RBC Global Asset Management

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Investing for, and during, retirement: what's safe in the short-term can be risky in the long-term

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Thirty years ago, William Bengen's *Determining Withdrawal Rates Using Historical Data* was published in the *Journal of Financial Planning*. The uninspiring title did little to dampen interest in his research. Using return histories for stocks, bonds and cash back to 1926, Bengen proposed appropriate withdrawal rates on retirement savings. These were based on the simple principles that past returns in capital markets are a reasonable guide for the future, that savers aim to maintain their standard of living through their retirement years, and that no one wants to outlive their nest egg. He made adjustments to accommodate inflation and for those wanting to leave bequests, but the moving parts of his analysis were few. Nevertheless, that research has been foundational in the field of retirement planning ever since.

A few months ago, following a recovery in cash rates from near-zero to 5% and a painful surge in yields from 150-year lows, we asked our quantitative research and investment policy teams to reconsider Bengen's analysis, adding the history of market returns since his 1994 publication (Exhibit 1).

Our results, which are based on 96 years of data from 1928 to 2023, are outlined in the following pages, but the summary is quite concise: Bengen's analysis survives the test of time. His proposed retirement portfolio with a constant asset mix of 50% bonds/50% stocks lasted a minimum of 26 years from the retirement date under all actual experiences for bonds and stocks since 1928, assuming an initial withdrawal rate of 4% of accumulated savings at the date one leaves the workforce, boosted each year to accommodate inflation.

Exhibit 1: History of balanced portfolio returns
60% equities / 40% bond portfolio, 30-year annualized

Note: Data from February 1, 1901 to March 31, 2025. Balanced portfolio is 60% S&P 500 and 40% U.S. 10-year T-bonds. Source: Robert J. Shiller, Bloomberg, RBC GAM

Like Bengen, our research began with a $1,000,000 retirement portfolio, an initial withdrawal rate of 4% and annual adjustments for inflation. We applied that methodology across a variety of asset mixes spanning investor profiles from very conservative to aggressive growth. Exhibit 2 focusses on the balanced profile with an asset mix of 60% stocks/40% bonds. Outcomes cover a wide range dependent on market experience during the retirement years (the dotted lines capture 90% of all outcomes), but assuming annual withdrawals as described, the portfolio lasted a minimum of 27 years and the median portfolio was actually larger after 30 years than at the date of retirement.

This was true even for the most unfortunate savers who retired just as stocks were about to collapse in 1929, 1973, 1987 or even 2008. Every $1 million of savings at the date of retirement would have provided at least 27 years of pre-tax spending of $40,000 along with annual adjustments for the actual inflation rate (Exhibit 3).

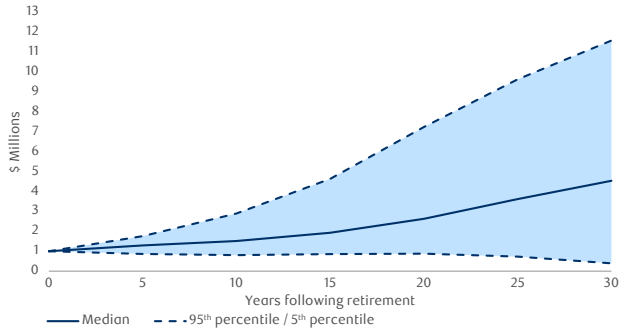
> "Hiding in cash, although it is perceived to be safe in the short term, will erode wealth over the long term as inflation eats into purchasing power."

Exhibit 4 plots the outcomes for a portfolio that is fully invested in cash. While this portfolio is considered conservative from a volatility point of view, it has an unacceptably high risk of running out of money over longer time horizons. Although the median life for this strategy was 27 years, it failed in 81% of the 30-year historical retirement windows since 1928 and the worst outcome failed within 17 years after leaving the workforce. Hiding in cash, although it is perceived to be safe in the short term, will erode wealth over the long term as inflation eats into purchasing power. One can't avoid taking some degree of investment risk with their retirement savings. Without it, real wealth is not created and retirement goals may not be achieved.

