BLUEPRINT
INVESTMENT PARTNERS

THE 60/40 PROBLEM

Examining the Traditional 60/40 Portfolio in an Uncertain Rate Environment

Executive Summary

The investment industry is facing a "60/40 problem." Over the past several decades, advisors have leaned on the 60/40 portfolio to deliver a less-volatile, but still relatively reliable return for balanced investors due to their lack of tolerance for the volatility and drawdowns of a pure equity allocation. While the addition of bonds to an otherwise non-diversified portfolio of equities does indeed reduce the beta of the overall portfolio, the correlation to equities remains high given that "the 60" has been 3 times as volatile as "the 40." In our view, the 60/40 problem boils down to an underestimation of future risks for both bonds and stocks. Rather than solving a new problem with an old solution, Blueprint has considerable evidence of a better way.

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Historically the trade-off between equities and bonds has conformed to intuition and been in sync with financial theory – as rates fall, bond prices increase and stocks become more attractive on a relative basis. Investors during interest rate regime changes were left with a relatively simple choice – bonds near new highs or stocks near new lows… or the converse. With U.S. stocks and bonds both at or near all-time highs, the choice today is significantly more complicated. At this juncture, investors are confronted with a changing interest rate landscape following an environment where equities and bonds have both generated Sharpe ratios above their full sample average. Could rising rates cause an economic crisis? Could equities and bonds continue to rise in tandem? What is an advisor to do in these uncertain times? Our answer at Blueprint utilizes traditional asset class diversification while also incorporating time diversification or trend following.

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Using simple models to show the robust properties of this approach, we tested the effects of utilizing a trend following model applied to a 60/40 portfolio during each of the U.S. interest rate regimes vs. buy-and-hold. Using 8 and 12 month moving averages (T8 and T12 respectively), we analyzed the absolute and risk-adjusted returns to determine if the addition of trend following could benefit a traditionally allocated portfolio during rising and/or falling rate environments. The two trend following strategies included a 20% buy-and-hold component and 80% trend following component. The buy-and-hold component was included to allow for the benefits of asset diversification as well as to guard against investors making emotionally-charged decisions impacted by Availability and Hindsight biases. Regarding trend following strategy rules, when the most recent month's closing price was above the moving average, the asset was determined to be in an uptrend. When the most recent month's closing price was below the moving average, the asset was determined to be in a downtrend. Allocations were then shifted from downward trending assets to upward trending assets or cash.

We found that applying a trend following strategy to a 60/40 buy-and-hold portfolio improved the risk-adjusted performance across every interest rate regime since 1900. Exhibit A below displays a summary of the Sharpe Ratios for each period. Looking specifically at rising rate environments, trend following allowed an investor to achieve higher risk-adjusted returns without having to make a prediction about, or be beholden to, future bond yields or stock returns. Looking at falling rate environments, including the two largest financial crises since 1900, a trend following strategy allowed investors to sidestep a significant portion of the maximum drawdown and achieve higher Sharpe ratios in the '29-'31 (Great Depression) and '07-'09 (Great Recession) periods by shifting exposure away from equities and toward bonds or cash. Again, these shifts required no predictions – they resulted merely from a simple strategy driven by data.

Exhibit A – Sharpe Ratio Comparison: Trend Following vs. Buy-and-Hold, 1900–2018

Interest Rate Direction	Time Period & Strategy	Sharpe Ratio (1%)	Improvement in Sharpe vs. Buy-and-Hold
Rising	Jan 1900 - Jan '21		
	Buy-and-Hold	0.47	
	TF (8-mo EMA)	0.77	+63.8%
	TF (12-mo EMA)	0.78	+66.0%
Falling	Feb '21 - Jan '41		
	Buy-and-Hold	0.35	
	TF (8-mo EMA)	0.58	+65.7%
	TF (12-mo EMA)	0.57	+62.9%
Rising	Feb '41 - Sept '81		
	Buy-and-Hold	0.78	
	TF (8-mo EMA)	0.93	+19.2%
	TF (12-mo EMA)	0.93	+19.2%
Falling	Oct '81 - Jul '16		
	Buy-and-Hold	1.00	
	TF (8-mo EMA)	1.17	+17.0%
	TF (12-mo EMA)	1.16	+16.0%
Rising	Aug '16 - Jul '18		
	Buy-and-Hold	1.33	
	TF (8-mo EMA)	1.48	+11.3%
	TF (12-mo EMA)	1.48	+11.3%

Given the historical uniqueness of the current period for traditional asset classes, we encourage advisors to explore incorporating efficient, robust risk management processes to solve their 60/40 problem.

