

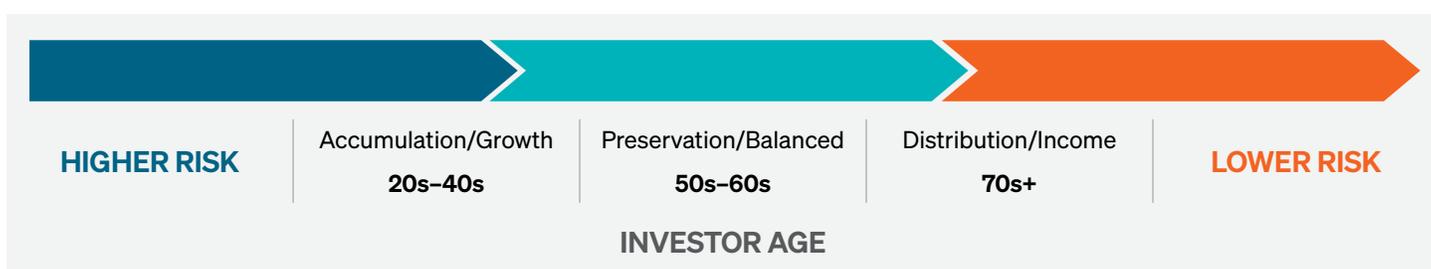


# Understanding Risk During Retirement

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## The Lifecycle of the Investor

The lifecycle of the investor investor generally comprises three distinct stages; accumulation, preservation and distribution. During the accumulation stage, an investor contributes to a portfolio that is expected to grow over time. There has traditionally been a focus on maintaining significant exposure to common stocks during this stage. It certainly makes sense. Common stocks, often called equities, are one of the few assets that have historically outpaced inflation.



This pattern of contributions continues into the wealth preservation stage, a time when many investors start experiencing the positive effects of long-term compounding. As their account balance grows over time, investors often focus on reducing risk to prepare for the big leap into retirement.

Retirement introduces the last stage; distribution. This stage often involves many significant life changes. Most retirees have

focused on working for more than 40 years, all while diligently saving for retirement. Suddenly, they are no longer receiving paychecks. They just have a nest egg, which they have been contributing toward for their entire adult life. In some ways, this nest egg could be the answer to the important question of whether they will remain financially solvent.

## Risk-Based vs. Goals-Based

At the heart of financial planning is defining a person's goals and allocating their resources so that they maximize the probability of achieving those goals. The structure of this process is traditionally built on a foundation of risk, forged by the confluence of the investor's willingness and ability to take risk.

While equities are essential during the accumulation phase, clients who are more risk averse tend to allocate less to equities than those with a higher risk appetite. Risk averse investors are likely to miss out on greater potential upside in order to experience a smoother ride with less volatility. Working longer or saving more are common alternatives for more risk averse investors.

For those who are comfortable with taking additional risk, equities traditionally offer the best opportunity for long-term growth. Balancing this risk-reward relationship is often the cornerstone of asset allocation for clients during the accumulation and wealth preservation stages.

As investors enter the distribution stage, many continue to use the same risk-based framework to make investment decisions. In some ways, it makes sense. Research shows that people have a lower tolerance for risk as they age. It is also important to keep an investor committed to their objective long enough to achieve it. A financial plan that leaves a client stuffing cash under their mattress after one bad quarter is not an effective solution. On the other hand, one indisputable fact that we must deal with is math.

Figure 1 displays the stream of future withdrawals from \$1,000,000 with three different withdrawal rates. The title of each column references the Year 1 withdrawal percentage. Withdrawals in years 2–30 are increased by 2.5% annually to account for increases in the cost of living, otherwise known as inflation. At the bottom of the table are the sums of future spending needs.

