

An Integrated Framework for Saving, Investing and a Sustainable Retirement

Synopsis

We contrast traditional approaches to saving, retirement planning and investing with new techniques that may dramatically ease the savings burden for working professionals while maintaining a high level of confidence in retirement sustainability. Specifically, we illustrate how a Value Averaging approach dominates the well-known Dollar Cost Averaging approach to incremental saving. Retirement plans designed with simplistic return and lifespan assumptions are revealed to be highly vulnerable to failure. We also offer evidence that Strategic Asset Allocation is a sub-optimal investment framework and demonstrate how a Dynamic Asset Allocation approach can improve investment performance by as much as 300% when adjusted for risk.

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Introduction

People seek advice from Financial Planners and Investment Advisors for an almost infinite variety of reasons, but this essay will deal with saving, investing and retirement planning because optimal techniques in these domains apply to almost everybody in the same way.

The solutions we espouse work very well independently, but their real power arises from thoughtful integration. The integrated approach that we advocate facilitates a more robust working lifestyle that lasts throughout retirement. Further, these approaches allow us to quantify your probability of success during each life phase, and provide a roadmap for periodic adjustments to keep you on track.

Let's think for a moment about the challenge of financial planning: we work for many years, during which time we set aside savings to generate a nest-egg that is sufficient to sustain us through retirement. But just how large does our nest-egg need to be? If we set the bar too high, we save too much and miss out on lifestyle opportunities in our working years. If we save too little, say goodbye to travel plans, club

memberships and cottages in retirement.

Our retirement analyzer applies advanced techniques from the pension and life insurance industries to determine the size of your nest-egg liability at the end of your career. Think about this liability as the debt you owe yourself to realize the retirement you deserve. The size of this liability is highly sensitive to lifespan assumptions, inflation, and the portfolio performance assumptions during retirement. Portfolio performance isn't just average returns; the predictability and stability of those returns matters just as much, though this important fact is not addressed at all by most Advisors.

The investment approach we describe below provides strong, highly stable returns, which means a smaller nest-egg will suffice to provide for a sustainable retirement. Further, our savings approach *reverse-engineers* your personal wealth trajectory so that you automatically reach your target wealth at your retirement date, regardless of investment outcomes. If you are able to meet your savings goals, you'll achieve your nest-egg objective.

That's right: you can live a rich life and have a fulfilling retirement, and sleep well all the way along. To learn how, please read on.

Saving

Due to David Chilton's seminal book on retirement saving, *The Wealthy Barber*, most people believe that Dollar Cost Averaging, where a fixed percentage of income is systematically invested on a monthly schedule, is the best savings strategy. Almost all Investment Advisors and Planners also base their saving models on this approach because it is intuitive and simple, and addresses the reality that most people save incrementally on a monthly schedule.