There are many nuances. Most importantly, neither Bengen's 50/50 nor our balanced profile's 60/40 blend of stocks and bonds were the optimal mix, although they may satisfy the

Exhibit 2: Value of sample retirement portfolio: all experiences

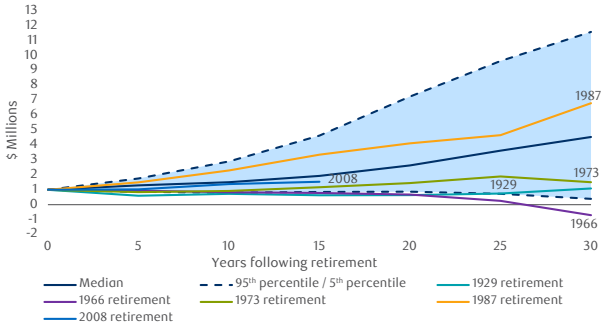
60% equities / 40% bond portfolio, 4% annual withdrawal



Note: Shaded area represents the range of outcomes between the 5th and 95th percentile of historical results for a sample 60/40 balanced portfolio (60% S&P 500 Index and 40% U.S. 10-year Treasury bonds using data from 1928 to 2023. Source: RBC GAM

Exhibit 3: Sample retirement portfolio for selected "worst case" dates

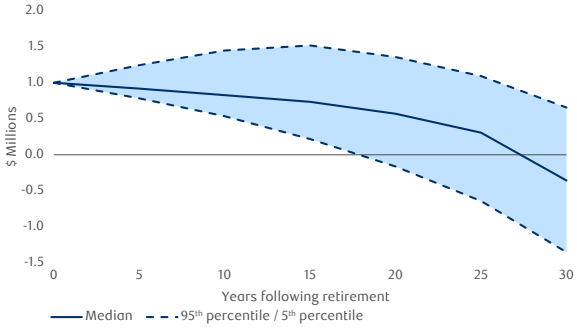
60% equities / 40% bond portfolio, 4% annual withdrawal



Note: Lines are labeled by retirement year. Shaded area represents the range of outcomes between the 5th and 95th percentile of historical results for a sample 60/40 balanced portfolio using data from 1928 to 2023 for the S&P 500 Index and U.S. 10-year Treasury bonds. Source: RBC GAM

Exhibit 4: Value of sample retirement portfolio

100% cash portfolio, 4% annual withdrawal



Note: Shaded area represents the range of outcomes between the 5th and 95th percentile of historical results for a sample cash portfolio (3-month Treasury bills) using data from 1928 to 2023 for the S&P 500 Index and U.S. 10-year Treasury bonds. Source: RBC GAM

Exhibits 2 to 4 assume sample retirement portfolio begins with $1M and is drawn down by $40K/year adjusted to inflation over a 30-year horizon.

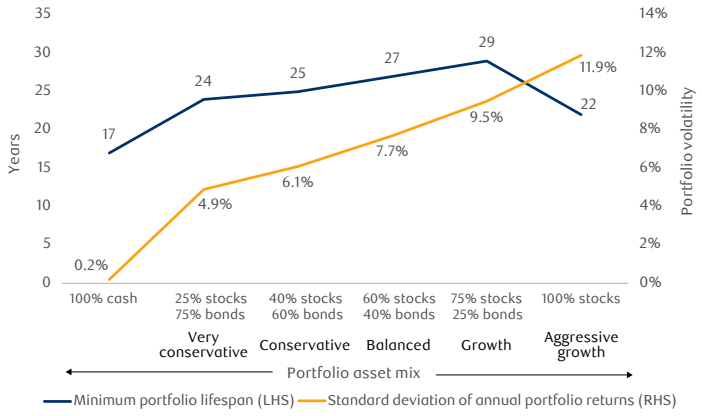
psychological requirements of some investors. Despite stocks' higher levels of volatility (including sometimes shocking crashes), a constant equity exposure of up to 75% actually produced the best results in terms of returns, volatility and portfolio survival (exhibits 5 and 6). This reflects stocks' history of rallying strongly from past bear markets. Of course, higher levels of equity exposure require confidence in the self-correcting nature of the economy and markets, and the ability to live through large drawdowns in savings without the threat of changing investment plans after losses are recorded and before recovery is in place.

Balancing between risks

When selecting the client's asset mix, two risks have to be addressed: the longer run threat of running out of money and the shorter run risk of market drawdowns. Exhibits 5 and 6 show that these pull in opposite directions. While a more conservative portfolio has less market risk, it also has less opportunity to create real wealth than more aggressive portfolios, which again have higher market risk. The choice of the most appropriate asset mix will depend on your time horizon and your risk appetite.

