

All Duration Investing

How Investors Can Improve Financial Planning Needs and Portfolio Performance by
Implementing an All Duration Asset Allocation Strategy

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ABSTRACT

The goal of this paper is to provide a framework for understanding the appropriate time horizons for certain asset classes by quantifying their specific duration. We then use that duration framework to apply an asset-liability matching methodology across all time horizons with the goal of helping financial planners and investors implement more behaviorally robust and planning-based investment portfolios. This “All Duration” approach enhances behavioral alpha by giving investors more certainty in their portfolio across specific time horizons by reducing activity and maintaining a more predictable financial planning process.

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The Investor's Intertemporal Conundrum & Behavioral Biases

In this paper we will propose an approach to asset management that seeks to improve an investor's financial planning process by establishing a methodology that is consistent with optimizing behavioral alpha through asset-liability matching. Our goal is to quantify an approximate "duration" for common asset classes (and strategies) thereby giving the investor the ability to better match specific assets with personal liability needs. In doing so we seek to help investors better meet their goals by remaining more disciplined through the application of asset-liability matching.

Ben Graham said *"the investor's worst enemy is likely to be himself."* We propose that the investor's worst enemy is not merely him/herself, but time. It has been said that *"risk is uncertainty of lifetime consumption."*¹ Consumption is uncertain because our future consumption needs evolve and are uncertain across *time*. Therefore, all of asset-liability management becomes a temporal conundrum that involves the behavioral hurdle of trying to have the proper quantity of assets at a certain time in life. When there are imbalances in this attempt to match certain assets with our future liabilities we expose ourselves to behavioral biases that threaten the viability of our financial plan.

No One Ever Panic Sold a Certificate of Deposit²

An investor who purchases a 12 month 1% yielding Certificate of Deposit (CD) knows all of the information they need to eliminate or reduce behavioral biases in this allocation:

- Time horizon
- Income
- Credit risk

The likelihood of panic selling a security is a function of certainty. That is, the investor can reduce the risk of overreacting by having near certainty about their future financial needs. The key ingredient in this mix is the element of risk across time. Assuming no credit risk, the owner of a CD is able to plan their future with near precision around this instrument because they have certainty of risk relative to time horizon. The buyer of a 12 month CD who needs 1% income over that period perfectly matches assets with liability needs across time. The investor knows exactly what their duration is within this holding thereby reducing the risk of behavioral mistakes in managing the asset over time.

1– French, Ken "Five Things I know About Investing." <https://www.dimensional.com/us-en/insights/five-things-i-know-about-investing>

2–We cannot be certain that no one ever panic sold a CD. In fact, after the speculative fervor of the last few years we cannot be certain about most things in finance.

While this concept cannot be applied with the same degree of precision across all asset classes we believe an approximate conceptualization of duration can be applied to help investors instill better discipline in their portfolios and build more behaviorally robust portfolios that are more consistent with their financial planning needs.

The Arithmetic of Asset-Liability Matching

Investors too often treat long-term assets like they are short-term investments and in doing so increase taxes, fees and behavioral mistakes. These frictions can be mitigated or even eliminated when the proper time horizon is applied to these specific asset classes.

William Sharpe's *Arithmetic of Active Management* showed that the average passive investor must outperform the average active investor after taxes and fees.¹ If we applied this concept to all asset classes in a perfectly efficient market, investors would hold all of their assets for the exact period across which they exist. In other words, a 10 year Treasury-Note buyer would hold for exactly 10 years, a 1 year CD buyer would hold for exactly 1 year—so on and so forth. Investors do not do this, in part, because they have an inherent intertemporal conundrum where their liabilities are unpredictable, and so the assets they hold cannot always be held for the entirety of their full maturity. In addition, asset lifetimes and returns can be uncertain because of default risk and the issuance of longer more perpetual style instruments like equities.

Further, investors suffer from well known behavioral biases that result in holding asset classes for inappropriate time horizons. Equities, for example, are inherently long-term instruments; however investors routinely trade them in a hyperactive manner that, in aggregate, can only reduce average aggregate returns. But this is not necessarily irrational or even inefficient—it is partially the result of this inherent need for some level of activity in portfolio management as investors try to meet uncertain liabilities across time.

