

The Retirement Portfolio



How portfolio distributions (should) change investing



NATE BYERS, CPA/PFS

Nate@CalcWealth.com

Calculated Wealth

Last updated: October 2022

TABLE OF CONTENTS

Introduction.....	3
What everyone wants from their portfolio	4
Committing to your investment process.....	5
Confident cash flow	7
What is a safe withdrawal rate?	8
Buy-and-Hold Investing and Safe Withdrawal Rate Research.....	9
What are the factors that influence safe withdrawal rates?	10
Early Drawdowns	11
A historical example illustrating a sequence of returns	11
What would happen if they took withdrawals?	13
A Risk Management Alternative.....	14
Second level thinking - Dual momentum	17
Trend Can be our Friend.....	19
Summary	23
Disclaimer.....	24

INTRODUCTION

The purpose of this whitepaper is to uncover the inefficiencies of conventional retirement portfolio advice. Conventional investment advice doesn't separate savers from retirees. I believe this conventional approach is dangerous for retirees.

The facts within this whitepaper illustrate why **a retirement portfolio must be treated different**. The rules you used to build your wealth need to be reconsidered when nearing and in retirement.

I conclude the whitepaper with my preference for managing retirement portfolio risk. However, I do not suggest this is the only way to manage the risk.

It's up to you to decide how you choose to manage the risk. How you choose to invest your money is ultimately your responsibility. You need to be aware of the risks inherent within your strategy and stick to that strategy.

There are no perfect investment strategies. All investment strategies involve risk, including the loss of principal.

Nothing is guaranteed. We must live with uncertainty.

You only have one shot at retirement. Increasing your knowledge will boost your confidence.

Greater confidence empowers you to stick to your investment plan.

You won't find my actual investment strategy within this whitepaper due to industry regulations. Instead, the strategy within this whitepaper is a publicly available strategy that represents the idea behind the strategies that I use.

This should not be construed as investment advice. Complete your due diligence on what's best for you to manage your retirement portfolio.

Happy investing!

WHAT EVERYONE WANTS FROM THEIR PORTFOLIO

“RICH PEOPLE ARE JUST POOR PEOPLE WITH MONEY”
- ANONYMOUS

Throughout my career I’ve been blessed with the opportunity to work with families ranging from very low net worth up to 10’s of millions in net worth. Within that range, I’ve also partnered with families with a wide range of financial literacy and confidence.

This diverse experience opened my eyes to a stunning realization.

Everybody wants the same thing from their retirement portfolio.

And no... it’s not just “more money.” 😊

Everybody wants their retirement portfolio to:

- **Maximize Cash Flow early in retirement**
- **Maintain consistent cash flow throughout retirement**
- **Minimize short-term drawdowns (aka portfolio losses)**

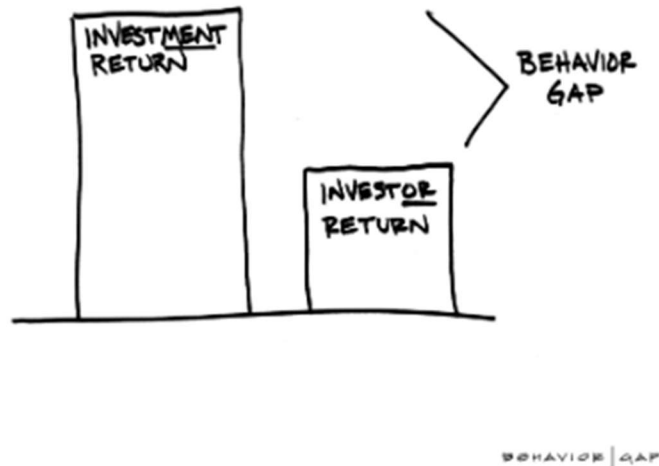
This realization has shaped everything I do in wealth planning. Building your wealth isn't the same as living on your wealth.

Living on your wealth requires different financial and emotional solutions. These are the solutions that are outlined in this whitepaper.

COMMITTING TO YOUR INVESTMENT PROCESS

Each year Dalbar runs a survey of individual investment returns versus market returns. The survey finds a stunning gap between investors' underperforming market returns.

This gap is known as the behavior gap.



Why does this gap exist? I believe it's because most people focus on investment products, and not on an investment process. If you've ever asked the questions, what's a "good investment" then you've fallen into the trap of focusing on the product over the process.

It's OK, this is entirely normal. In fact, taking a process focused approach is hard.

To trust an investment process, you either need to take your time to learn about it, or you must find someone who understands the process and you trust them to implement it.

Investment success requires commitment, so before you invest, you might want to recite the traditional wedding vow.

"I take thee to be my wedded husband/wife, to have and to hold, from this day forward, for better, for worse, for richer, for poorer, in sickness and in health, to love and to cherish, till death do us part, "

Traditional wedding vow

The advantage of marriage is that you get to date before you commit. This test drive might give you an idea of whether it's worth sticking with that person through good times and bad.

With investing, we don't have to "date" different investment processes. We have the benefit of a large data set and financial history to rely on as our guide. We can look at the past to understand market dynamics.

It gives us an opportunity to look in to review mirror to understand how your investment process would have behaved in a similar market environment.

Once you see how it acted in prior markets, you can decide if that's a "marriage" you're willing to commit to. For example, if this strategy is known for losing 30% in big bad bear markets, then you shouldn't be surprised when it does it again. If you know that going into the process, then you shouldn't look to "divorce" it once it does what you knew it would eventually do.

Point in fact, take a step back and learn how your investment process might act in the future before committing to it. If you can't handle what you see the rear-view mirror, you either need to change your mindset going forward or find a strategy that better fits your view on the world.

Don't become another "behavior gap" statistic.

CONFIDENT CASH FLOW

The happiest retirees have a confident cash flow plan. A confident cash flow plan doesn't mean it's bulletproof. The future is unknowable. Uncertainty is never eliminated.

Throughout our careers, we become accustomed to a consistent paycheck. Certain professions and business owners might experience some spending volatility, but overall, there is a bit of consistency attached to it. Business owners who live their life with volatile cash flows from the business are typically OK with it because they control it.

Volatile or "lumpy" paychecks are a lot different when you know your future action will create some future payment. We may not like it, but when we're in control we accept it.

