

Bear Markets' Impact on Pension Plans

Understanding the potential effects on defined benefit plans when the inevitable bear market occurs.

Markets go through multi-year cycles and regimes: bull markets, bear markets, periods of rising markets, and periods of sub-par returns. The focus of this Viewpoint is not simply the decline in a portfolio's value during bear markets. Rather, it is the longer-lasting impact bear markets can have on mature defined benefit pension plans.

Mature plans have negative cash flow profiles, paying out more in benefits than they receive in contributions. Even when stock prices eventually recover, the risk of this scenario manifests because assets will have been sold at depressed prices during the bear market to pay benefits. As a result, a plan's gains during a recovery are less than the losses incurred during the bear market.



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Historical Stock Market Behavior

Exhibit 1 highlights the five largest bear markets since 1926. Markets suffered losses of more than 80% during the Great Depression, but there have been four other episodes when the S&P 500 Index declined by more than 30%.

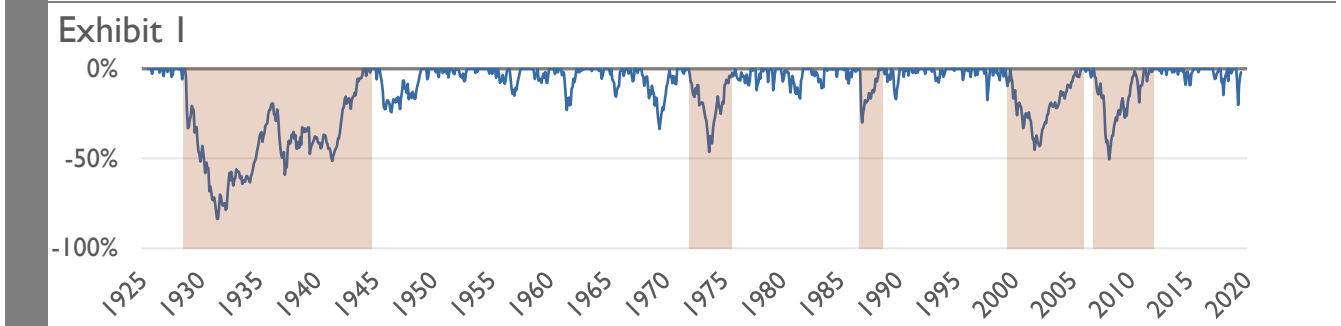


Exhibit 2 presents data for notable bear markets, beginning with the Great Depression. The second column shows the magnitude of peak-to-trough drawdowns, which ranged from 84% during the Great Depression to 30% during 1987's Portfolio Insurance debacle. The next four columns present ways to think about the duration of bear markets. Their duration is important because, as described above, even if a plan enters a bear market fully funded, once the market decline begins, mature plans will be selling assets at "depressed" prices to meet benefit payment obligations. Of course, the longer a bear market persists, the larger this effect becomes. The "Length of Bear Market" column is the time from the market's peak to the trough. The next three columns show measures of peak-to-peak duration. The "Nominal" column illustrates how long it took stock prices to return to the market's previous peak. The "Inflation-Adjusted" column shows how long it took stock prices to return to the market's previous peak in inflation-adjusted terms. The "Long-Term Trend" column captures the duration of time during which plans would have sold assets at "depressed" prices.

Bear Market	Draw-down	Length of Bear Market	Time to Return to Peak		
			Nominal	Inflation-Adjusted	Long-Term Trend
Great Depression	-84%	2 Yrs, 10 Mths	15 Yrs, 3 Mths	15 Yrs, 4 Mths	24 Yrs, 9 Mths
Oil Embargo	-46%	1 Yr, 9 Mths	3 Yrs, 11 Mths	10 Yrs, 1 Mths	23 Yrs, 2 Mths
Portfolio Insurance	-30%	3 Mths	1 Yr, 8 Mths	1 Yr, 10 Mths	7 Yr, 10 Mths
Tech Bubble	-45%	2 Yrs, 1 Mths	6 Yrs, 0 Mths	12 Yrs, 4 Mths	17 Yrs, 3 Mths
GFC	-50%	1 Yr, 4 Mths	4 Yrs, 4 Mths	5 Yrs, 2 Mths	5 Yrs, 11 Mths
2020 Covid	-20%	2 Mths	5 Mths	5 Mths	5 Mths