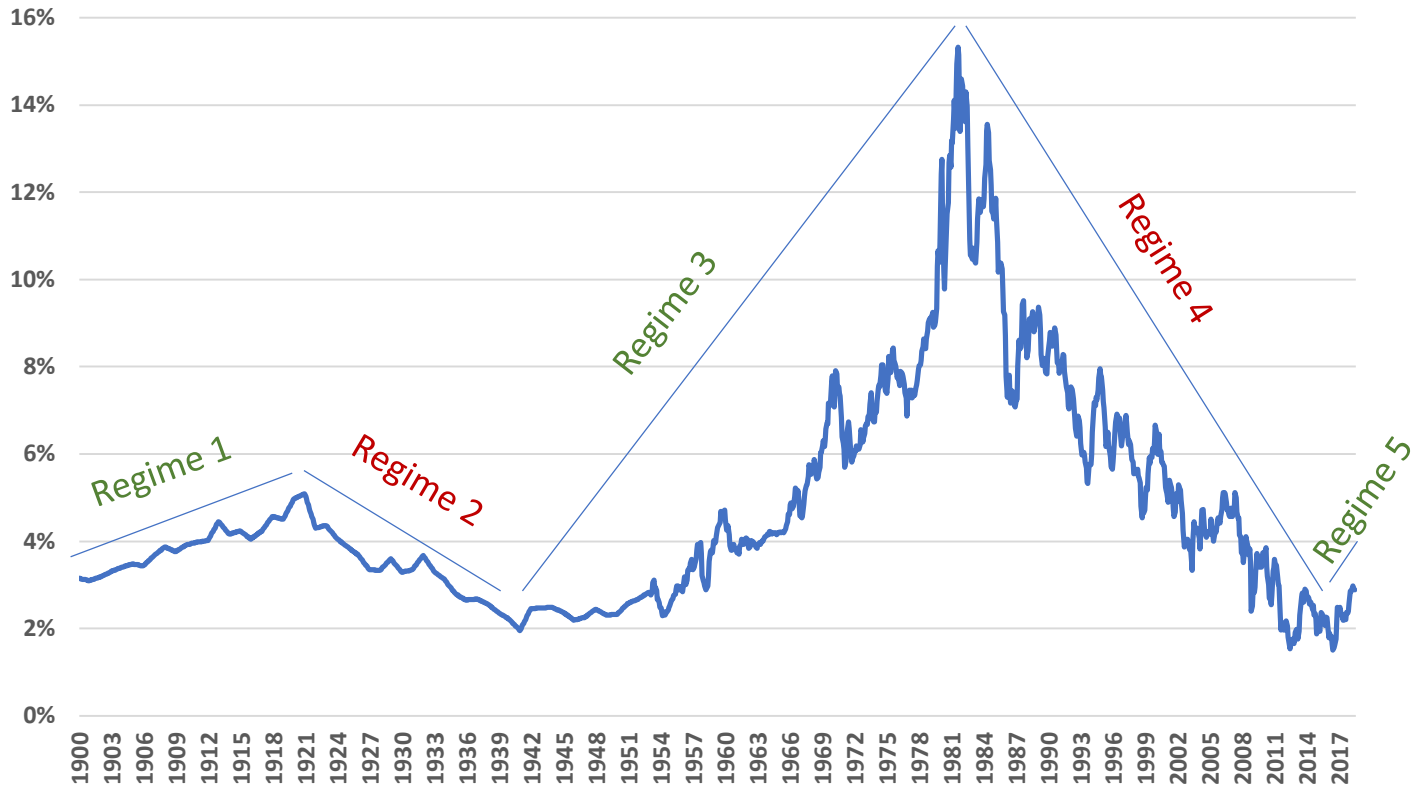
At Blueprint we believe that investing with discipline is more important than investing in instruments. Adding a trend following strategy to a buy-and-hold portfolio has increased positive outcomes on both an absolute and risk-adjusted basis in both rising and falling interest rate environments over the past century. Advisors and investors should have a time-tested plan by which to operate in environments that mirror and, most importantly, do not mirror the past. Given the historical uniqueness of the current period for traditional asset classes, we encourage advisors to explore incorporating efficient, robust risk management processes to solve their 60/40 problem.