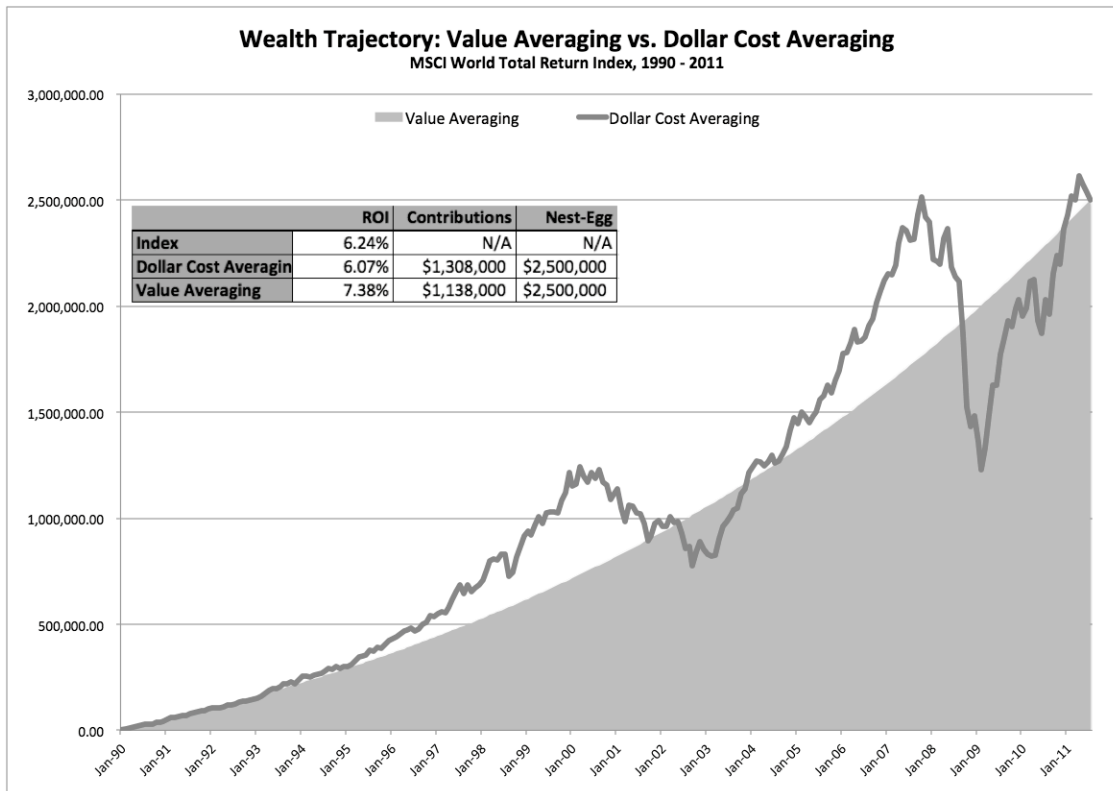
Unfortunately, this approach is sub-optimal because it is highly sensitive to the sequence of investment returns delivered by the underlying investments. That is, one's wealth trajectory depends greatly on whether strong returns occur early or late in the savings phase. This leaves savers extremely vulnerable to poor markets toward the end of their saving horizon, right before retirement.

For most indices over the past 30 years, a dollar cost averaging approach would have delivered substantially lower returns to savers than the actual returns from their underlying investments. This is because the strong returns experienced in the early years of the strategy (the 80s and 90s) would have only impacted the small amount of savings that had accrued in the first few years. In contrast, the poor returns experienced at the end of the saving period during the 2000s impacted the bulk of one's total expected savings.

Fortunately, a saving strategy exists which is mathematically likely to deliver higher returns to savers than might actually be produced by their underlying investments over their saving horizon. This approach, called **Value Averaging**, sets monthly or quarterly wealth targets that are achieved through a combination of savings and investment growth. With this approach, a saver who invests his savings in an index that delivers 6.5% per year over his investment horizon may actually achieve returns on his savings in excess of 7% per year. In contrast, a saver who uses the dollar cost averaging approach might realize returns of just 6% per year.

For example, an investor in a broad global stock market index would have realized a dollar-weighted return on investment of 6.07% using a Dollar Cost Averaging approach over the past 20 years, even though the underlying index delivered annualized returns of 6.24% over the period. Incredibly, a Value Averaging approach would have earned a return on investment of 7.38%.

This means that a person targeting a \$2.5 million nest-egg over the period with a Dollar Cost Averaging strategy needed to contribute \$1,308,000 in savings to their plan, while a person using a Value Averaging strategy only required savings of \$1,138,000. **The difference amounts to extra disposable income of \$8,500 per year!**



Source: Butler|Philbrick & Associates, MSCI Inc.

Also, because Value Averaging means you know your exact wealth trajectory in advance, you will meet your target. A dollar cost averaging approach sets a savings target that is a fixed proportion of

income, and leaves the outcome to chance, which means you could end up saving and sacrificing for your entire working life but still fall short at retirement.