Many retirees feel a loss of control once their cash flow comes from their portfolio. Our desire for consistent cash flow is what makes certain annuities, rental real estate, pensions, and Social Security so attractive.

Since the annuity industry is filled with a lot of bad information, most sophisticated investors are skeptical including them as a valid option. Annuities are outside the scope of this whitepaper, but they do serve a valid purpose... when done correctly.

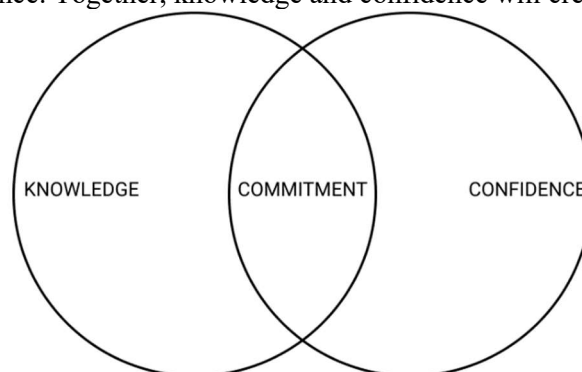
Business owners often gravitate to rental real estate. This is primarily because they are familiar with real estate and understand it. It's also because they are seeking cash flow and don't have access to pensions just like most professionals and executives.

Every worker is entitled to Social Security. However, Social Security isn't sufficient to fund most families' entire lifestyles.

In the end, you're most likely going to need a retirement portfolio if you've successfully accumulated wealth. Knowing this, you must be prepared to convert your retirement portfolio into a confident cash flow.

Confident cash flow in retirement is difficult since most families built their wealth because of their unrelated skills and/or luck. The good news is that you can create a confident cash flow plan in retirement. To create a confident cash flow plan, you need knowledge.

Knowledge creates confidence. Together, knowledge and confidence will create commitment.



WHAT IS A SAFE WITHDRAWAL RATE?

Most retirees believe it's safe to create their retirement paycheck from dividends and interest. Living off the income is intuitive.

Unfortunately, living off dividends and interest is not sufficient for a withdrawal plan. First of all, at the time of this whitepaper, dividend yields, and interest rates are near record lows. Creating a meaningful cash flow plan on dividends and interest would require substantial assets.

Even if you have substantial assets, maximizing the yield on the portfolio introduces concentration risk. A portfolio of dividend stocks clusters the group of stocks into a smaller subset of companies, which are subject to specific company risk versus broad market risk.

Concentration risk leads to larger portfolio drawdowns, which as you'll learn later is public enemy #1 of a retirement portfolio.

Sustainable safe withdrawal rates are based on the total return of a portfolio. The total return of a portfolio is the combination of dividends, interest, capital gains, and return on principal.

The idea of safe withdrawal rates was discovered through safe withdrawal rate research. The goal of safe withdrawal rate research was to answer the question:

How much can I spend in retirement without running out of money?

To answer this question, researchers needed to find the "worst date in history" to retire. From that date, they looked at how much a hypothetical retiree could have withdrawn each year before running out of money.

Bill Bengen is the original safe withdrawal rate researcher. He intuitively understood retirees wanted to maintain consistent cash flow. This meant finding an initial withdrawal and providing inflation increases each year. Bill's research uncovered the famous rule of thumb – the 4% rule.

What this meant is if someone retired with \$1,000,000, they could take a \$40,000 withdrawal in year 1. Then in the following years, they would increase the prior year's withdrawal by the inflation rate.

Here is a quick example using a \$1,000,000 starting balance:

- Year 1: \$40,000
- Year 2: \$40,000 + Inflation (ex: 2.3%) = \$40,920
- Year 3: \$40,920 + Inflation (ex: 3.1%) = \$42,189

Bill's research created a lot of interest in the topic. There are dozens, if not hundreds of papers with various iterations.

One of Bill's iterations increased the safe withdrawal rate closer to 4.5%. However, there are some indications that "today's" safe withdrawal rates are closer to 3%.

To keep things simple, **I'm going to use a safe withdrawal rate of 5% throughout most of the analysis within this whitepaper.** The reason I selected 5% is that it is a reasonable withdrawal rate for most of the data set in our research.

A 5% withdrawal rate is not a recommendation.

If you want a deep dive into the various research, consider Wade Pfau's book, [How Much Can I Spend in Retirement](#).

Buy-and-Hold Investing and Safe Withdrawal Rate Research

Safe withdrawal research brought attention to a subject that is critically important to a retiree's success in retirement.

Most safe withdrawal rate research tests fixed and variable withdrawal rate methods.

Fixed withdrawals provide consistent cash flow for retirees. It's also easy to understand and implement.

The downside of fixed withdrawals is that it may lead to the depletion of retirement portfolios earlier than desired. It also doesn't address the retiree's desire to maximize cash flow early in retirement.

Variable withdrawals provide a rule set for maximizing cash flow early in retirement.

The downside of variable spending is that it's more difficult to understand and implement. It nearly guarantees a change in spending at some point. This isn't necessarily bad, most retirees have a natural change in their spending patterns throughout retirement. *See the "go-go, slow-go, and no-go" retirement research.*

Beyond choosing between fixed and variable withdrawal rates, some papers test changes to asset allocation. This research looks at varying the buy-and-hold portfolio's mix of stocks and bonds (i.e., 30/70, 60/40, 70/30, etc.).

The research focused on changes in asset allocation to maintain a US stock and bond mix. The idea is that adjusting the stock and bond mix at different times may increase the safe withdrawal rate.

The reason researchers focus exclusively on only buy-and-hold equities and bonds is because it's much more controlled and straightforward.

You might be wondering, what is buy-and-hold investing? According to Investopedia:

Buy and hold is a passive investment strategy in which an investor buys stocks (or other types of securities such as ETFs) and holds them for an extended period regardless of fluctuations in the market. An investor who uses a buy-and-hold strategy actively selects investments but has no concern for short-term price movements and technical indicators.

The average buy-and-hold portfolio is built on a 60% allocation of US Stocks and a 40% allocation of US Bonds.

In 2012, Michael Kitces summarized [20 years of research](#) on safe withdrawal rates. This included papers on fixed and variable spending as well as adjustments to asset allocation.

