving to more cautious portfolios as the investor moves closer to the point of disinvesting.

Selecting appropriate portfolios for drawdown customers is much more complex. They are a lot more sensitive to market shocks, as their need to draw income from their pot means they are exposed to locking in the losses during a market crash. However, many cautious portfolios may not deliver the necessary returns to support their income needs throughout the whole retirement. Therefore, using only return and volatility information is insufficient to design and select appropriate portfolios for drawdown customers.

Combining customer cash flow information with forward-looking projections can add more value to the design and selection processes. Exhibit 3 illustrates the same portfolios but now incorporates information about customer cash flow needs. This example takes an individual, aged 65 with an investment pot of GBP 150,000, who wants to withdraw GBP 12,000 (that is, 4% of the initial pot) annually and increase this drawdown amount in line with inflation over time. The chart displays the portfolios with two new dimensions: income sustainability and maximum 1-year loss at 5th percentile of nominal return (%).

Exhibit 3 Income sustainability vs. maximum 1-year loss at 5th percentile of nominal return (%) assuming withdrawal income of 4% of initial investment pot and 25-year investment horizon



Income sustainability is the probability of maintaining an income—in this case 4% of the initial pot growing with inflation (thereafter referred to as 4% income)—over 25 years. Whereas, maximum 1-year loss at 5th percentile of nominal return (%) represents the greatest potential loss over a 25-year horizon if a 1-in-20-year market shock occurs during that period. This gives us more information about the potential risks involved in investing in the portfolios under consideration. We can see that at 4% income, portfolios F1 to F4 have a less than 50% probability of supporting this level of income. Conversely, portfolios F15 to F20 could suffer significant losses during a market crash. In fact, portfolios F8 and F9 seem to be optimal in reaching a balance between income sustainability and potential losses. However, even then the portfolios offer only about a 70% likelihood of maintaining the income and are exposed to potentially incurring an 18%-20% loss during a market shock.

One approach that is outside of the scope of this document is to improve these outcomes by reviewing the asset mix and possibly adding other asset classes that can offer higher yield or some diversification benefit. These considerations might not be obvious from looking at portfolios in the return-volatility space.

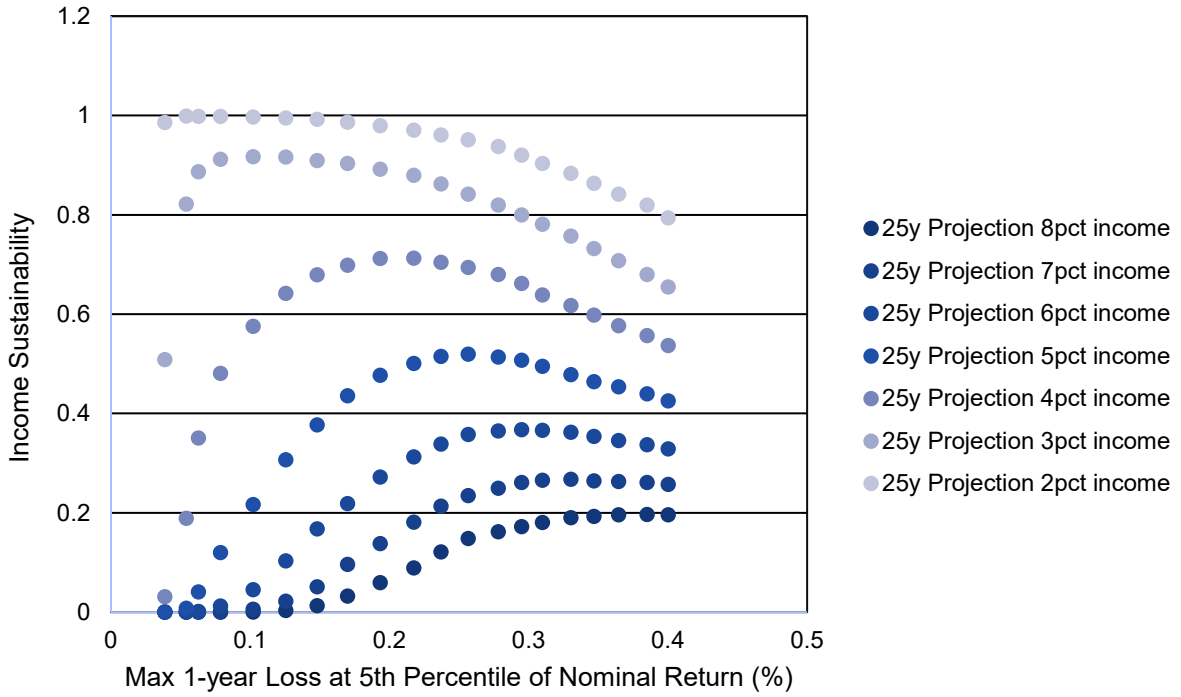
Alternatively, it might be worth exploring how income levels might affect the relative attractiveness of existing portfolios. We will explore this in the next section.

Selecting an Appropriate Income Level

The level of income is an important consideration when designing portfolios for drawdown clients. As noted in the previous section, reaching a 4% income target requires that individuals take on a certain amount of risk—and even then it is not guaranteed that they will be able to support this level of income throughout the 25 years under consideration. So, the obvious questions are these: what income level is more reasonable, and what does that mean for my portfolio design?

Exhibit 4 again considers the same individual, aged 65, with a GBP 150,000 initial investment pot, and looks at the distribution of portfolios in the income sustainability vs. maximum 1-year loss at 5th percentile of nominal return (%) space under different levels of drawdown income represented as a percentage of initial fund, and assuming it will grow with inflation.