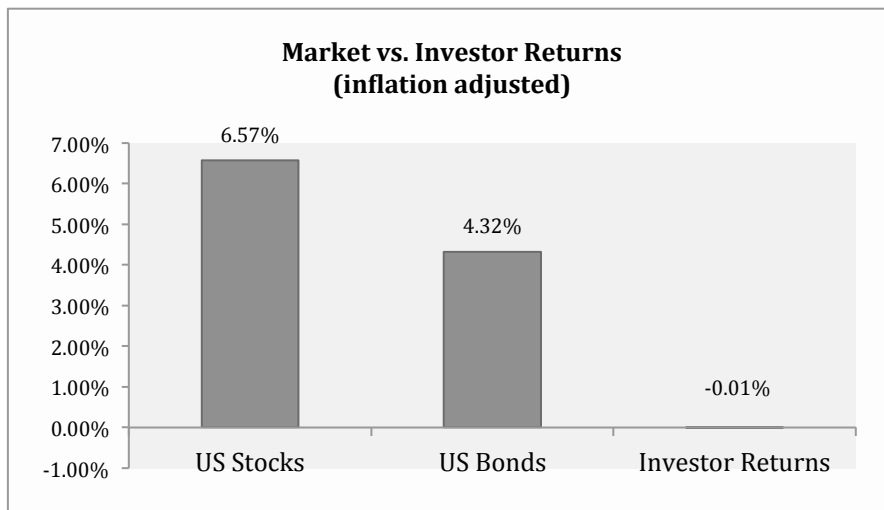
Retirement

This topic is a minefield. Most Planners and Advisors know just enough to be dangerous to clients. The vast majority of plans are destined to fail catastrophically for 3 reasons:

1. Investors Don't Get Market Returns

U.S. stock and bond markets have delivered returns of 6.6% and 4.3% per year respectively, after inflation, for the past 20 years. For this reason, most Advisors build this return expectation into

retirement plans. Unfortunately however, the average balanced investor has realized no net returns after inflation over the same period.



Source: Dalbar: *Quantitative Analysis of Investor Behaviour*, 2011

This alarming disparity results from three critical factors:

Fees

Fees are inescapable but can be minimized, especially in areas where the investment industry has proven that it cannot add any measurable value. Specifically, investors should not pay for traditional fundamental-based active management. Most mutual funds and portfolio managers fall into this category; they have no demonstrated ability to beat their index over any meaningful horizon, so investors should just invest in indexes directly using Exchange Traded Funds (ETFs), or indexed mutual funds for a negligible fee. Then the question becomes, which indexes and when? We'll answer that in the section on investing below.

Bad Advice

Most Advisors focus on stock selection despite insurmountable evidence that investors should focus on asset allocation. This misguided attitude arose during the long and strong bull market of the 1980s and 1990s, and was perpetuated by mutual fund companies and investment firms because they earn most of their money from selling stocks and stock mutual funds.

This mistake is compounded interminably because of the misapprehension that they should make investment decisions on the basis of forecasts from analysts, strategists or economists. While some analysts and strategists are demonstrably better than others Philip Tetlock, James Montier and a score of other researchers have proved beyond a doubt that, in absolute terms, no one is any good at forecasting. Therefore it makes no sense to use forecasts to make investment decisions.

Nevertheless, this is the illusion under which most participants in the investment industry operate, which makes it easy for smart investors to eat their lunch.

Behavioural Flaws

Investors are partly to blame for their own poor performance. They tend to select Advisors based on factors that have no correlation with investment acumen, such as:

- Friendships
- Proximity
- Likeability or charisma
- Media appearances
- Professional association endorsement

Investment Advisors are not accountants, lawyers or doctors. These professions require years of education, internship, and extremely challenging professional examinations. In contrast, Investment Advisors run the gamut in terms of qualifications. At one end of the spectrum, an Advisor can have no university education, pass the simple Canadian Securities Course and Conduct and Practices Handbook Course, spend 6 months under supervision and then manage peoples' retirement savings.

At the other end, an Advisor might have an advanced academic or professional degree, such as a Masters in Finance or CFA Charter, be an Accredited Investment Fiduciary and a registered Portfolio Manager, a combination requiring many years of mastery and study. Investors would do well to learn about these differences and seek out qualified professionals.

Further, all investors fall prey to deleterious cognitive and emotional

biases that cause them to make poor investment decisions, especially under pressure. They chase hot sectors and stocks at the wrong time, or follow tips from a friend in the mining (or healthcare, or retail...) business. They capitulate under duress at market bottoms, turning paper losses into permanent wealth impairment. They hold onto losers in order to 'get their money back', and sell winning investments too soon to avoid losing paper gains.