The article combines the different factors that influence a safe withdrawal rate. This creates a "layer cake," leading to a safe withdrawal rate.

Michael caveat's this summary the best by stating:

"...many of the factors discussed here were evaluated in separate research studies, and it is not necessarily clear whether they are precisely additive."

Even with that caveat in mind, there is a ton of value in understanding how each factor influences your cash flow in retirement.

What are the factors that influence safe withdrawal rates?

1. Controllable → *You 100% control these decisions.*
 - Fees net of expected investment outperformance
 - Buy and hold vs. Tactical Asset Allocation
 - Single country bias vs. Globally diversified portfolio
2. Preference → *Your preference for prioritizing inevitable trade-offs.*
 - Spending flexibility
 - Legacy/Longevity hedge
3. Facts → *These are your facts. You have limited to no control over it.*
 - Tax drag on taxable investments
 - Time horizon
 - Valuation environment

If we focus only on the controllable decisions, what do we see?

Vanguard's founder, John Bogel, said it best "we get what we precisely don't pay for." Lower your fees and increase the amount you can spend on everything else.

The next bullet point includes "fees net of expected investment outperformance. This is also known as "alpha." To receive alpha, an investor must use an active trading strategy. Investors who choose a passive buy-and-hold strategy cannot receive alpha. The objective of buy-and-hold investing is to receive market returns before fees. Therefore, expecting alpha is only valid if you're using a sound investment plan.

The final two factors are

- Buy and hold vs. Tactical Asset Allocation
- Single country bias vs. Global diversification

Which choices increase your withdrawal rate?

- Tactical Asset Allocation – 0.20%
- Global diversification – 0.50%

Why do these choices increase your withdrawal rate?

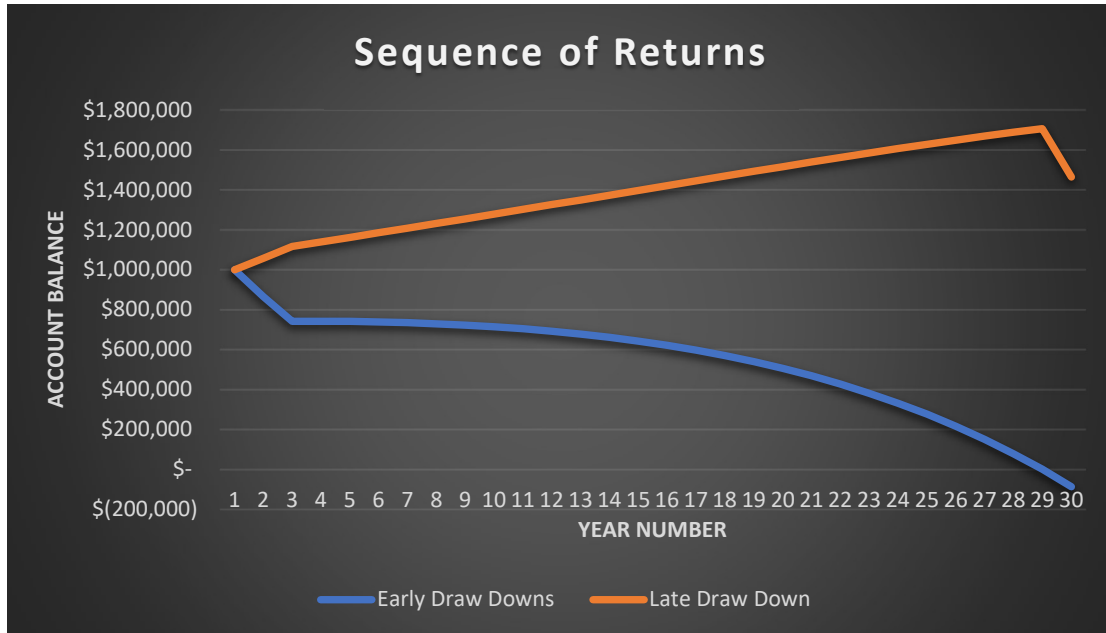
The answer lies in the detailed understanding of the nature of sequence of returns risk.

EARLY DRAWDOWNS

Sequences of returns risk is the risk of receiving lousy investment returns early in retirement.

Here is a simple 30-year example:

- The Orange and Blue lines both:
 - Start with a \$1,000,000 balance
 - Withdraw \$50,000 in year one, then increase by 2.25% each year after
 - Grow by 8.5% in years 3 through 28
- The Blue line starts with a 10% **loss** in years 1 and 2. In years 29 and 30, it grows by 10%.
- The Orange line starts with a 10% **gain** in years 1 and 2. In years 29 and 30, it declines by 10%.



No market indices, index funds, or actual investments were used in this analysis. The rate of return and inflation rate was created for illustrative purposes only.

As you can see, the results are dramatically different. Both portfolios averaged 7.37% returns.

One portfolio ended with more than it started. The other went negative before year 29.

The example above uses simple, hypothetical returns to set the framework. Unfortunately, the sequence of returns risk isn't just a cute academic exercise.

A historical example illustrating a sequence of returns

Rita and Chase each have \$1 Million. They don't need to spend it since they plan on living on their pension and Social Security income.

Rita has never liked the ups and downs of the market. Even though she's not planning on spending the money she still chooses to use a less volatile strategy.

Rita is smart and has researched different investment strategies. She understands the importance knowledge plays in committing to an investment strategy.