In a theoretical world where all assets are held to their full maturity our investors would earn higher average returns because they would be applying an efficient temporal version of Sharpe's original *Arithmetic*. We further contend that these investors would increase their average excess return by behaving better. In other words, not only would they increase their returns by reducing their taxes and fees across time, but they would improve their average returns by reducing the potential for fear-based selling and FOMO-based buying.²

1—See Sharpe, William—The Arithmetic of Active Management. <http://web.stanford.edu/~wfsarpe/art/active/active.htm>

2— FOMO or “fear of missing out” refers to the behavioral bias of buying high because of the fear of missing out on gains that others are earning.

Given all this, we can arrive at a similar conclusion to Sharpe's Arithmetic:

"The average investor who holds their assets to maturity will earn a higher after tax and fee return when compared to the average investor who tries to trade that asset in an attempt to earn more than it is designed to earn across its lifetime."

In other words, the average holder of our 12 month CD cannot trade that instrument into earning more than what it is designed to payout over its lifetime. In the aggregate these traders can only earn 1% before taxes and fees and they cannot force this instrument to earn more than 1% in aggregate even if some investors time their purchases better than others. This concept can be applied to all asset classes; however, the trick is in understanding the proper duration over which to hold assets so as to optimize activity.

Duration and the Point of Indifference

In a 1977 *Forbes* article Warren Buffett went into some detail about how stocks are very similar to bonds in that they have a sticky coupon across long periods of time:

*"I believe...that stocks, in economic substance, are really very similar to bonds."*¹

A diversified portfolio of equities can be thought of as being similar to a high quality multi-decade instrument that pays a 5-7% coupon on average. We propose applying a specific duration to this and other instruments in order to clarify the time horizons over which this instrument can be appropriately utilized in a diversified portfolio.

William Bernstein once described the "duration" of stocks as being the point where the investor is indifferent to a certain decline after accounting for future dividends.² Applying Kahneman and Tversky's concept of loss aversion, we propose that the average investor's "point of indifference" is their real break-even relative to historical average returns and drawdowns.³ In other words, given a certain level of potential principal loss, how long can an investor expect to experience a loss before they are "made whole"? From a behavioral finance perspective this is the true "point of indifference" because the investor is indifferent to losses over this time period.

The figure below shows our findings of duration calculations across many common asset classes and can be applied more broadly to virtually any asset class, strategy or factor with a long enough empirically supported track record.

1—See Buffett, Warren, *Forbes* 1977, How Inflation Swindles the Equity Investor. <https://fortune.com/2011/06/12/buffett-how-inflation-swindles-the-equity-investor-fortune-classics-1977/>

2— See Bernstein, William—The Duration of Stocks <http://www.efficientfrontier.com/ef/999/duration.htm>

3—See Kahneman, Tversky—Prospect Theory: An Analysis of Decision Under Risk. <https://www.jstor.org/stable/1914185>

The goal of good financial planning is to maximize certainty of asset flows and levels across time. However, there is an important inverse correlation in many of these asset classes and their time horizons. The short duration instruments will tend to be relatively poor real return instruments whereas the longer duration instruments will tend to be superior real return instruments. Conversely, the short duration instruments are more consistent with principal stability whereas the longer duration instruments can expose us to significant principal uncertainty in the short-term. But by applying an “all duration” approach we can resolve this asset class paradox.