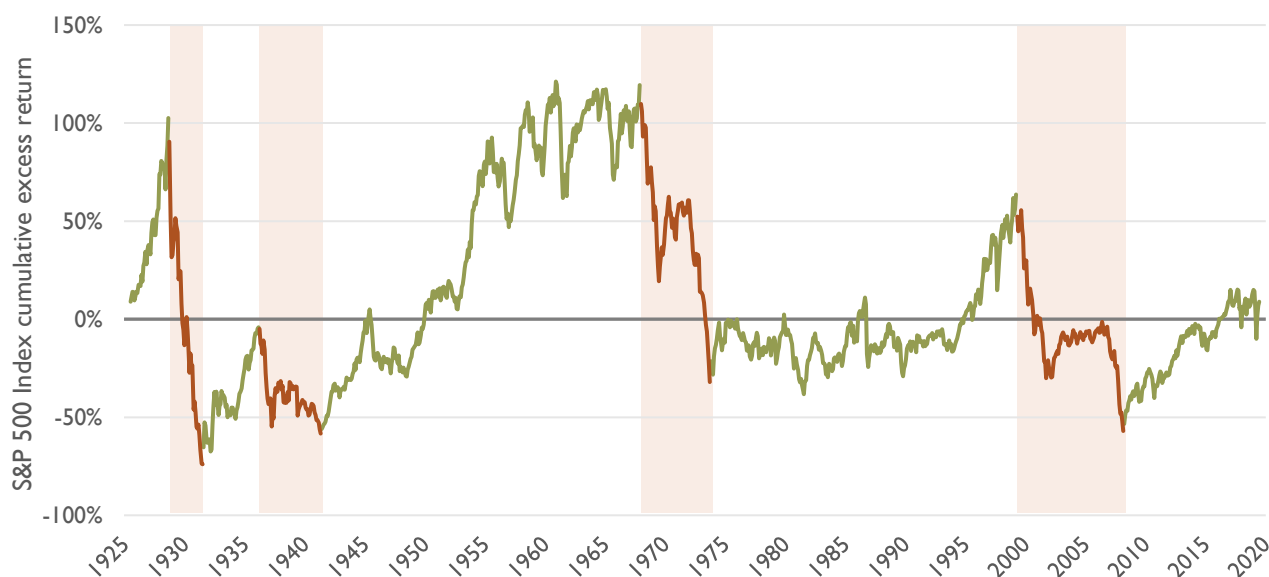
Since pension plans have an assumed rate of return, an important measure of a market cycle's duration is how long it took stock prices to recover to the market's pre-bear peak *plus* the return investors had expected to earn along the way. The "Long-Term Trend" column is a proxy for this. It measures how long it took stock prices to return to the previous market peak, adjusted by adding a risk premium of 4.5% per annum to the cash return.

Consider the bear market that followed the Tech Bubble:

- It lasted just over two years.
- It took another four years before the S&P 500 Index reached its previous high (i.e., six years peak-to-peak).
- It was another six years before the S&P 500 Index reached its previous high on an inflation-adjusted basis.
- An additional five years (17 years in all!) was needed for the S&P 500 Index to get back to where it would have been had stock prices appreciated at the rate of cash plus 4.5%, following the Tech Bubble's collapse.

While bear markets are the more obvious concern, extended periods of sub-par performance can also damage a plan's funded status. **Exhibit 3** shows the cumulative excess return of the S&P 500 Index relative to its long-term average. The periods of sub-par performance are highlighted. Bracketed by two bear markets, the 9-year period between March 2000 and February 2009 saw the S&P 500 Index lose 40% of its value (6% per annum). The value of the Index would have doubled during that period if it had appreciated at its long-term excess rate of return of 6.4%.