FIGURE 1

YEAR	2% WITHDRAWAL	4% WITHDRAWAL	6% WITHDRAWAL
1	\$20,000.00	\$40,000.00	\$60,000.00
2	\$20,500.00	\$41,000.00	\$61,500.00
3	\$21,012.50	\$42,025.00	\$63,037.50
4	\$21,537.81	\$43,075.63	\$64,613.44
5	\$22,076.26	\$44,152.52	\$66,228.77
6	\$22,628.16	\$45,256.33	\$67,884.49
7	\$23,193.87	\$46,387.74	\$69,581.61
8	\$23,773.72	\$47,547.43	\$71,321.15
9	\$24,368.06	\$48,736.12	\$73,104.17
10	\$24,977.26	\$49,954.52	\$74,931.78
11	\$25,601.69	\$51,203.38	\$76,805.07
12	\$26,241.73	\$52,483.47	\$78,725.20
13	\$26,897.78	\$53,795.55	\$80,693.33
14	\$27,570.22	\$55,140.44	\$82,710.66
15	\$28,259.48	\$56,518.95	\$84,778.43
16	\$28,965.96	\$57,931.93	\$86,897.89
17	\$29,690.11	\$59,380.22	\$89,070.34
18	\$30,432.37	\$60,864.73	\$91,297.10
19	\$31,193.17	\$62,386.35	\$93,579.52
20	\$31,973.00	\$63,946.01	\$95,919.01
21	\$32,772.33	\$65,544.66	\$98,316.99
22	\$33,591.64	\$67,183.27	\$100,774.91
23	\$34,431.43	\$68,862.86	\$103,294.28
24	\$35,292.21	\$70,584.43	\$105,876.64
25	\$36,174.52	\$72,349.04	\$108,523.56
26	\$37,078.88	\$74,157.76	\$111,236.65
27	\$38,005.85	\$76,011.71	\$114,017.56
28	\$38,956.00	\$77,912.00	\$116,868.00
29	\$39,929.90	\$79,859.80	\$119,789.70
30	\$40,928.15	\$81,856.30	\$122,784.44
<b>Total</b>	<b>\$878,054.06</b>	<b>\$1,756,108.13</b>	<b>\$2,634,162.19</b>

As Figure 1 illustrates, if a retiree only requires 2% of their assets for spending needs, the total sum of all future withdrawals is less than the initial account balance. This retiree does not need to take any additional risk to fund a 30-year time horizon. Naturally, as the withdrawal rate increases, the total sum of future spending needs increases. It becomes clear that a retiree with a larger withdrawal rate needs more growth than a retiree with a lower withdrawal rate.

A traditional, risk-based assessment has reached a crossroad. A client may fit the criteria of an extremely conservative investor but require a higher withdrawal rate. Based on traditional risk-measures, an advisor may recommend a low-risk portfolio that may not generate the growth needed to fund future spending goals. Unlike the accumulation and wealth preservation stages, the ability to return to work may be challenging, as their skills could become less marketable over time and health issues may create obstacles to earning additional income. In contrast, a goals-based retirement solution is specifically constructed to meet the spending requirements of a retiree. By focusing on the desired withdrawal rate, the portfolio is allocated to achieve the growth needed for reaching a retiree's goal.

# The Top Three Retirement Risks

## LONGEVITY RISK

Research studies continue to show that the top fear for retirees is longevity, or the risk of outliving their assets. Thoughts of growing old with no resources to support yourself can be a scary thought. The ability to earn income may also be impaired by diminishing physical and mental capacity, making the reliance on retirement savings even more important.

One way to reduce the impact of longevity risk is investing in equities during the distribution stage. From 1928–2021, the average annual return for U.S. equities (S&P 500 Index) was 10.5%. The average annual return for U.S. fixed income (10-Year U.S. Treasury Bonds) is +5.0%. Unless your nest egg has a starting balance that exceeds the sum of your future spending needs, long-term growth will be necessary. As Figure 1 illustrates, more growth is needed as a retiree's withdrawal rate increases.

## VOLATILITY RISK

The most common way to define risk for most investors is volatility, which is often measured by standard deviation. Standard deviation is a statistic that measures the variation of returns over time. The higher the standard deviation of an asset, the more volatile it is. This means its shortterm returns tend to be more extreme, higher and lower, than its long-term average returns.