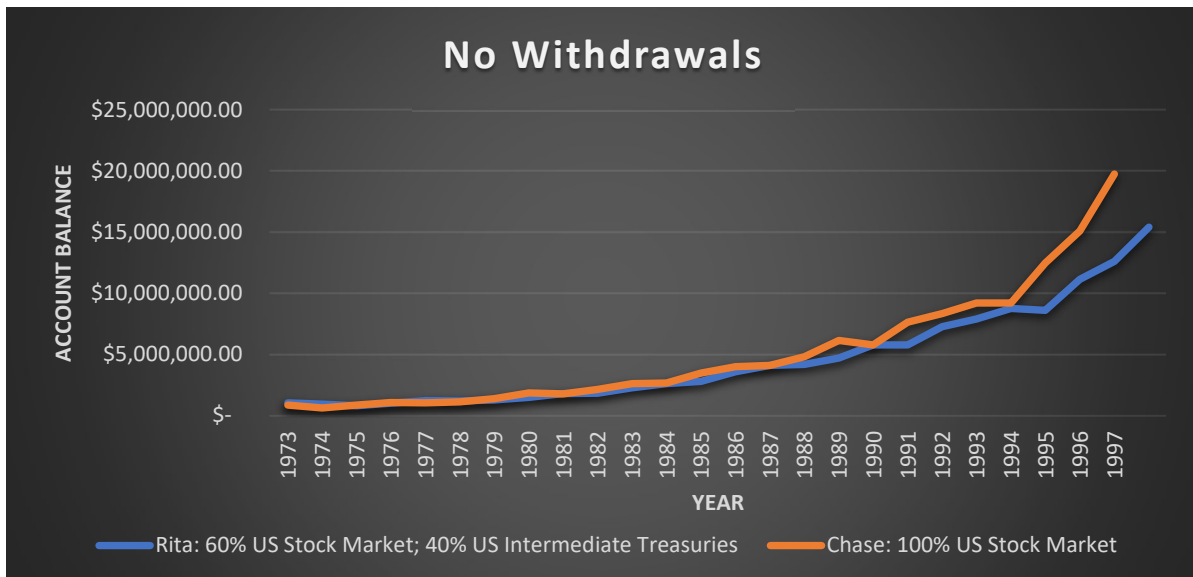
She decides that a strategy that combines stocks and bonds is best for her. She's willing to sacrifice the growth of her portfolio since she knows the combination will reduce the downside.

Chase has built his wealth using his favorite stock fund and has an iron stomach to stick through down markets.

He chooses to invest his money just like he did throughout his career.

Chase's bet pays off. His average return is 1.88% more than Rita's.

Rita receives 12.07% while Chase receives 13.95%. This bet earned him over \$4 million more than Rita.



For illustrative and educational purposes only. This chart is being presented to show the results of two hypothetical portfolios from January 1973 to December 1997. It does not represent the performance of any Calculated Wealth portfolio or investment strategy. Returns assume the reinvestment of all distributions and do not reflect trading costs, transaction fees, commissions, or actual taxes due on investment returns. Investing involves risk, including possible loss of principal. Past performance is not indicative of future results. Nothing herein should be interpreted as personalized investment advice.

US Stock Market is represented by AQR US MKT Factor Returns 1972-1992 (AQR Data Sets) and Vanguard Total Stock Market Index Fund (VTSMX) 1993+. US Intermediate Treasuries are represented by FRED Interest Rate Data (5-year maturity) 1972-1991 and Vanguard Intermediate-Term Treasury Fund (VFITX) 1992+.

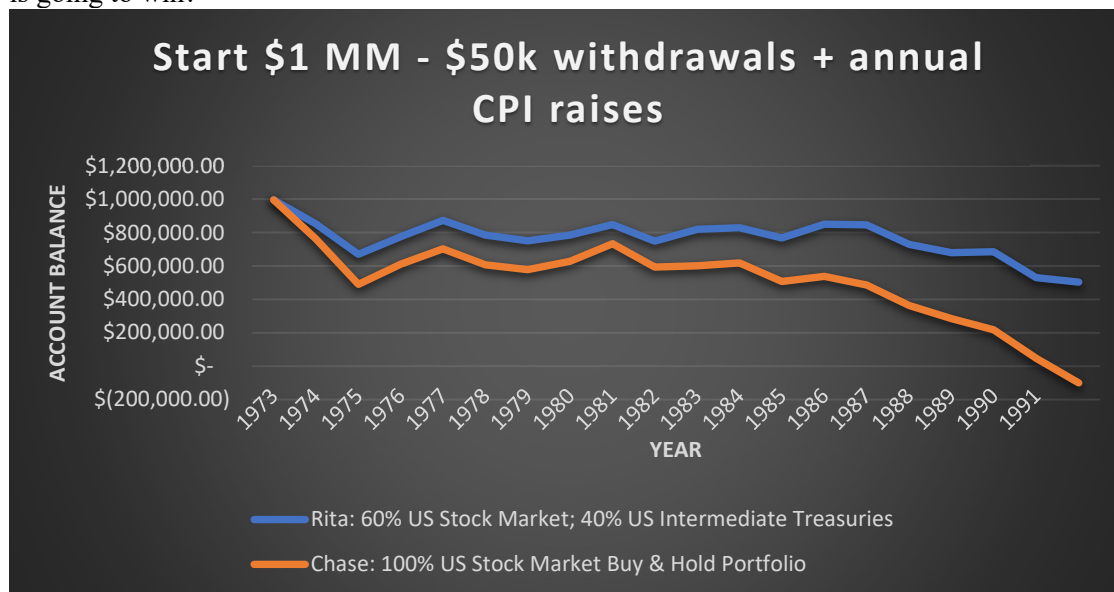
Chase's annual return was also higher than Rita's return, 16 out of 25 years return. He won nearly two out of every three years. Congrats Chase!

The results here align with the basis of classical portfolio management. Accepting more risk is required to receive maximize long-term wealth.

What would happen if they took withdrawals?

Now let's assume Rita and Chase need to withdraw from their portfolio. Rita will keep her portfolio that averaged 12.07%. Chase will keep his portfolio that averaged 13.95%.

Who is going to win?



For illustrative and educational purposes only. This chart is being presented to show the results of distributions on two hypothetical portfolios from January 1973 to December 1997. It does not represent the performance of any Calculated Wealth portfolio or investment strategy. Returns assume the reinvestment of all distributions and do not reflect trading costs, transaction fees, commissions, or actual taxes due on investment returns. Investing involves risk, including possible loss of principal. Past performance is not indicative of future results. Nothing herein should be interpreted as personalized investment advice.

US Stock Market is represented by AQR US MKT Factor Returns 1972-1992 (AQR Data Sets) and Vanguard Total Stock Market Index Fund (VTSMX) 1993+. US Intermediate Treasuries are represented by FRED Interest Rate Data (5-year maturity) 1972-1991 and Vanguard Intermediate-Term Treasury Fund (VFITX) 1992+. Distributions taken at the end of the period and adjusted by inflation. Inflation is represented by Bureau of Labor and Statistics Consumer Price Index (CPI-U).