Exhibit 4 Income sustainability vs. maximum 1-year loss at 5th percentile of nominal return (%) assuming different levels of income withdrawal (2% to 8%) and 25-year investment horizon



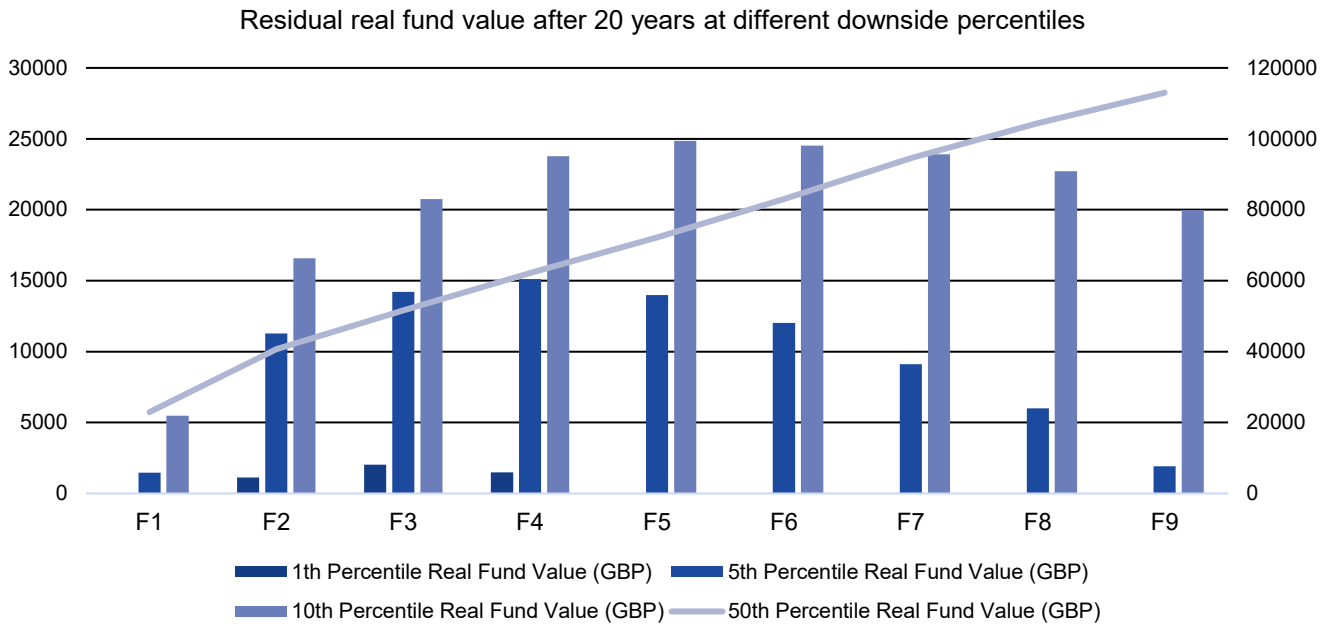
This strongly illustrates the need for incorporating cash flow profiles and more probabilistic/outcome-based measures into the design and selection process. Considering only the 2%, 3%, and 4% income levels may lead to disparate portfolios being selected when deciding on the optimal balance between income need and potential risk.

Sequencing Risk

As stated earlier, one challenge for drawdown portfolios is that they are exposed to what is known as sequencing risk. The need to draw income from the portfolio means that in times of market distress, such as the recent shock caused by the coronavirus outbreak, investors will be realizing the losses, and as a result reducing the overall return on their portfolio. Reviewing the downside risk is paramount to understanding your exposure to poor market conditions. And it may lead to a completely different portfolio being selected for those who consider only expected or median forecasts.

Exhibit 5 shows the residual real fund value at different percentile levels for portfolios F1 to F9 at the 20-year horizon, assuming 3% withdrawal rate of income. As the purple line corresponding to the 50th percentile (that is, median outcome) shows, the riskier the portfolio, the greater the residual fund after 20 years—making portfolios on the right side more attractive. However, looking at lower percentiles that give an idea of the residual real fund under poorer market conditions, we see a very different picture. Assuming the 10th worst outcome, portfolio F5 is the most attractive; assuming the 5th worst outcome, portfolio F4 has the highest residual real fund value. Finally, if we consider a very extreme situation, not unlike the current impact of the COVID-19 outbreak, only portfolios F2 to F4 have any residual real fund left.

Exhibit 5 Residual real fund value at the 20-year horizon, at different percentile levels, assuming 3% withdrawal rate



Conclusion

Designing drawdown portfolios that deliver a desired level of income to customers can be challenging. Generating enough return to meet customers' income needs must be carefully balanced against potential downside risks. This is especially true as any sudden market drops cannot be easily recovered when customers need to draw regular income amounts.

The recent market shock caused by the COVID-19 outbreak highlights how volatile financial markets can be, and how hard it might be to anticipate such events when studying only historical market data.

Analysis using forward-looking projections—especially when combined with customers' cash flow requirements—offers advantages compared to using historical market data. Forward-looking data enables significantly more robust analysis that helps in designing and selecting portfolios that not only aim to manage risks such as market shocks such as the ones caused recently by the coronavirus pandemic, but also that give the best chance of sustaining an income for the rest of retirement. Designing portfolios that account for severe market shocks also allows an investment firm to use this information when communicating the risk and return trade-off to their clients to support investment suitability requirements.