As an example, Figure 2 shows the average annual return and standard deviation of U.S. fixed income (10-year Treasury Bonds) and equities (S&P 500 Index) from 1928–2021. Equity has a higher average return but is more volatile. Fixed Income has a lower average return but is less volatile.

FIGURE 2

	S&P 500 INDEX	10-YEAR TREASURY
Average Annual Return	10.49%	5.02%
Annual Standard Deviation	14.09%	5.20%

Traditionally, fixed income has been a complementary asset to equities. During this same time period, the correlation between these two assets was -0.03. With little correlation, fixed income is often thought of as good diversification for equities and a key component to reduce the volatility risk of a portfolio.

## SEQUENCE OF RETURNS RISK

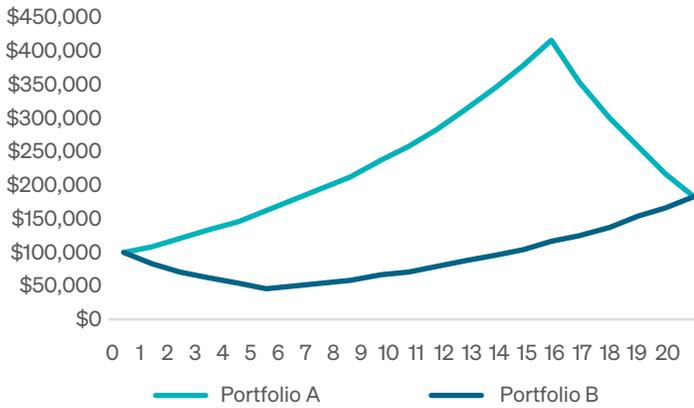
If you are a buy-and-hold investor who is not making contributions or withdrawals, the order of your investment returns does not matter. Figure 3 shows the order of returns for two portfolios during a 20-year period.

Portfolio A has 15 consecutive years of 10% gains, followed by 5 consecutive years of -15% losses. Portfolio B has five consecutive losses of -15% in the first 5 years but finishes with 15 consecutive years with gains of +10%. In Figure 4, both portfolios begin with \$100,000 and experience each year's respective returns from Figure 3. The order of returns has no effect on the ending balances after 20 years.

FIGURE 3

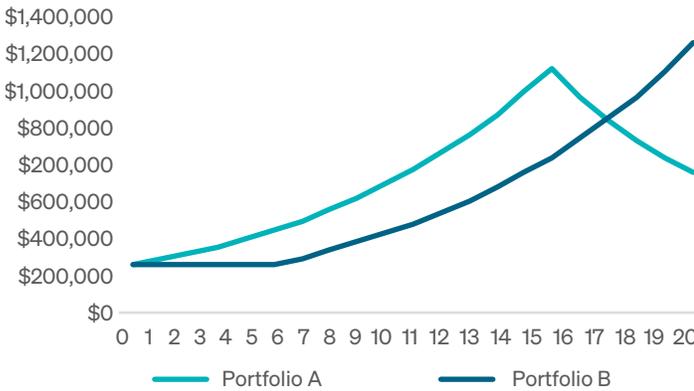
YEAR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Average	
<b>PORTFOLIO A</b>	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	-15%	-15%	-15%	-15%	-15%	3.75%	
<b>PORTFOLIO B</b>	-15%	-15%	-15%	-15%	-15%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	3.75%