When you take distributions from a portfolio, the math completely changes.

Rita and Chase still experience the same average return as before. However, Chase experiences larger drawdowns early in the sequence.

Because large drawdowns happened early in retirement, Chase's account drops and never recovers enough to outpace Rita.

After taking distributions, Rita beat Chase by nearly \$500,000!

Chase averaged 1.88% more than Rita over that time frame. He also had a better return than her 2 out of every 3 years. Wow!

If you were given a crystal ball, would you be able to pass up the portfolio that would yield 1.88% more and outperform over 60% of the time?

A RISK MANAGEMENT ALTERNATIVE

Many academics and practitioners believe the only way to reduce risk is to add more bonds or add other asset classes. While some researchers suggest a dynamic approach to increasing your allocation to bonds.

The next level of risk management is through trend following. Trend following is a systematic, rules-based trading strategy. It trades based on a mathematical discipline. It's also known as tactical asset allocation. For the rest of the whitepaper, I will use "trend-following" as the primary term.

Trend following is primarily the systematic approach to buying rising trends and selling falling trends. The most common rules to determine a trend are Moving Averages and Momentum.

The 200-day Moving Average is the easiest to understand and a good place to start. The 200-day moving average compares the historical price from 10 months ago to the end of month price. If the current price falls below the moving average, conditions aren't favorable, and the position will be sold.

Here is an example of applying the moving average to the Vanguard Total Stock Market Index fund (VTSMX). In this illustration, VTSMX and cash are the only two assets in the investment universe.

Portfolio	Initial Balance	Final Balance	CAGR	Stdev	Best Year	Worst Year	Max. Drawdown
Moving Average Model	\$10,000	\$177,371	10.82%	10.89%	35.79%	-6.99%	-17.57%
Buy & Hold Portfolio	\$10,000	\$168,756	10.62%	15.22%	35.79%	-37.04%	-50.89%



Source: Portfolio Visualizer (see FAQs for data sources). For illustrative and educational purposes only. This chart is being presented to show the impact of using a simple moving average trend following strategy on a portfolio from January 1994 to December 2021. It does not represent the performance of any Calculated Wealth portfolio or investment strategy. Returns assume the reinvestment of all distributions and do not reflect trading costs, transaction fees, commissions, or actual taxes due on investment returns. Investing involves risk, including possible loss of principal. Past performance is not indicative of future results. Nothing herein should be interpreted as personalized investment advice.

Moving average strategy results from Jan 1994 to Dec 2021 are based on 10 calendar month simple moving average of each portfolio asset. The tactical asset allocation strategy is invested in US stocks as represented by the Vanguard Total Stock Market Index Fund (VTSMX) when the adjusted close price of VTSMX is greater than or equal to the moving average, otherwise, the specific portfolio allocation is invested in Cash (CASHX). Tactical asset allocation strategy trades are executed using the end-of-month close price each month based on the end-of-month signals. The time period was constrained by the available data for Vanguard Total Stock Mkt Idx Inv (VTSMX) [May 1992 - Apr 2022].

The blue line represents flipping the assets between VTSMX and cash whenever the moving average for VTSMX is below its 200-day price. In other words, when VTSMX is at or above the 200-day moving average, it holds VTSMX. Whenever it's below its 200-day moving average, it holds cash.

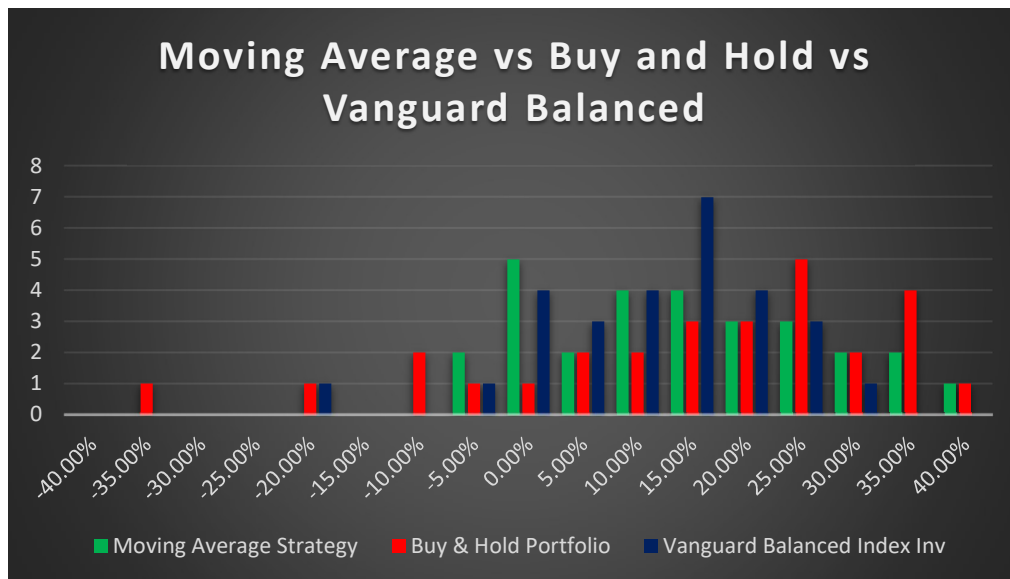
This rules-based strategy returned 10.82% while buying and holding the VTSMX returned 10.62% before transaction costs and taxes. If the investment was held in a tax-favored account like an IRA, then the net tax result would be the same between the two options. In the sample tested it averaged up to 1.5 trades per year so it would have had minimal trading costs.

What you get is a similar return with less than half the drawdown.

By applying this simple rule, the drawdown of the moving average strategy limited the drawdown to 17.57%. The buy-and-hold investor suffered a 50.89% drawdown.

Knowing that drawdowns matter, this is an interesting result. In fact, applying the 200-day moving average to this single equity fund limited the drawdown better than a balanced portfolio.