Exhibit 3: Cumulative Excess Return vs Long-Term Average



Stylized Bear Markets

Now that we have explored the cyclical behavior of the stock market, we can use that perspective to look at the implications for the funded status of defined benefit pension plans.

Most institutional investors tend to focus on the stock market's long-term average return. They believe that if the stock market reliably recovers after bear markets, investors can look past the cycles and focus on long-term average returns. However, for mature defined benefit plans, a bear market can materially damage the plan's funded status, even if the market recovers as expected. This damage is especially likely (and potentially irrecoverable) in mature plans that were underfunded at the onset of the bear market.

The charts in **Exhibit 4** depict four hypothetical scenarios for returns over a 10-year period. The first chart shows the cumulative return of a stock-only portfolio. The second shows the return of a portfolio rebalanced to 65/35 (i.e., 65% stocks, 35% bonds) each year, with bonds returning a constant 3.5% per annum.

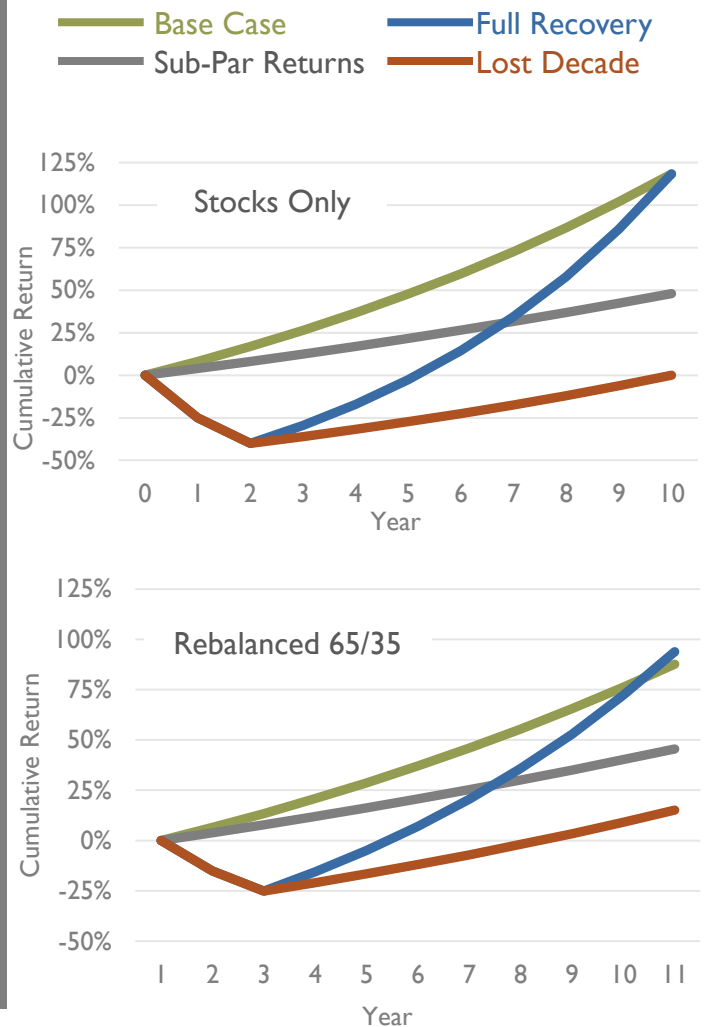
The "Base Case" scenario (green line) assumes stocks return 7.67% each year. Under this assumption, the rebalanced 65/35 portfolio returns 6.5% annually—the plan's assumed rate of return for this analysis.

In the "Sub-Par Returns" scenario (gray line), stocks appreciate only 4% each year lowering the 65/35 portfolio's return to 3.8% per annum.

The "Bear Market with a Quick Recovery" scenario starts with a two-year bear market, during which stocks decline 40%. Then, the stock market recovers, regaining its "trend" by year 10.