**FIGURE 4  
NO CONTRIBUTIONS OR WITHDRAWALS**



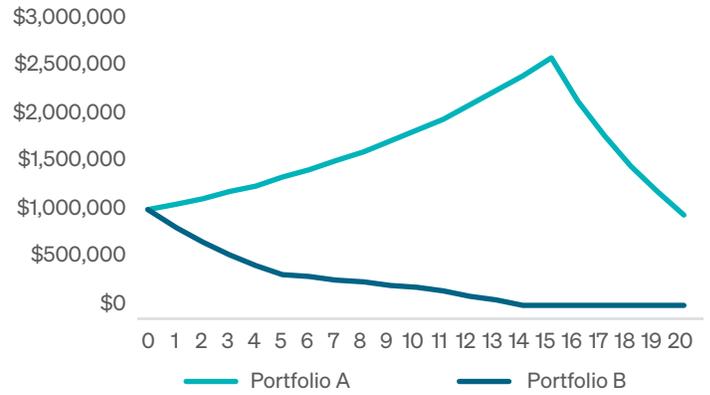
During the accumulation phase, it is a different story. The portfolios in Figure 5 experience the exact same order of returns, but with one difference. In this example, an investor deposits that year's maximum 401K contribution of \$19,000 at the beginning of Year 1 and increases the contribution by 2.5% annually in years 2–20. Despite both portfolios experiencing the same average return over 20 years, the poor performance in the final years for Portfolio A caused more damage than the difficult start for Portfolio B. The string of losses occurred early for Portfolio B, before the account value was very large. The contributions also purchased more of the investment at lower prices. As counterintuitive as it sounds, investors in the accumulation phase may want to root for bear markets to occur when they are young.

**FIGURE 5  
PERIODIC CONTRIBUTIONS**



Finally, let's review the sequence of returns risk during the distribution stage. Figure 6 shows the annual ending balances of two portfolios that both began with \$1,000,000. In this example, each portfolio withdrawals 4% (\$40,000) at the beginning of Year 1 and increases that withdrawal amount by 2.5% annually for the next 19 years.

**FIGURE 6  
PERIODIC WITHDRAWALS**



The sequence of returns impact is reversed when an investor is taking distributions. The poor early returns for Portfolio B have a much greater impact than the poor performance in the final 5 years for Portfolio A. Portfolio B experiences consecutive losses in the early years, while simultaneously removing money from the account at lower prices. When the market recovers, Portfolio B has less money invested and the gains after Year 5 aren't enough to offset the bad start. After experiencing large drawdowns early in retirement, Portfolio B runs out of money during the 14th year. Using a strategy that limits downside during the early years of the distribution stage could reduce the sequence of returns risk for a retiree.



# Managing the Top Three Retirement Risks

During the distribution stage, managing these three risks can be a balancing act. To reduce longevity risk, an investor requires growth assets to help fund future spending needs. On the other hand, equities may increase volatility risk and sequence of returns risk. How does the investor balance these competing risks during retirement?

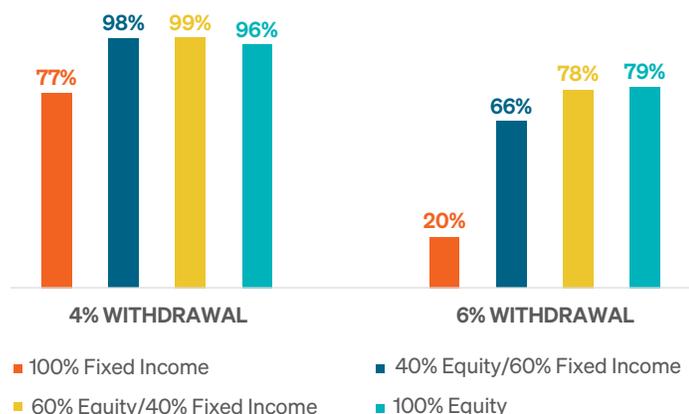
## MINIMIZING LONGEVITY RISK

As mentioned earlier, equities historically have a higher average return than fixed income, which reduces longevity risk. As the desired withdrawal rate increases, the total amount of future spending needs increases. To highlight the impact of including equity to a portfolio during the distribution stage, we used Monte Carlo simulations, giving an investor four portfolio choices. Each portfolio followed the parameters to the right, during the simulation process.

MONTE CARLO PARAMETERS
Starting Balance: \$1,000,000
Time Horizon: 30 Years
Year 1 Withdrawal: 4% or 6%
Annual Withdrawal Adjustment: CPI - 1%
10,000 Simulations

Figure 7 shows the probability of success for each respective portfolio and withdrawal rate. Success is measured by the portfolio funding all the retiree's spending needs over 30 years. These charts demonstrate that adding equity to a portfolio generally increases the odds of success for a retiree with a longer time horizon. As the withdrawal rate increases, equity becomes even more important to maximize the success rate.