Investors are overconfident, do not understand the odds, fall victim to the availability heuristic, fear losses more than they appreciate gains, are unduly influenced by social pressure and informational cascades, embrace the narrative fallacy, and mistake information for knowledge. The only way to avoid these destructive biases is to set and follow an investment plan that helps you avoid situations where you are likely to make bad choices. We'll discuss one such approach below.

2. Retirement Plans Do Not Account for Uncertainty

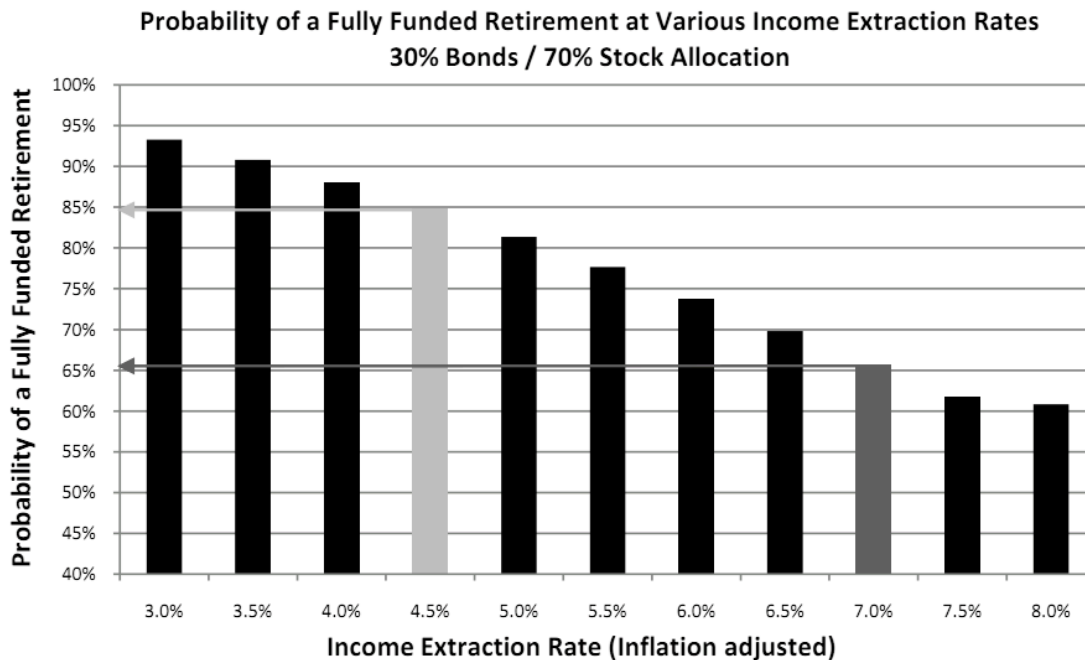
Most plans model linear returns over a fixed lifespan. That is, most plans assume returns to portfolios of 6 or 7%, year after year, with no fluctuations. Further, they plan through a fixed lifespan of 85 or 90.

Unfortunately, these are very dangerous assumptions. Markets fluctuate - a lot - and this has an enormous impact on retirement sustainability. Further, lifespan is random. No one lives to age 85 exactly. For a random married couple, there is a 40% chance at least one member of the couple will be alive at age 90.

Market fluctuations can be quantified using a mathematical construct called volatility, and lifespan is easily modeled using Statistics Canada lifespan tables. By

introducing these two dynamics to the retirement planning process, it is possible to define the probability of retirement sustainability.

A retirement plan that is constructed using typical assumptions and techniques involving fixed returns or lifespan has between a 35% and 50% chance of failure. For example, a traditional plan that assumes 7% returns, 3% inflation, and a 20-year lifespan after retirement would suggest a retiree can extract 7% per year from their portfolio (pre-tax). Even using the same average assumptions, once we account for the actual variability of lifespans and returns, we discover that the actual safe extraction rate is closer to 4.5%, with an 85% chance of success.