Exhibit 5: Sample retirement portfolios

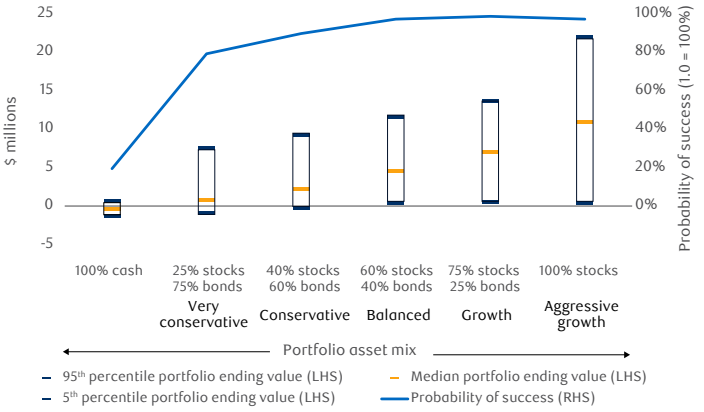
Minimum lifespan and volatility of portfolios by risk profile



Note: As of February 28, 2025. Portfolio volatility is represented by standard deviation of annual returns for the representative benchmarks of RBC GAM's Money Market Fund and our five risk profiles ranging from Very Conservative to Aggressive Growth, based on a 40-year history. The minimum lifespan represents the least amount of time a sample portfolio would have fully depleted, based on history back to 1928. Source: RBC GAM

Exhibit 6: Sample retirement portfolios

$1M start, $40K/year withdrawl adjusted to inflation, 30-year horizon



Note: As of February 28, 2025. The boxes on the chart represent the ending portfolio balance (ranging from the 5th percentile to the 95th percentile of iterations performed since 1928) for a sample retirement portfolio that begins with $1M, and is drawn down by $40K/year adjusted to inflation over a 30-year horizon. Negative plots represent iterations where the portfolio would have run out of funds at some point before the 30-year horizon ellapsed. The probability of success indicates the percentage of samples since 1928 where the retirement portfolio would not have run out of money over a 30-year measurement period. Source: RBC GAM

Other considerations

Bengen considered a variety of initial withdrawal rates but settled at 4% per year at retirement with annual inflation adjustments as higher amounts exposed retirees to unacceptably high risks of running out of savings within the 30-year retirement period (Exhibit 7). Similarly, withdrawal rates below 4% sometimes left unwanted surpluses following the 30-year window.

Another important aspect of retirement saving is the need to diversify investments. Although both Bengen's initial study and our update focused on a simple blend of U.S. Treasury bonds and stocks represented by the S&P 500 Index, retirement plans should be diversified across sovereign and corporate debt markets and equity issuers, sectors, styles and geographies.

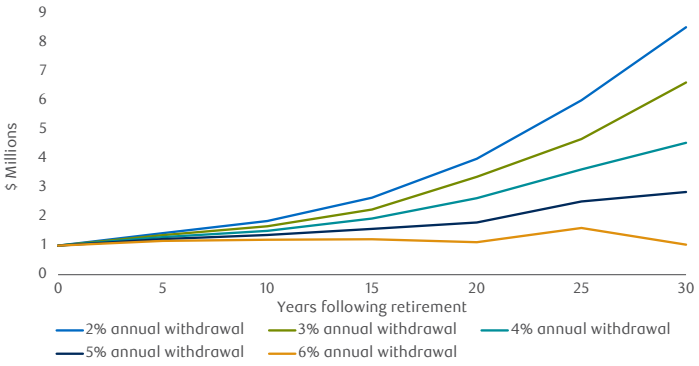
Research is timely

This research is timely. The past two years of high cash rates has resulted in a mountain of savings invested sub-optimally for the long term (Exhibit 8). Investors can hardly be blamed for hanging around the T-bill market following two devastating bear markets in stocks in the past 15 years and the shocking collapse in bond prices of 2022-2023. Five percent annual returns on risk-free cash seemed like a good idea with bond yields beneath that and stocks, rallying to all-time highs, showing valuations at demanding levels despite a near-constant threat of recession. But here's the rub: during the period that short-term interest rates first moved above bond yields (October 2022) and year-end 2024, a traditional long-only balanced fund with 60% stocks/40% bonds returned far more. The RBC Select Balanced Portfolio Series A, for example, a 60/40 balanced structure, returned 28.9% after fees over that 15-month period (or 12.4% annualized). As comfortable as T-bill returns of 5% were, especially in an environment with plenty of macro risks and high stock market valuations, the cost of that comfort in terms of lost opportunity was steep.

The fear of loss is understandable, especially where retirement savings are at risk. Daniel Kahneman and Amos Tversky documented its powerful effect on judgement in their Nobel prize winning work on prospect theory. In their research, avoidance of loss dominates risk taking asymmetrically, and sometimes to an irrational degree. Many will be encouraged by the actual record of stock market loss and ultimate rebound, recognizing that unleveraged, diversified portfolios require time for recovery, but that taking a long view during difficult markets has generally proven to be the correct strategy. Moreover, understanding the history of loss and recovery through bear and bull markets and committing to a disciplined approach enables a much more productive investing experience, even during the retirement years.