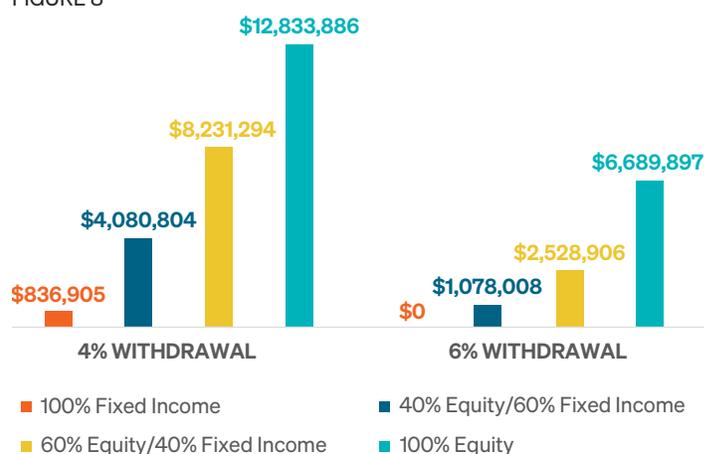
FIGURE 7



A Monte Carlo simulation generates a wide variety of market return scenarios from actual market returns. In this case, we used the S&P 500 Index to represent equity returns and the U.S. 10-Year Treasury to represent fixed income returns. The simulation utilizes data from 1950 through 2018. For each quarter of any given simulation, the model randomly generates one quarter of equity and fixed income returns based off of the distribution of historical returns. The simulation was run 10,000 times to generate an estimate of likely outcomes for each portfolio. By keeping track of the number of simulations in which a portfolio meets the required spending needs, we can estimate the success rate of the portfolio.

While Figure 7 illustrates these success rates, it does not indicate whether there was \$1 or \$1,000,000 left in the portfolio. Equity's upside really stands out when we observe the average ending balance for retirees after 30 years. Figure 8 shows the average ending balance for each respective portfolio and withdrawal rate. The average retiree, starting with a 6% withdrawal rate, will run out of money by investing their entire portfolio in fixed income. The lack of equity, combined with a higher withdrawal rate, causes the portfolio to run out of money before 30 years have passed. The theme is consistent. Adding more equity gives a retiree greater potential upside, which may translate to a larger legacy or additional spending flexibility later in life.

FIGURE 8



## SOLVING VOLATILITY RISK

Fixed income is traditionally combined with equity to provide diversification and reduce overall portfolio risk. Although the long-term correlation between these two asset classes is nearly zero, it is important to note that this has differed throughout history. For example, from 2000 to 2017, fixed income and equity were inversely correlated. Based on a trailing 5-year correlation, Figure 9 demonstrates that the correlation turned positive beginning in 2016. If the correlation were to remain positive over the next 20 years, investors may experience a period where the combination of equities and fixed income provides little diversification.

Future fixed income returns may also be lower than they have been during the past few decades. As Figure 10 shows, the average annual return for fixed income between 1950–2018 was +5.2%. Between 1950–1979, 10-year Treasury bonds returned +3.0% per year. This is drastically different than 1980–2018, when bonds gained +7.8% per year.

With interest rates remaining low, it is nearly impossible for bond investors to earn the average return they have achieved during the past few decades. While risk may be reduced within the portfolio, a heavy reliance on an asset class with below-average returns could significantly impede longevity.