Introduction

The movie "Moneyball" has an interesting scene in which General Manager Billy Beane is debating his scouts on how to best replace two key players lost in free agency given the team's limited budget. The scene contains a back and forth between Beane and several scouts discussing and clearly disagreeing about "the problem." "You're not even looking at the problem", Beane declares. Fast forward to today - at this unique point in modern financial history - with interest rates near historic lows and stocks near historic highs. Against this backdrop we wonder if advisors and investors are correctly "looking at the problem" of a potential rise in interest rates.

Since 1900, the U.S. has experienced five interest rate regimes. Exhibit A displays this full modern history of U.S. 10-year yields.

Exhibit A - History of U.S. 10-Year Government Bond Yields: 1900 – 2018



Sources: Blueprint Investment Partners, Federal Reserve Bank of St. Louis and Global Financial Data (GFD). The above graph is using the U.S. 10-Year Treasury Yields as a proxy for "yields". Past performance is not a guarantee of future performance.

Given this context, should an advisor's reliance on the 60% stock/40% bond (i.e. 60/40) portfolio, typically suited for "balanced" clients, be questioned? At a minimum, advisors need to be aware of the impacts that a rising rate environment may have on their clients' portfolios. Over the past several decades, advisors have leaned on the 60/40 portfolio to deliver a less-volatile, but still relatively reliable return for balanced investors due to their lack of tolerance for the volatility and drawdowns of a pure equity allocation.

While the addition of bonds to an otherwise non-diversified portfolio of equities does indeed reduce the beta of the overall portfolio, the correlation to equities remains high given that "the 60" has been 3 times as volatile as "the 40."

Even during the longest running bond bull market in modern U.S. history (1981-2018), the positive attribution of bonds has been muted given their inherent volatility characteristics (or lack thereof). Our previous paper[1] addresses this:

"Clearly, traditional portfolio returns have been primarily driven by equities, particularly in times of crisis. For example, since 1900 a U.S. 80%/20% portfolio has had a 99% correlation to a 100%/0% portfolio. Even a 40%/60% portfolio has had an 86% correlation to an all-equity portfolio."

So then, what are advisors to do given the prospects of a bond bear market? The two most common responses we have observed are to:

a) allocate more of the portfolio to alternatives in hopes that the correlation benefit will show up in terms of "crisis alpha" or
b) do nothing

The first option is fair assuming your short-list of alternatives includes managed futures. Both the data and our experience show that diversified trend following via managed futures has been one of the most, if not the only, reliable alternatives in the crisis alpha space. The second and seemingly most prevalent course of action is taken by advisors who subscribe to the notion that markets cannot be predicted and thus one must buy and hold a diverse set of assets and rebalance them on occasion for clients to have the highest probability of meeting their goals. In this buy-and-hold framework, an investor with a short to intermediate-term time horizon would presumably invest in a traditionally diversified or 60/40 portfolio given that large drawdowns cannot be tolerated, either emotionally or mathematically.

More sophisticated advisors may employ additional tax loss harvesting or dollar cost averaging processes to boost returns, but these typically only add 20-30 bps to annual performance.[2] Specifically for bonds, these advisors may shorten duration at the prospect of rising rates. However, this further limits the ability for bonds to have a meaningful impact on the portfolio, particularly in crisis periods.

We at Blueprint agree that markets cannot be predicted. We have amassed substantial evidence in support of a better solution for diversification. Said another way, we believe that many are not even "looking at the problem."

1. Robinson, Jon and Langley, Brandon and Childs, David and Crawford, Joe and Ross, Ira, Applying a Systematic Investment Process to Distributive Portfolios: A 150 Year Study Demonstrating Enhanced Outcomes Through Trend Following (November 1, 2016)
2. www.kitces.com/blog/evaluating-the-tax-deferral-and-tax-bracket-arbitrage-benefits-of-tax-loss-harvesting/

Ok, so what's the problem?

In our view, the 60/40 problem boils down to an underestimation of future risks for both bonds and stocks. As of Q3'18, U.S. equities are near all-time highs and while 10-year bond yields have been rising, they are still near their lows. At no point since 1900 have U.S. interest rates been at or near their lows when equities were at or near all-time highs. The table below breaks down these regimes, the corresponding 10-year U.S. Government Bond yield, and whether U.S. equities made new all-time highs within 12-months of the final period month.