The chart below compares the US Total Stock Market Index Fund with a 200-day moving average strategy to the US Total Stock Market using a buy and hold system against the Vanguard Balanced Index Fund (VBINX). *VBINX was used in this analysis due to Portfolio Visualizer software limiting VBINX as the "benchmark" portfolio. VBINX is a reasonable proxy for the 60/40 portfolio we've used throughout this whitepaper.*



US Total Stock Market Moving Average		US Total Stock Market Buy & Hold		Vanguard Balanced	
Annualized Return	Annualized Volatility	Annualized Return	Annualized Volatility	Annualized Return	Annualized Volatility
10.82%	10.89%	10.62%	15.22%	8.61%	9.21%
Biggest Loss	-17.57%		-50.89%		-32.57%
Starting Balance (1/1/1994)	\$ 10,000		\$ 10,000		\$ 10,000
Ending Balance	\$ 177,371		\$ 168,756		\$ 101,124

Source: Portfolio Visualizer (see [FAQs](#) for data sources). For illustrative and educational purposes only. This chart is being presented to show the results of three hypothetical strategies. It does not represent the performance of any Calculated Wealth portfolio or investment strategy. Returns assume the reinvestment of all distributions and do not reflect trading costs, transaction fees, commissions, or actual taxes due on investment returns. Investing involves risk, including possible loss of principal. Past performance is not indicative of future results. Nothing herein should be interpreted as personalized investment advice.

Moving Average strategy results from Jan 1994 to Dec 2021 are based on 10 calendar month simple moving average of each portfolio asset. The tactical asset allocation strategy is invested in US stocks as represented by the Vanguard Total Stock Market Index Fund (VTSMX) when the adjusted close price of VTSMX is greater than or equal to the moving average, otherwise, the specific portfolio allocation is invested in Cash (CASHX). Moving average strategy trades are executed using the end-of-month close price each month based on the end-of-month signals. The time period was constrained by the available data for Vanguard Total Stock Mkt Idx Inv (VTSMX) [May 1992 - Apr 2022].

US Total Stock Market - Buy and hold strategy results are based on the Vanguard Total Stock Market Index Fund (VTSMX). Vanguard balanced results are represented by the Vanguard Balanced Index Fund (VBINX).

What do we see?

This simple trend-following strategy achieves a similar return as its buy-and-hold counterpart. It also provided greater downside protection than a standard balanced portfolio.

Combining stocks and bonds is not the only way to reduce portfolio drawdown risk.

SECOND LEVEL THINKING - DUAL MOMENTUM

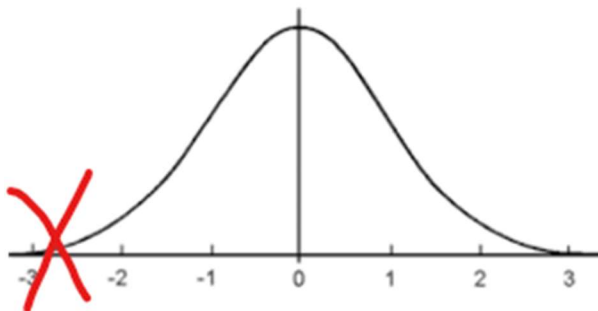
Approaching risk management through the use of moving averages is a fantastic first step. If you can see the value and appreciate how it works, then you're well on your way to becoming an astute risk manager. The next step on your journey is to investigate Dual Momentum investing.

An excellent place to start is through Gary Antonocci's work on Dual Momentum. While I view Dual Momentum as critically important to a good trend following approach, I do not invest my money, nor do I recommend that my clients invest in Gary's publicly available Dual Momentum strategy.

But Gary's publicly available book and research on dual momentum is a great place to start to learn the benefits of trend following.

What makes Dual Momentum great is:

1. It cuts off the left tail in the distribution of returns (i.e., cuts losses early)



2. It allows you to lean heavily into "risk assets" when the risk/reward ratio is at its greatest (i.e., it's lets winners ride).

The best way to understand the value of dual momentum is through Gary's historical performance.

Currently, his backtest runs from January 1950 – to September 2018 ([article here](#)):

	Gary	S&P 500
CAGR	15.8%	11.4%
Annual Std Dev	11.5%	14.2%
Sharpe Ratio	0.96	0.52
Worst Drawdown	-17.8%	-51.0%
Worst 6 Months	-15.7%	-41.8%
Worst 12 Months	-17.8%	-43.3%
% of Profit Months	69%	64%

Earlier I mentioned that trend following cuts off the left tail of distributions.

Left tail returns are typically from Bear Markets.

According to Gary this is how his strategy performed in all bear markets that occurred from January 1950 – to September 2018:

BEAR MARKETS	S&P 500	GARY
Jan 1962-Jun 1962	-22.8%	-15.7%
Dec 1968-Jan 1970	-29.3%	4.3%
Jan 1973-Sep 1974	-42.6%	15.1%
Dec 1980-Jul 1982	-16.5%	16.0%
Sep 1987-Nov 1987	-29.6%	15.1%
Sep 2000-Sep 2002	-44.7%	14.9%
Nov 2007-Feb 2009	-50.9%	-13.1%
AVERAGE	-33.8%	0.9%

Results are hypothetical, are NOT an indicator of future results, and do NOT represent returns that any investor attained. Indexes are unmanaged, do not reflect management or trading fees, and one cannot invest directly in an index.

Remember ... investing always involves risk, including loss of principal. Past results are not indicative of future performance.

You can track Gary's performance in real time at his website:

<https://www.optimalmomentum.com/global-equities-momentum/>

TREND CAN BE OUR FRIEND

Gary's Dual Momentum strategy provided some interesting results. While these results are intriguing, we shouldn't base any investment decision purely on its backtest. The benefit of a backtest is that it can help shape expectations.

In the case of a retirement portfolio, what do backtests tell us about trend following?

Many trend-following investment strategies seek to control drawdown risk. When I look for smart strategies, I seek out ones that have shown the potential to limit drawdowns before including distributions to around 20%. Gary's strategy has done this through his sample period.

The point of this whitepaper is to emphasize the importance of risk management for retirement portfolios. The benefit of trend following is that it cuts off the left tail of the distribution curve. The rules within the strategy de-risk the portfolio when the trend is no longer positive.