In the "Lost Decade" scenario (red line), stocks decline 40% in the first two years, and slowly recover. In that scenario, the stock market suffers a "lost decade" as it only recovers its losses by the end of year 10.

Exhibit 4: Cumulative Return





Impact of the Four Types of Bear Markets on the Funded Status of DB Pension Plans

The charts in **Exhibits 6 to 9** illustrate the relationships between plans' funded status and stock market returns, relative to initial funded status and net distribution rate (benefit payments minus contributions). **Exhibit 5** shows the funded status and net distribution profiles of four representative portfolios, which are all rebalanced annually to 65% stocks, 35% bonds.

Exhibit 5: Characteristics of Representative Portfolios

	Assets	Liabilities	Net Distribution	Discount Rate
Fully Funded	\$100	\$100	\$0	6.5%
Fully Funded, Mature	\$100	\$100	\$5	6.5%
Underfunded	\$80	\$100	\$0	6.5%
Underfunded, Mature	\$80	\$100	\$6	6.5%

The “Fully Funded” plan has \$100 million in assets and \$100 million in liabilities, contributions that are equal to distributions, and a 6.5% rate of return assumption. The “Fully Funded, Mature” plan uses the same assumptions, but distributes \$5 million each year, while the “Underfunded” plan starts with \$80 million in assets and \$100 million in liabilities. Finally, the “Underfunded, Mature” plan starts at 80% funded and distributes \$6 million annually.

Exhibit 6 shows the funded status of the Fully Funded plan under each of the return scenarios. In the Base Case, the plan's realized return is equal to its assumed return, so the plan remains fully funded. In the Sub-Par Returns scenario, the funded status of the Fully Funded plan declines as its realized returns do not keep up with its assumed rate of return. In the Bear Market, Full Recovery, scenario, the Fully Funded plan's funded status declines with the bear market, but the plan returns to fully funded status as the stock market returns to its trend value. In the Lost Decade scenario, the funded status of the Fully Funded plan falls during the bear market and then stabilizes at that lower level as post-bear market returns are in line with the Fully Funded plan's return assumption.