ASSET CLASS DURATIONS



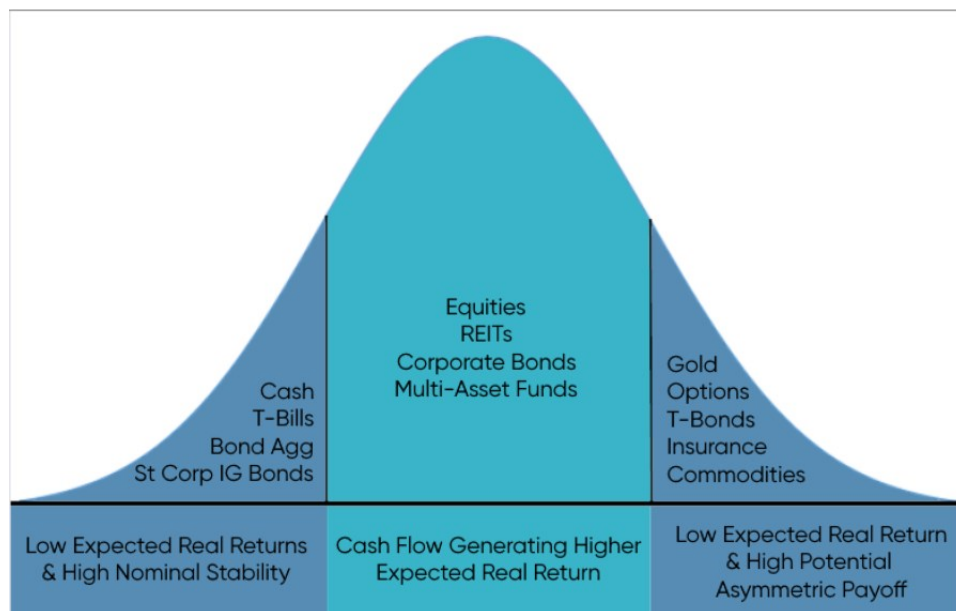
GFAP refers to the Global Financial Asset Portfolio, the current market cap of global stocks & bonds.

As a general framework for allocation using expected future returns relative to nominal and real asset class risks it can be helpful to think of different asset class allocations across a bell curve where the distribution is comprised of higher expected real return instruments like stocks, corporate bonds, REITs and diversified multi-asset funds. The tails would reflect lower quantities in asset classes that have the potential to provide extreme nominal stability as well as extreme real stability.

Specifically, cash, for example, provides us with absolute nominal stability and short-term certainty with the potential for very high real uncertainty. On the other hand, an instrument like a life insurance contract provides us with low nominal certainty (the premiums are a net negative cash flow) and the potential for very high asymmetric real returns. Instruments such as gold, commodities, options and T-Bonds tend to exhibit similar characteristics in that they’re typically longer duration instruments that will likely generate low/unstable real returns in the short-term while also providing us with the potential for high short-term real returns in *specific* environments (death for insurance, deflation for T-Bonds, inflation for gold/commodities).

1—We quantify “point of indifference” using post-war max drawdowns across asset classes combined with average long-term expected real returns. For example, if an investor purchased equities today and experienced an immediate one time principal loss of –55% it would take 17.75 years for the investor to be made whole in real terms assuming a real return of 4.65%. The data we used to quantify these calculations may be made available upon request.

With this understanding, an appropriately allocated All Duration financial plan would prudently include many of these instruments in a manner that is similar to an All Weather strategy with the foundation of the plan being based on the investor's specific temporal/financial needs. Importantly, this curve would need to be customized and shifted according to each investor's underlying financial plan. A retiree, for instance, might require fatter tails to better suit their need for insurance and short-term cash flow certainty. Likewise, a very young investor can likely afford thinner tails since they likely have a lower need for cash and insurance instruments.



This concept is useful for anyone trying to apply asset-liability matching to their financial planning and asset management process because it places specific instruments in the proper temporal perspective while maintaining the broader benefits of asset class diversification. This not only helps match assets with liabilities, but it will help the investor implement a more patient approach across asset classes thereby helping them optimize their own behavioral alpha. And while this sort of approach has become increasingly popular in retirement planning it can also be applied across any point in an investor's lifetime.

This framework can also help financial planners better match specific strategies to help reduce potential conflicts between asset managers and planners. Too often, we find that there is a conflict between financial planning and investment management where the investment management community is charging high fees for the hope of market beating returns whereas the financial planning community is trying to apply financial discipline in client portfolios that is consistent with their financial goals. The conflict arises when the investment managers are taking risk to earn return that magnifies behavioral risk and reduces the potential of meeting financial goals. This conflict is often the result of the aforementioned asset-liability mismatch where the investment manager is taking duration risk in assets that create uncertainty for the end investor. Matching specific strategies to specific client needs can help reduce or eliminate this conflict.