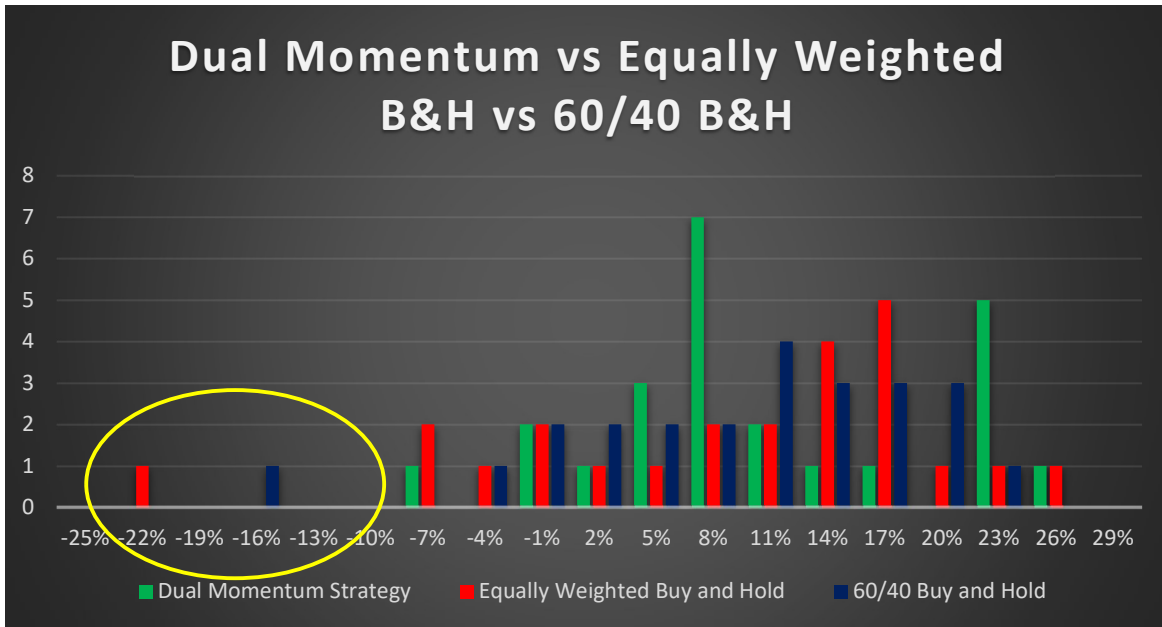
To illustrate this, we can test it out using [Portfolio Visualizer](#). Doing this yourself is a great test to help your understanding. Feel free to try it yourself or just read through it.

Here is a scenario:

- Dual Momentum strategy
- Year-to-Year comparison
- Start: January 1998; End: December 2021
 - Data period is constrained by available data for all assets listed below
- Starting balance: 1,000,000
- Cashflow: Withdraw \$50,000 per year inflation-adjusted using annual CPI-U
- Asset selection:
 - Vanguard Total Stock Market Index Fund (VTSMX)
 - Vanguard Developed Markets Index Fund (VGTSX)
 - Vanguard Intermediate-Term Treasury Index Fund (VFITX)
 - Cash (CASHX)
- Trading rules: Based on standard practices
 - 10-month timing period
 - Excluding the previous month in the return calculation
 - Trade at end of month

Using the facts above we compare the results of the Dual Momentum strategy and the equally weighted portfolio. The equally weighted portfolio holds 33% VTSMX, 33% VGTSX, and 34% VFITX through the testing period. This portfolio is then rebalanced back to target at year-end.

Here are the results:



Source: Portfolio Visualizer (see FAQs for data sources). For illustrative and educational purposes only. This chart is being presented to show results of three hypothetical portfolios. It does not represent the performance of any Calculated Wealth portfolio or investment strategy. Returns assume the reinvestment of all distributions and do not reflect trading costs, transaction fees, commissions, or actual taxes due on investment returns. Investing involves risk, including possible loss of principal. Past performance is not indicative of future results. Nothing herein should be interpreted as personalized investment advice.

Assets Traded: Vanguard Total Stock Market Index Fund (VTSMX); Vanguard Developed Markets Index Fund; Vanguard Total Bond Market Index Fund. Date analyzed – January 1998 – December 2021. The results of the dual momentum strategy are based on holding the top 2 best performing assets. Absolute momentum-based trend following filter is used to switch any selected assets that have a negative excess return over the risk-free rate to Cash (CASHX). The strategy uses a single performance window of 10 calendar month(s). Most recent month in each lookback window is excluded in momentum calculations. Trades are executed using the end of month close price each month based on the end of month signals. The Equal Weight strategy owned 33% VTSMX, 33% VGTSX, and 34% VFITX. The 60/40 strategy is represented by 60% VTSMX and 40% VFITX rebalanced annually.

Above is a chart that compares the following:

- Red bars are the Vanguard Total Stock Market Index Fund on a buy and hold basis
- Blue bars are split evenly between the Vanguard Total Stock Market Index Fund, Vanguard Developed Markets Index Fund, and Vanguard Total Bond Market Index fund. These three funds are rebalanced annually to their equally weighted buy and hold strategy.
- The green bars represent the same three funds in the blue bars. However, the dual momentum rule set drives the decision to hold the asset. At any given time, the hypothetical portfolio will own 2 of the three funds. It might own one fund and will never own all three funds.

Observe how the left side of the chart doesn't include any dual momentum results. The strategy successfully cut off the left tail of returns in the sample tested. Next, see how the green bars are clustered tightly in the middle returns ranging from 2 – 17%.

You're thinking, OK, cool, but who had the best return?

	Dual Momentum Strategy	Equal Weight Strategy	60/40 Strategy
Start Balance	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000
End Balance - No Withdrawals	\$7,940,681.92	\$5,135,422.86	\$6,077,650.00
End Balance - \$50k Withdrawals + Annual inflation increases	\$3,287,504.76	\$1,258,805.06	\$889,595.80
No Distribution Rate of Return	9.02%	7.06%	7.81%
\$50k Distribution Rate of Return	5.08%	-1.31%	-0.49%
Maximum Drawdown (including distributions)	-21.32%	-41.94%	-38.82%

Each portfolio starts with \$1,000,000. We compare the ending balance with no withdrawals against \$50,000 annual withdrawals adjusted each year for inflation.