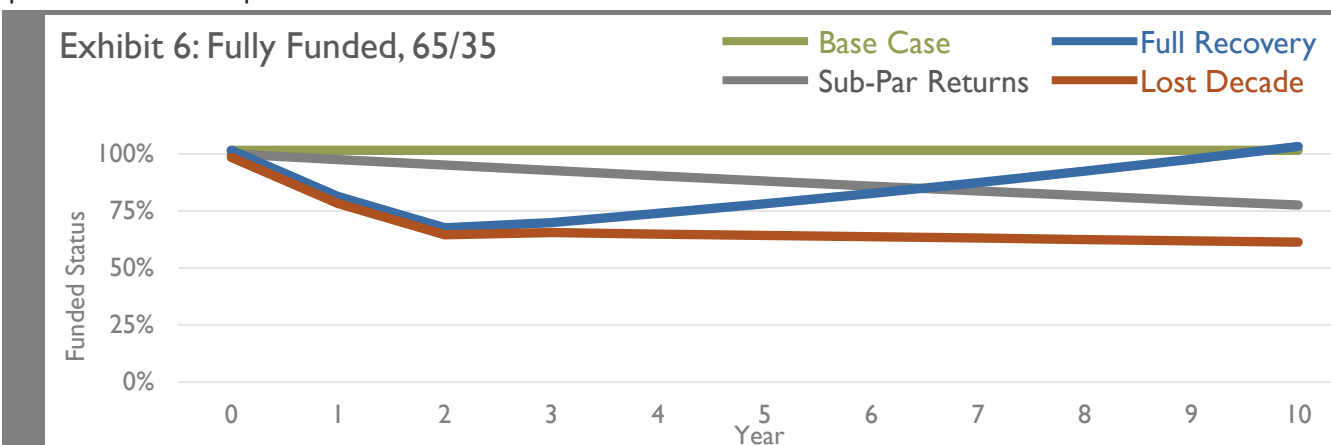
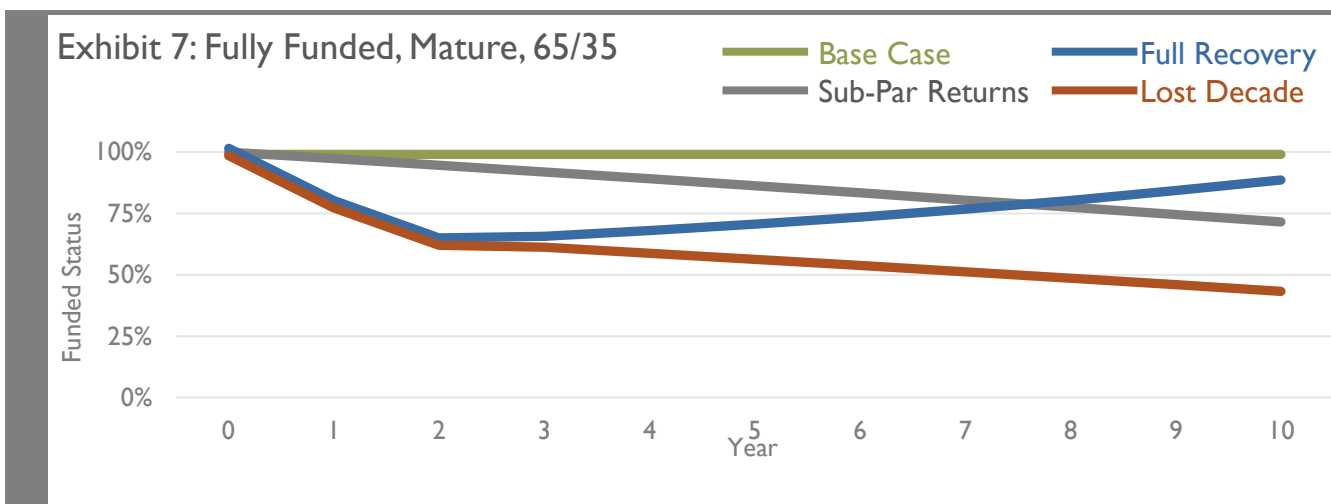
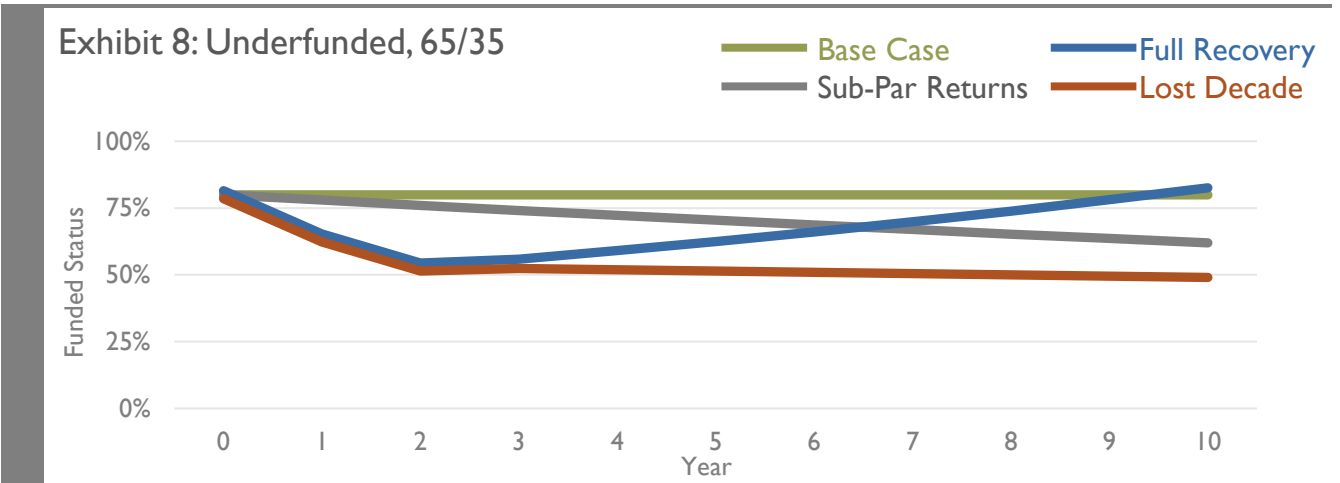