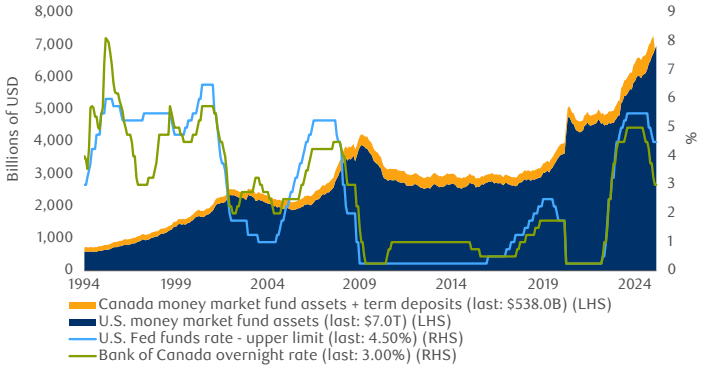
Exhibit 7: Value of sample retirement portfolio

Median result for 60% equities / 40% bond portfolio



Note: Lines represent the median result for a sample 60/40 balanced portfolio under various annual withdrawal rates using data from 1928 to 2023 for the S&P 500 Index and U.S. 10-year Treasury bonds. Source: RBC GAM

Exhibit 8: U.S. and Canada money market fund and term deposits



Note: As of February 28, 2025. Source: ICI, Bank of Canada, RBC GAM

Exhibit 9 presents data for our five risk profiles, modelling returns through stock market corrections and bear markets since 1928, including drawdowns (the maximum decline from a bull market cycle peak to a bear market trough) and the months required to recover the prior cycle high, restoring portfolios back to their values before the decline set in. For the profiles presented, equity exposure ranges from 25% to 100%.

The data for the full period in Exhibit 9 is heavily impacted by the experience of the 1930s. Peak to trough declines for the five profiles ranged from 29% to 83% following the 1929 stock market crash, and full recovery took 4 to 15 years. While the post war years have experienced some crushing declines and uncomfortable bear markets, even the drawdowns associated with the 1974 collapse, the tech wreck of the early 2000s and the Great Financial Crisis were considerably more contained in both size and duration.

The maturing of central bank policy and market regulation following the Great Depression have no doubt had an impact and, as a result, we think the post-war experience is much more relevant. If we focus on the post-war years, peak to trough declines diminish to 19% to 51% across the five profiles, and recovery periods shorten to 2 1/2 years to 4 3/4 years. Patience is still required to survive bear markets without permanently impairing future portfolio values, but the time required to restore bear market losses of the post-war era has been about 1/10 of the expected 30-year retirement period. Another way of looking at the data is to assume retirement at age 65 and an expectation to live to age 95. Viewed through this lens, the data suggests maintaining significant equity exposure well into one's 80's!

Exhibit 9: Drawdown and recovery statistics by risk profile
Data from 1928 to April 2025

Profile	Very conservative	Conservative	Balanced	Growth	Aggressive growth
Asset mix	25% stocks, 75% bonds	40% stocks, 60% bonds	60% stocks, 40% bonds	75% stocks, 25% bonds	100% stocks
Full history: 1928 to April 2025					
Average drawdown	-2.8%	-3.2%	-4.2%	-5.1%	-6.6%
Average time to recovery (years)	0.4	0.4	0.4	0.5	0.5
Average drawdown (>5%)	-9.1%	-11.6%	-13.4%	-15.5%	-14.9%
Average time to recovery for drawdowns >5% (years)	1.3	1.6	1.5	1.5	1.3
Average drawdown (>10%)	-14.9%	-19.7%	-23.0%	-23.1%	-26.9%
Average time to recovery for drawdowns >10% (years)	2.0	2.6	2.7	2.4	2.7
Max drawdown	-28.6%	-45.2%	-62.2%	-71.8%	-83.1%
Max drawdown date	5/31/1932	5/31/1932	5/31/1932	5/31/1932	5/31/1932
Max drawdown: time to recovery (years)	3.9	5.9	6.5	7.1	15.3
Post-war: 1946 to April 2025					
Average drawdown	-2.7%	-2.9%	-3.7%	-4.6%	-6.2%
Average time to recovery (years)	0.4	0.4	0.4	0.4	0.4
Average drawdown (>5%)	-8.2%	-9.5%	-11.1%	-13.1%	-13.3%
Average time to recovery (years)	1.2	1.2	1.1	1.2	1.0
Average drawdown (>10%)	-12.7%	-16.3%	-18.3%	-18.8%	-23.6%
Average time to recovery (years)	1.7	2.1	2.0	1.9	1.9
Max drawdown	-18.5%	-19.5%	-29.4%	-38.3%	-51.0%
Max drawdown date	9/30/2022	9/30/2022	2/28/2009	2/28/2009	2/28/2009
Max drawdown: time to recovery (years)	3.3+	2.5	2.9	3.3	4.8