Without withdrawals, the ending portfolio value of the dual momentum strategy is 1.5x the equal weight portfolio. When accounting for withdrawals, the ending portfolio value is 2.6x more significant than the equivalent weight portfolio. If you run this same test and go to bonds instead of cash, the results are even greater.

Don't get caught up in the results for no withdrawals. Focus on the results when there are withdrawals. This is what I believe is the key to a successful retirement income portfolio. To expand that analysis, let's look at the most recent 12-month worst-case drawdown scenario of March 2008 to February 2009.



Source: Portfolio Visualizer (see FAQs for data sources). For illustrative and educational purposes only. This chart is being presented to show the impact the March 2008 – February 2009 drawdown for three hypothetical portfolios. It does not represent the performance of any Calculated Wealth portfolio or investment strategy. Returns assume the reinvestment of all distributions and do not reflect trading costs, transaction fees, commissions, or actual taxes due on investment returns. Investing involves risk, including possible loss of principal. Past performance is not indicative of future results. Nothing herein should be interpreted as personalized investment advice.

Assets Traded: Vanguard Total Stock Market Index Fund (VTSMX); Vanguard Total International Stock Index Fund (VGTSX), and Vanguard Intermediate-Term Treasury Index Fund (VFITX). The results of the dual momentum strategy are based on holding the top 2 best performing assets. Absolute momentum-based trend following filter is used to switch any selected assets that have a negative excess return over the risk-free rate to Cash (CASHX). The strategy uses a single performance window of 10 calendar month(s). Most recent month in each lookback window is excluded in momentum calculations. Trades are executed using the end of month close price each month based on the end of month signals. The Equal Weight strategy owned 33% VTSMX, 33% VGTSX, and 34% VFITX. The 60/40 strategy is represented by 60% VTSMX and 40% VFITX rebalanced annually.

Maybe your retirement will be perfectly timed before a long, strong bull run and you won't need the insurance that Dual Momentum has historically provided.

Alternatively, you might retire before the next great bear market where Dual Momentum was a great decision.

Since you can't control what happens to the market when you retire, it's up to you decide if you're willing to live with the risks of buy-and-hold investing or if you want the insurance and assurance from an alternative approach to risk management such as Dual Momentum.

If you decide to change your strategy, make sure you're changing it based on new evidence that contradicts your prior understanding and not becoming a victim of the behavior gap.

Ultimately, it's your retirement plan and you must live with the decision you make. If you see the value in Dual Momentum and would like to learn more, please reach out at any time to discuss (Nate@CalcWealth.com) and/or check out Gary Antonacci's work at (optimalmomentum.com).



SUMMARY

Retirement portfolios must be treated differently. Low-cost buy-and-hold investing is being taught as the only way to invest. Within the literature on buy-and-hold investing you will find many brilliant and simple truths.

Where buy-and-hold investing goes wrong is that it assumes it's equally great for savers and retirees. The math of portfolio distributions and the math of gains and losses proves this a risk not worth taking.

My preference for managing this risk is through trend-following. When done right, trend-following has shown historical success in managing retirement portfolio math.

Trend-following eloquently protects downside risk without sacrificing much of the upside. In fact, the math of gains and losses indicates that it can enhance portfolio returns and extend the portfolio's longevity.

Executing these strategies doesn't require any big brain thinking. It requires relentless execution to be successful.

It's possible there are better investment strategies out there. Through my research I view trend following as the best strategy for retirement portfolios.

Whatever path you choose with your retirement portfolio, I wish you the best.

DISCLAIMER

- The information set forth in this document has been obtained or derived from sources believed by Calculated Wealth, LLC (“The Author”) to be reliable. However, The Author does not make any representation or warranty, express or implied, as to the information’s accuracy or completeness, nor do The Author recommend that the information serve as the basis of any investment decision.
- PAST PERFORMANCE IS NOT INDICATIVE OF FUTURE PERFORMANCE AND INVESTMENTS IN EQUITY SECURITIES DO PRESENT RISK OF LOSS.
- The strategies discussed in this presentation are not appropriate for all investors. The results shown in this presentation are hypothetical and do not represent returns that an investor actually attained.
- No representation is being made that any account will or is likely to achieve results similar to those shown.
- The content of this presentation is provided for informational purposes only, and nothing herein should be interpreted as personalized investment advice. Under no circumstances does this information represent an offer to sell, a solicitation to buy, or a recommendation regarding any securities transaction.
- None of the content in this presentation is guaranteed to be correct, and anything shown here should be subject to independent verification.
- You, and you alone, are solely responsible for any investment decisions that you make.
- The strategies discussed in this presentation are for educational purposes and are provided with the benefit of hindsight and may not perform in the future as they have historically. They do not reflect actual trading by the Author or any of the Author’s clients.
- There can be no assurance that any investment strategy or style will achieve any level of performance, and investment results may vary substantially from year to year or even from month to month. An investor could lose all or substantially all of his or her investment. Both the use of a single adviser and the focus on a single investment strategy could result in the lack of diversification and consequently, higher risk. The information herein is not intended to provide, and should not be relied upon for accounting, legal or tax advice or investment recommendations. Any investment strategy and themes discussed herein may be unsuitable for investors depending on their specific investment objectives and financial situation. You should consult your investment adviser, tax, legal, accounting or other advisors about the matters discussed herein. These materials represent an assessment of the market environment at specific points in time and are intended neither to be a guarantee of future events nor as a primary basis for investment decisions.
- Investors should understand that while performance results may show a general rising trend at times, there is no assurance that any such trends will continue. If such trends are broken, then investors may experience real losses. The information included in this presentation reflects the different assumptions, views and analytical methods of The Author as of the date of this document. The views expressed reflect the current views as of the date hereof and The Author should not be expected to advise you of any changes in the views expressed herein.
- This commentary has been provided solely for informational purposes and does not constitute a current or past recommendation or an offer or solicitation of an offer, or any advice or recommendation, to purchase any securities or other financial instruments, and may not be construed as such. This commentary should not be considered as investment advice or a recommendation of any particular security, strategy or investment product.
- This document does not reflect the actual performance results of any investment strategy or index currently run Calculated Wealth LLC or its affiliates.