Importantly, from a financial planning perspective, it's helpful to understand that there are four primary ways to alter our average portfolio duration:

1. **Diversification** decreases/increases duration by creating a portfolio of temporally variable average return streams.
2. **Rebalancing** a portfolio can reduce duration by rebalancing away from high growth longer duration instruments into lower return and lower duration instruments & vice versa.
3. **Income** reduces duration by establishing a short-term stream of cash flows that enhance short-term asset certainty.
4. **Insurance** reduces duration by providing an asymmetric short-term outcome that provides potential income during a long duration period of uncertainty.¹

Diversification as a Temporal Optimization Tool

We often talk about how diversification across asset classes can be a powerful return optimization tool. But from a financial planning and behavioral finance perspective diversification of time horizons is equally important and can be an important complement to the diversification of asset classes. In fact, one of the interesting findings in our research is that the diversification of various asset classes substantially reduces the average duration of those combined asset classes. This is not surprising, but it is useful as multi-asset portfolios and strategies can be utilized to meet moderate duration financial planning needs without sacrificing low returns for safety.

Optimizing an asset allocation for the appropriate risk/return profile is best achieved through the asset-liability matching methodology. That is, we can merge the worlds of investment management with financial planning by trying to quantify someone's future liability needs and then combining those liability needs with an asset allocation that is likely to generate greater returns than the allocator's liabilities over their lifetime.

As a simple example, a moderately conservative 55 year old couple, Mr. & Mrs. Smith, are planning for retirement at 65 with an expected 4% withdrawal rate. They therefore seek to achieve a minimum target return of 4%.

¹-This is especially useful in the "All Duration" framework as portfolio insurance and other forms of personal insurance can play an important role in the financial planning process.

If we were to assume 20 year bond returns of 2% and 20 year stock returns of 7% then the asset allocator can comfortably invest in a 5% expected return 60/40 stock/bond portfolio based on the estimate that this portfolio will, on average, match their asset returns with the liability needs.

Buying a single 60/40 multi-asset fund such as a Balanced Index gives investors an average duration of 12.5 years according to our methodology. While this simple solution matches their average withdrawal need with their asset return goals the investor is still confronted with the temporal/behavioral uncertainty across future time horizons because we've bundled high volatility assets with lower volatility assets in one pool. This creates one moderately long duration, thereby making it difficult for the investor to prepare, behaviorally, for short-term liabilities while also creating behavioral risk of not being protected from long-term real return needs.¹ In other words, a multi-asset portfolio needs *at least* one other pool of assets to increase temporal certainty, both in the long-term and the short-term.

The solution to this problem is to match specific assets and liabilities across our other temporal needs. This can be achieved by maintaining the same style of broad diversification but better matching the investor's specific assets with their specific liabilities using individual instruments matching those time horizons.

Kitces 2014 shows the portfolio returns from a bucketing style strategy are similar to a broad multi-asset rebalancing strategy. However, we would argue that asset-liability matching with specific individual durations creates a more behaviorally robust strategy because the investor has more "tangible" durations.¹ Said differently, when a 60/40 Balanced Index is down 30% in 2008, the investor is indifferent to the fact that there is cash and short-term bonds *inside* the 60/40 index because they are a forced seller into the downturn to meet any short-term or medium-term needs. This investor's behavioral risk is increased because they cannot see and feel the stability of the short-term assets within the overall allocation. Instead, they experience a homogeneous asset class risk because the 60% equity slice exposes the portfolio to 85% of the volatility resulting in the behavioral risk that their diversified portfolio feels too much like an equity portfolio.

Instead, we propose that the investor break out the allocation into a series of simple, low fee and discernible duration allocations that we can quantify and match with specific assets. This gives our diversified multi-asset investor a style of certainty that is more similar to bond laddering where we are laddering specific durations across all asset classes to meet the investor's personal needs.

1-This becomes especially magnified in a stock/bond fund when stock/bond correlations move to 1 in years such as 2022.