Note: As of May 13, 2025. Calculated using monthly data from 1928 to April 2025 for the S&P 500 Index and U.S. 10-year Treasury bonds. + indicates that the profile has not yet fully recovered from its latest drawdown. Source: Robert J. Shiller, Bloomberg, RBC GAM

Focus on opportunity, not just threat of loss

Prospect theory may also explain the most surprising finding in our research. Bengen's 4% rule addressed the risk of running out of money. Exhibit 10, though, brings in the opportunity cost of avoiding significant exposure to equities during the retirement years. The table presents the savings remaining following 30 years of investment in portfolios mirroring the strategic asset mix of our five risk profiles, plus the experience for a portfolio invested 100% in cash. The Balanced profile (60 % stocks/40% fixed income) lasted the full 30-years in 97% of outcomes and left over 4 times the savings available at the date of retirement in half of all cases! The Very Conservative and Conservative profiles, with equity exposure ranging from 25% to 40% delivered lower volatilities, but also somewhat greater chances of running out of money (10-21%). Here too, substantial surplus savings remain following a 30-year retirement in at least half of all outcomes (i.e. the median experience), but the opportunity cost of carrying lower equity exposure cannot be ignored. Put simply, avoiding the volatility associated with higher equity exposure during retirement years actually increases the threat of running out of money within a 30-year window and massively reduces the residuals left behind.

Indeed, an all-cash portfolio is the most dangerous, surviving 30 years of retirement in less than 1/5 of outcomes.

The post-war data indicates that for those with expected retirement periods stretching beyond 3-5 years, maintaining significant exposure to equities should be a primary consideration.

To be clear, we are not advocating for the immediate commitment of all cash reserves to equities or even bonds. Some stock markets are unusually expensive, including the NASDAQ and large parts of the S&P 500. Bonds, too, are no longer as attractively priced after rallying from near 5% late in 2023 and again in the spring of 2025, especially with inflation still unsettled. Valuations cannot be ignored as history shows that, at least for stocks, long-term returns are largely a function of valuations at the investment date – the higher the valuation, the lower the ultimate return. Our own models indicate somewhat below normal returns for stocks and bonds going forward, something like 6.5% for global stocks, 4.1% for bonds and 5.5% for a traditional 60/40 balanced fund.

Nevertheless, threats to the global expansion appear to be receding, and fears of tariff-induced inflation are moderating. Stocks have been resilient in the face of heightened geopolitical tensions and not all are expensive. In particular, equity markets of the United Kingdom, Europe, and emerging markets remain attractively priced.

This research indicates that a greater risk than owning stocks now and accepting below normal returns going forward would be to have less than 50-75% of retirement savings invested in stocks at all times, unless one is highly skilled at tactical asset allocation. For cash-heavy investors with the risk appetite to accept volatility and the ability to look past large periodic drawdowns, we encourage thinking about a program to shift that into risk assets at whatever pace they are comfortable with, and to be opportunistic during the corrections that will inevitably appear through the stock market's long grind higher.

Exhibit 10: $1,000,000 starting portfolio value, withdrawing $40,000/year adjusted for inflation

		Portfolio ending value after 30-year investment horizon				
Portfolio name	**Portfolio mix**	**5th percentile**	**Median**	**95th percentile**	**Probability of success**	**Probability of failure**
All cash	100% cash	-$1,352,758	-$357,047	$655,840	19%	81%
Very conservative	25% stocks/75% bonds	-$874,480	$855,619	$7,508,879	79%	21%
Conservative	40% stocks/60% bonds	-$264,903	$2,228,026	$9,244,444	90%	10%
Balanced	60% stocks/40% bonds	$391,411	$4,539,046	$11,583,913	97%	3%
Growth	75% stocks/25% bonds	$537,163	$7,001,440	$13,580,525	99%	1%
Aggressive growth	100% stocks	$386,250	$10,846,817	$21,915,601	97%	3%

Note: As of May 13, 2025. Calculated using monthly data from 1946 to 2023 for the S&P 500 Index and U.S. 10-year Treasury bonds. Success represents a portfolio that has a positive ending value after 30 years. Failure means the portfolio ran out of money before the end of the 30-year investment window. Source: Robert J. Shiller, Bloomberg, RBC GAM

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