Source: Moshe Milevsky, "A Sustainable Spending Rate without Simulation", Financial Analysts Journal, 2005;
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3. No Framework to Adapt

As time goes on, an increasing portion of retirement unknowns become known. As a result, retirement plans should be revisited each year to make sure that plans are optimized for all new information. For example, if a person's retirement portfolio undergoes a major change, such as in 2008 when stocks dropped by 30% or more, then a plan that was sustainable at the 80th probability percentile at the end of 2007 might finish 2008 with only a 70% probability of success. This would likely compel a change in planning expectations where the retiree would slightly lower his

monthly income draw to ensure sustainability at a more comfortable probability threshold.

A plan that does not address all three of these factors has a dangerously high likelihood of failing. Unfortunately most Advisors and planners are not equipped with the training or tools required to account for these factors in retirement planning analysis. This will almost certainly change over the next few years as new research trickles down to the troops, but you don't have time to wait.

Investing

The investment universe is broad and deep, but for simplicity we divide it into two simple categories: assets and commodities.

Assets are claims on future cash flows, or the opportunity to generate the same. For example, stocks are claims on the residual free cash flow generated by a corporation after it pays all of its taxes, interest and preferred dividend obligations. Bonds are claims on interest payments. Rental property is a claim on rent payments. The current value of an asset is (*theoretically*) based on the discounted value of all future cash flows. Assets therefore have positive expected returns over the very long term almost regardless of the price paid, though those returns may be infinitesimal if the price is high enough.

Commodities do not generate intrinsic

cash flows. They are valuable only to the extent that profit can be made from transforming the commodity into a consumable. Speculators play a key part in setting the price of commodities because their price is set at the margin. That is, the last buyer (price setter) or seller (price taker) sets the price at which all inventories (and portfolios) are valued worldwide. Speculators' expected returns from holding commodities is purely a function of what they expect a 'greater fool' to pay in the future. Prices of commodities are mean reverting over the long-term as higher prices incentivize more exploration and production, and eventually greater supply forces prices to decline.

Commodities and gold also serve as a hedge against inflation. This is because dollars can be printed far more quickly and easily than a pound of copper, a

barrel of oil, or an ounce of gold can be extracted and processed for use. Over the long term, commodity prices rise as a function of the differential in the rates of 'production' between currencies and commodities. For this reason, despite their long-term zero-sum expected returns, commodities are a worthwhile part of a diversified portfolio because they will hold their value against inflation. This asset classification framework is distinct from the traditional approach, which typically considers just stocks, bonds and cash.

We espouse an approach based on a variety of extensions to the basic framework for portfolio optimization outlined by Harry Markowitz in 1967, and used in crude form by 99.9% of all professional investment managers around the world today. Markowitz derived equations for combining investments in such a way that a diversified portfolio of assets is able to deliver better risk-adjusted returns than any asset on its own. These equations form the foundation of Modern Portfolio Theory.

Markowitz' standard approach to asset allocation uses very long-term *average* returns, risk, and cross-asset correlations for all assets in the investment universe. Under the traditional application of his framework these parameters are then used to generate a **Strategic Asset Allocation** that sets the long-term target dollar proportions for each asset class in a portfolio. These proportions are typically held constant over time, and the portfolio is rebalanced annually back to the target allocations, leaving shorter-term gyrations in volatility and correlations unaccounted for.

The critical flaw in traditional portfolio management based on long-term average metrics is that the averages mask an enormous amount of fluctuation over time. Because the Strategic Asset Allocation (SAA) approach does not adapt regularly to changes in expected returns, volatility and correlations, our research suggests that this traditional approach captures only about 50% of the 'low-hanging' performance potential that is available from a diversified investment universe. Unfortunately, this is all that the vast majority of investors, even sophisticated institutional investors, have the tools to extract.