2-See Kitces, Michael 2014 "Managing Sequence of Return Risk With Bucket Strategies vs a Total Return Rebalancing Approach." <https://www.kitces.com/blog/managing-sequence-of-return-risk-with-bucket-strategies-vs-a-total-return-rebalancing-approach/?s=03>

Hypothetical Investor: Mr. & Mrs. Smith

Annual Retirement Income: \$50,000

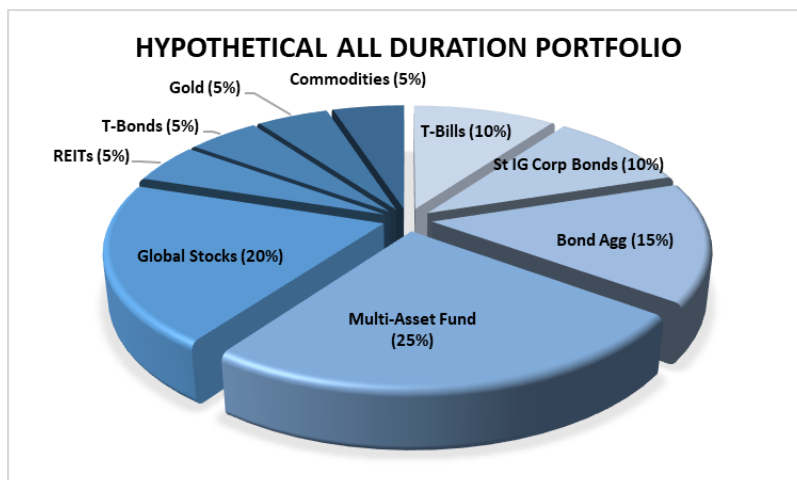
12 Month Retirement Expenses: \$40,000

Home Purchase in 5 Years: \$200K Down

Current Portfolio: \$1,000,000

Despite having a life expectancy of 85 years and a potentially 30+ year time horizon, the Smiths have front-loaded behavioral risk around their 12 month withdrawal needs, 5 year home purchase

plans and 10 year retirement plans, all of which exacerbate their average temporal uncertainty. The Smiths require a balance of various durations to generate a high enough total return while also meeting all these various time horizon needs.




The Smiths require at least a 30% short-term allocation of less than 7 years, but can afford to take some moderate to longer duration risk with a target average duration near their retirement years. Using the example above we resolve their asset-liability mismatch by establishing an “All Duration” portfolio with average duration of 12.7 years that covers all of their potential future time horizons while giving them a better understanding of the behavioral time horizons over which they should hold these instruments.

Duration Bucket	% Allocation	Holding	Specific Duration	Needs
1-3 Years	20%	T-Bills & ST Corp	0, 2.7	Emergency and short-term spending
3-7 Years	15%	Bond Aggregate	5.25	Potential home purchase
7-15 Years	25%	Multi-Asset Fund	11	Retirement planning – start of retirement
15-25 Years	30%	Global Equities, T-Bonds & REITs	17.75, 17.8 & 18.7	Long-term planning – through retirement
25+ Years	10%	Gold / Commodities	34.85	Ultra-long term planning

NB—The example in this section is highly simplified and planners and investors will need to fully customize the implementation to properly quantify the asset-liability matching process in reality.

1—This form of “all duration” strategy could be constructed with as many or few time horizons as the investor needs. This could include as few as 2 or 3 allocations across short, medium and long-term time horizons or as many as hundreds of time horizons built out over hundreds of positions and strategies.



This portfolio establishes a highly diversified asset allocation that is similar to a classic “All Weather” portfolio.¹ But unlike a traditional All Weather portfolio the All Duration investor has improved their overall diversification across asset classes and more importantly, across specific time periods. By matching specific asset classes across time the investor has increased their certainty around specific time horizons and future asset needs thereby increasing the likelihood of meeting their financial goals and improving the potential behavioral alpha in the portfolio.

Summary Conclusion

It's well known that *time in the market* is more important than *timing the market*. However, every asset allocator has a certain need to time the market in the sense that they have an inherent asset-liability mismatch across their financial planning needs. By establishing specific durations for specific assets we hope to better integrate the financial planning process with the investment management process by establishing a more behaviorally robust and temporally consistent methodology that will help investors better understand their liability time horizons and the assets that match appropriately to those time horizons.

If you would like to learn more about Discipline Funds and All Duration Investing please contact the authors at cullenroche@disciplinefunds.com and ericafries@disciplinefunds.com.

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1– The classic All Weather portfolio refers to Harry Browne's 4 fund All Weather using cash, T-bonds, Gold and Equities.