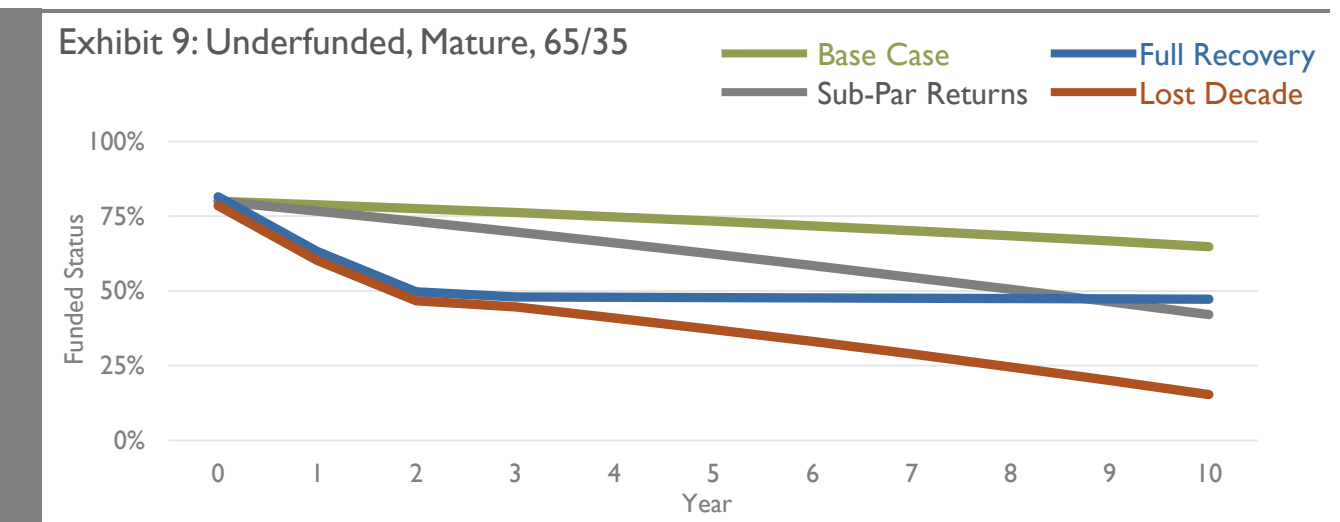
Exhibit 7 shows the funded status of the Fully Funded, Mature plan. It remains 100% funded in the Base Case. However, in the other three scenarios, the funded status declines and is lower than that of the Fully Funded plan because asset sales are required to meet benefit payment obligations. As a result, even though stocks produce positive returns after the bear market, fewer assets are available for appreciation and monetization to meet benefit payment obligations during the recovery period.



The chart in **Exhibit 8** shows the status of the Underfunded plan. In the Base Case scenario it remains 80% funded as both its assets and liabilities grow at 6.5%. Similarly, the Underfunded plan's status recovers in the Bear Market, Full Recovery scenario. Funded status declines and does not recover in the other two scenarios when the stock market's return is less than the plan's assumed return.



The chart in **Exhibit 9** shows the funded status of the Underfunded, Mature plan. The funded status of this plan declines in all four scenarios; even the scenarios in which asset returns match the plan's expectations. In the Bear Market, Full Recovery scenario, the funded status of the Underfunded, Mature plan lags despite a complete rebound in asset prices, while in the Lost Decade scenario, asset sales associated with its net negative distribution profile push its funded status down to 19%.