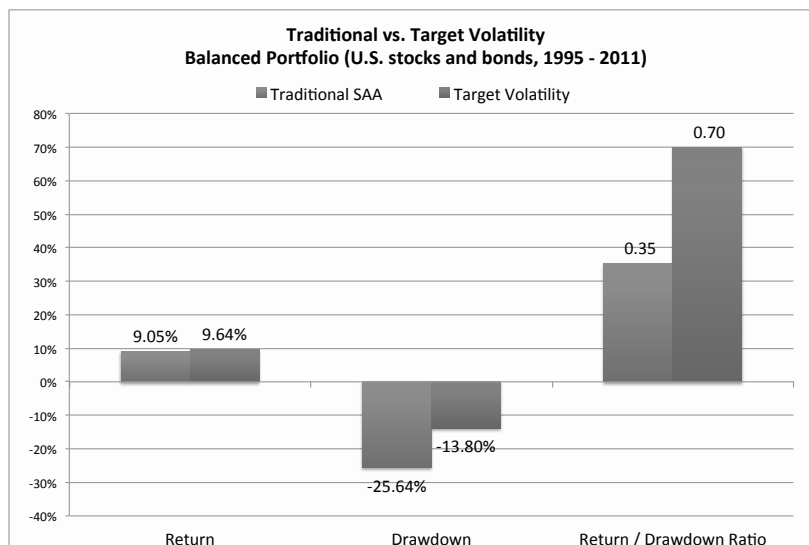
Dynamic Asset Allocation is an investment approach that constantly observes changes in expected returns, volatility and correlations for each asset under consideration for investment, and adapts portfolio composition regularly in response. This technique is a practical extension of the Adaptive Markets Hypothesis (AMH), a relatively new theory of markets put forth by Andrew Lo at MIT. AMH is an attempt to reconcile the math of Modern Portfolio Theory with the failings of the Efficient Markets Hypothesis exposed by Behavioural Economics.

An enlightened interpretation of the AMH identifies market volatility as a measure of investor uncertainty and financial instability. Research proves that an asset's volatility rises near market tops and during market drops, and then contracts into stable upward trends. Our testing shows that total portfolio performance improves when aggregate portfolio risk is actively controlled by

contracting and expanding portfolio allocations in response to expanding and contracting volatility. **In fact, on average a simple technique that controls for portfolio volatility improves portfolio performance by over 100% versus traditional SAA when adjusted for portfolio risk.**

return/risk ratios for simple balanced portfolios of U.S. stocks and bonds using both traditional SAA and a targeted volatility approach. We use drawdown as our risk measure because it matters most to investors. It is simply a measure of the maximum amount that the portfolio dropped in value from any peak-to-trough.

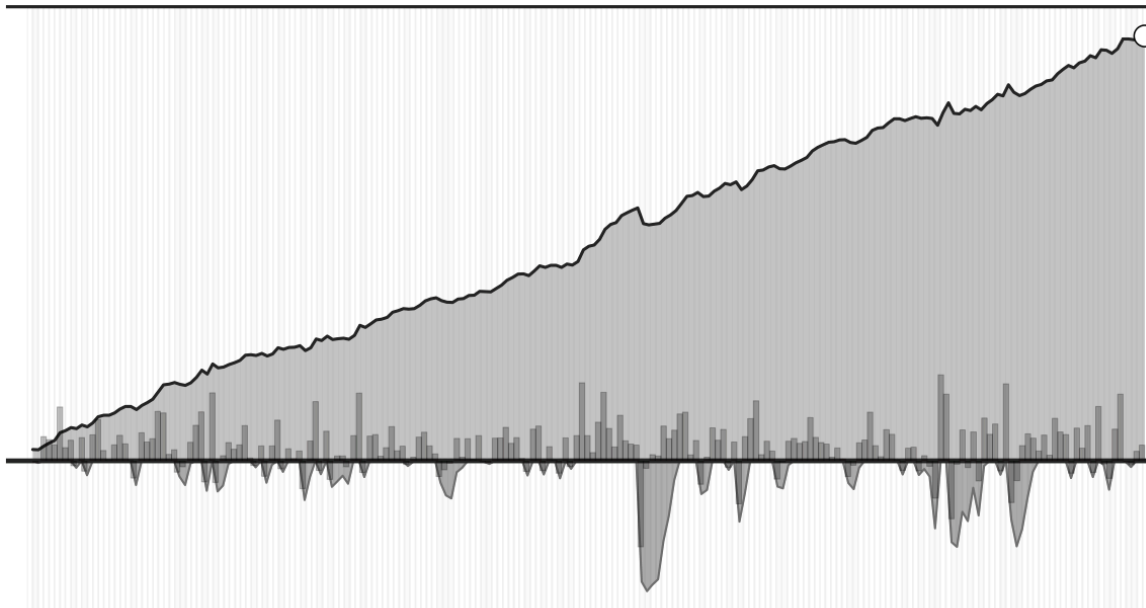
The chart below provides return, risk and