FIGURE 9  
5-YEAR CORRELATION BETWEEN EQUITY AND FIXED INCOME RETURNS

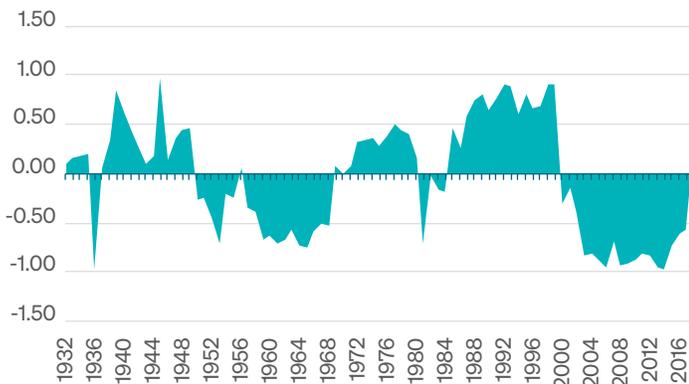
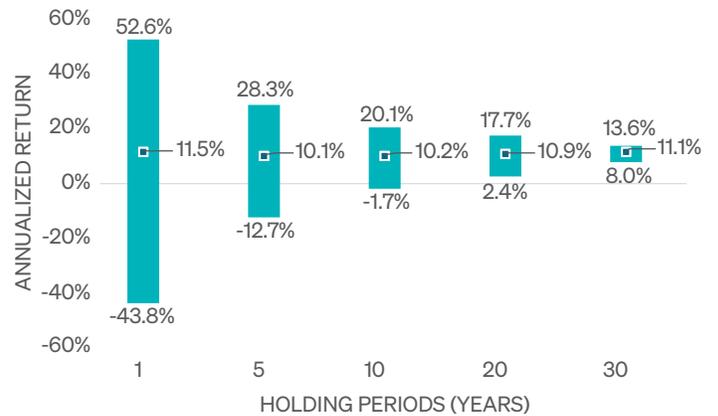


FIGURE 10  
PERIODIC CONTRIBUTIONS



An interesting thing also happens to the volatility of equities when an investor holds them over longer periods of time. Figure 11 shows the annualized return of the S&P 500 Index based on various holding periods. The yellow squares mark the average annualized return and the blue bar represents the highest and lowest annualized return for each respective holding period. We can see that the longer the holding period, the less volatile an investor's return. Since 1928 through 2018, there had never been a 20- or 30-year holding period where the S&P500 experienced a negative return.

FIGURE 11



## ADDRESSING SEQUENCE OF RETURNS RISK

As mentioned earlier, a higher exposure to equities reduces longevity risk. We also demonstrated that holding equities for longer periods of time reduces the long-term volatility of investing in equities. While this is true, Figure 11 still shows that holding equities for shorter periods may leave an investor with exposure to significant volatility. So, an investor needs equity to reduce longevity risk, but a more volatile asset like equity increases the sequence of returns risk during the distribution phase. Traditional equity alone may not be the solution.

## MANAGING RISK IN RETIREMENT WITH MEEDER

Meeder's Defensive Equity is a potential solution for today's retiree. Defensive Equity is an investment philosophy that we have been refining for nearly 50 years. The goal of this strategy is to reduce equity exposure when market risk is high and increase equity exposure when market risk is low. Meeder applies a multi-factor/multi-discipline approach, utilizing macroeconomic, fundamental, and technical analysis to assess the risk-reward relationship of the equity market. This approach seeks to capture most of the upside of equity returns while aiming to reduce volatility and downside risk. Defensive Equity aims to achieve this objective by providing the flexibility to move the investment in equity to cash or fixed income when market risk is high. In many ways, Defensive Equity is a diversification tool that reduces a retiree's reliance on fixed income, while also aiming to reduce equity drawdown risk.

By focusing on reducing major market drawdowns, the inclusion of the Defensive Equity strategy complements the exposure of traditional equity and fixed income within a retiree's portfolio, as illustrated in Figure 12.

It is also important to construct a retirement portfolio based on the retiree's desired withdrawal rate. As the withdrawal rate increases, the need for growth and Defensive Equity increases. Utilizing this goals-based framework, a retirement portfolio with all three components could minimize longevity, volatility, and sequence of returns risk.

FIGURE 12

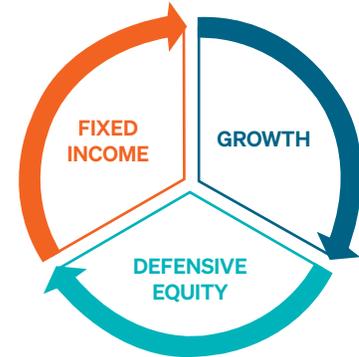


FIGURE 13

### KEYS TO MANAGING RETIREMENT RISK



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