Effects of Allocating Less to Stocks

A smaller allocation to stocks would certainly help in the event of a lost decade. However, for most plans, significant equity exposure is necessary to achieve the required rate of return. Importantly, while reducing the allocation to stocks in a portfolio helps during bear markets, it does not eliminate funded status risk. For example, in a -40% bear market, having 10% less in stocks (e.g., 55% rather than 65%) would reduce overall portfolio drawdown by 4%. While that loss reduction is helpful, a fund with 55% in stocks would still fall in value by more than 20%.

Also, the lower expected return offsets the risk-reduction benefit from the smaller stock allocation. If we assume that the equity risk premium (the stock market's expected return minus the expected risk-free return) is 4%, then a 10% lower allocation to stocks would reduce the portfolio's expected return by 40 basis points. If we assume that the duration of plan liabilities is 12 years, a 40-basis-point reduction in expected return effectively reduces plan funded status by approximately 4.8%.

Asset allocation decisions should depend in large part on a plan's funded status. Trustees of a young, fully funded plan may better tolerate a lost decade, and choose to hold more equities in order to maintain the plan's funded status in normal markets. Trustees of a mature, underfunded plan may allocate less to equities due to concerns that a bear market could push the plan toward insolvency.

Summary

Even if financial markets behave in line with expectations over the long term, an interim period of poor returns can have lasting, adverse consequences to underfunded and mature plans. Historically, stock prices in the U.S. have always recovered from bear market losses, but assets sold to pay benefits during a bear market may permanently impair a plan's funded status. This particular risk is a function of the magnitude of the bear market, its duration, the plan's funded status entering the bear market, and the difference between its contributions and distributions during the bear market.

While it would be nice to offer a painless solution to the issues raised in this Viewpoint, there is not one. Plan portfolios need to have a significant allocation to equities in order to meet their return assumptions and benefit-payment obligations.

Bear markets have occurred regularly in the past and will recur in the future. It is unrealistic for investors to assume they have the requisite skill to identify, and the fortitude to sell at, stock market peaks. Tail hedges can mitigate downside risk but are very expensive to maintain over time. Finally, holding a diversified portfolio does help at the margin, but investors should not expect to find assets with high expected returns that also exhibit low correlations with stocks.



We recommend that Trustees do their best to maintain a plan's funded status and to keep contributions and distributions in balance. In addition, trustees should consider the likely consequences of a lost decade to better understand how best to navigate and survive one. Also, if the next decade is one during which the stock market beats expectations, Trustees should consider using the resultant gains to build a buffer and improve the plan's resiliency in preparation for the next, inevitable bear market.



Considerations for Taft-Hartley Plans

The analysis presented above assumes that the appropriate measure of risk for a defined benefit pension plan is its funded status at a 10-year horizon. The reality is that other risks and considerations make individual plan analyses much more complicated. No two plans have the same circumstances, and most have multiple objectives, each with a different time horizon. Trustees' return expectations, strategy preferences, and risk tolerances differ widely too. As a result, asset allocation decisions require careful, detailed analysis informed by a thorough discussion of all relevant objectives, opportunities, risks, and constraints.

For example:

PBGC guarantee

Because insolvency essentially removes limits on employer withdrawal liability, and the PBGC guarantee provides downside protection, plans facing insolvency and with expected benefits less than the PBGC maximum, may decide to take greater investment risk. (This approach assumes that the PBGC multi-employer fund will remain sound.)

Merger

For plans expecting to merge into a successor plan within a year or two, the investment horizon becomes the target merger date, and the primary investment objective may be to protect the plan's funded status during the interim period.

Annuitization

In higher interest rate environments, Trustees of well-funded plans may consider buying terminal annuities or immunizing plan liabilities. Trustees of less well-funded plans may prefer to increase portfolio risk with annuitization as a longer-term objective.

Multi-employer Pension Reform Act

All decisions should consider a plan's MPRA zone status. Trustees of severely underfunded and declining funds must consider the implications of asset allocation policy on the feasibility of obtaining relief.

For underfunded plans with significant net distributions, insolvency may be inevitable. In these cases, the near-term practicalities of managing assets against a net negative distribution profile should guide asset allocation decisions.

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