Source: Butler|Philbrick & Associates

Dynamic Asset Allocation really finds its oats when you expand the available asset class universe to include other major international stock markets, commodities, gold, and global real estate assets. This broader universe enables the portfolio to capture returns that are occurring anywhere in the world, and offers maximum diversification benefits. The chart below is an example of how powerful this combination of techniques can be.

You will notice that over the same period from 1995 through 2011 a portfolio that leverages all of the tools of Dynamic Asset Allocation delivered performance of 14.82% per year (see **CAGR** in the chart below) while never dropping more than 11% from peak to trough. The return / drawdown ratio (“MAR” on the chart below) is 1.35, almost 300% better than the same ratio for a traditional balanced portfolio of stocks and bonds.



Curve		Trade		Time	
Total Return	947%	Trade Winning %	60%	% Winning Months	75%
CAGR	14.82%	Average Trade	0.51%	Average Winning Month	2.07%
Sharpe	2.16	Average Win	2.57%	Average Losing Month	-1.42%
DVR	1.98	Average Loss	-2.52%	Best Month	7.37%
MAR	1.35	Win/Loss Ratio	1.02	Worst Month	-8.53%
Max Daily Drawdown	-11.01%	Best Trade	13.6%	% Winning Years	100%
Average Drawdown	-0.98%	Worst Trade	-35.3%	Best Year	32.54%
Avg Drawdown Length	11.79	Avg Days in Trade	10.48	Worst Year	5.34%

Source: Butler|Philbrick & Associates

Putting It All Together

We've shown you a better way to save, a more robust way to think about retirement finances, and a simple way to capture 50% more performance from a diversified portfolio. These are powerful techniques in their own right, but they are even more powerful in combination.

For example, consider a 50-year-old professional earning \$300,000 per year with \$1,000,000 in retirement savings, and who wants to retire at age 60. If we apply return and risk assumptions from the traditional SAA portfolio to our robust retirement analyzer we discover that this person's nest-egg liability at age 60 is \$3,064,000 with an 85% chance of retirement sustainability. To accumulate an extra \$2,064,000 in wealth between ages 50 and 60 using the same portfolio return assumptions requires \$120,000 per year in savings, adjusted for inflation, using traditional dollar cost averaging, or about \$10,000 per month.

By applying our new techniques we can reduce the size of the nest-egg liability at age 60

because the person can expect higher and more stable returns during retirement. **With more robust return and risk assumptions from a Dynamic Asset Allocation approach the nest-egg liability at age 60 shrinks to \$1,636,000, over \$1.4 million smaller than under traditional SAA assumptions.** Even better, to accumulate an extra \$636,000 from age 50 to 60 requires just \$38,000 per year in savings, adjusted for inflation, using a Value Averaging approach, or \$3100 per month.

Summary Table:

	Age	Target Retirement Age	Current Savings	Nest-egg liability	Required Monthly Savings
Traditional SAA with Dollar Cost Averaging	50	60	\$1,000,000	\$3,064,000	\$10,000
Dynamic AA w/ Value Averaging	50	60	\$1,000,000	\$1,636,000	\$3,100

We said at the beginning of this paper that we would “... show you a better way to save, a more robust way to think about retirement finances, and some simple ways to capture substantially more performance from a diversified portfolio.” By combining a Value Averaging savings approach with a probability based retirement analysis, and using a Dynamic Asset Allocation investment strategy, we demonstrated how a person might reduce his monthly savings burden by over 50% while still facilitating a sustainable retirement lifestyle comparable to pre-retirement lifestyle expectations.

If you would like more information about how we implement these techniques for clients, please contact us directly at the coordinates above.

*Butler|Philbrick and Associates is part of Macquarie Private Wealth Inc.

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