Exhibit B - U.S. Interest Rate Regismes Since 1900

	Jan 1900 – Jan 1921	Feb 1921 – Jan 1941	Feb 1941 – Sep 1981	Oct 1981 – July 2016	Aug 2016 – July 2018
Rate Environment	Rising	Falling	Rising	Falling	Rising
10-Year Bond Yield at End of Period	5.09%	1.95%	15.32%	1.50%	2.89%
Change in Rates (bps)	+194 bps	-307 bps	+1333 bps	-1365 bps	+133 bps
New All-Time Highs in Equities Trailing or Forward 12-months?	No	No	Yes	Yes	Yes

Sources: Federal Reserve Bank of St. Louis and Global Financial Data (GFD). Analysis is for the time period January 1900–July 2018. The above analysis is using the U.S. 10-Year Treasury Yields as a proxy for "yields". Past performance is not a guarantee of future performance.

Historically the trade-off between equities and bonds has conformed to intuition and been in sync with financial theory – as rates fall, bond prices increase and stocks become more attractive on a relative basis. Likewise, as rates rise and bond prices decrease, bonds become more attractive to potential buyers. Take for example the first falling rate regime from 1921-'41. This period ended with rates at then all-time lows (bond prices at all-time highs) with the S&P 500 in a 44% drawdown.

With bonds generating a Sharpe Ratio[3] of 1.44 against 0.20 for equities during this period one could say at a minimum that equities had become a relatively more attractive investment or value against bonds. The rising rate period that followed (Feb '41-Sep '81) confirms this notion as the Sharpe Ratio for stocks was 2x greater than that for bonds. Exhibit C displays each rate regime and the accompanied Sharpe ratios for each asset class.

Exhibit C - Sharpe Ration by Interest Rate Regime: Equities and Bonds: 1900-2018

	Equities	Bonds	Rate Environment
Jan 1900 – Jan '21 Sharpe Ratio CAGR	 0.39 5.9%	 0.41 2.1%	**Rising**
Feb '21 – Jan '41 Sharpe Ratio CAGR	 0.20 7.0%	 1.44 4.9%	**Falling**
Feb '41 - Sep '81 Sharpe Ratio CAGR	 0.72 11.0%	 0.28 2.5%	**Rising**
Oct '81 - Jul '16 Sharpe Ratio CAGR	 0.68 11.5%	 0.95 8.8%	**Falling**
Aug '16 - Jul '18 Sharpe Ratio CAGR	 1.65 14.4%	 -1.30 -2.5%	**Rising**
Entire Sample Sharpe Ratio CAGR	 0.49 9.6%	 0.63 4.6%	--

Sources: Blueprint Investment Partners and Global Financial Data (GFD). Analysis is for the time period January 1900–July 2018. Past performance is not a guarantee of future performance

Historically investors during regime changes were left with a relatively simple choice – bonds near new highs or stocks near new lows… or the converse. With U.S. stocks and bonds both at or near all-time highs, the choice today is significantly more complicated. The data in Exhibit C inspires the question – which prior rising rate regime might the one ahead resemble? Depending on your answer or prediction, the ensuing results could vary widely.

Take for example the period from 1900-'21 where equities and bonds both generated Sharpe Ratios and compound annual growth rates (CAGR) far below the sample average with each producing its lowest CAGR among the four regimes. On the other hand, the period from '41-'81 saw U.S. equities perform very well on an absolute and risk-adjusted basis with bonds generating their worst risk-adjusted return of the sample.

3. The Sharpe ratio is a ratio of return versus risk. The ratio measures the return (CAGR) per unit of risk (standard deviation).

At this juncture, investors are confronted with a changing interest rate landscape following an environment where equities and bonds have both generated Sharpe ratios above their full sample average. Could rising rates cause an economic crisis? Could equities and bonds continue to rise in tandem? Either way, what strategy works best when you sit back and make the honest conclusion that "I just don't know…"? We have a simple, elegant and robust solution.

The 60/40 Portfolio and Time Diversification

A look back over the history of the four interest rate regimes with a focus on the two rising rate periods may be more relevant for advisors going forward. At a minimum, given the lack of modern historical precedent, we strongly urge advisors to not rely solely on the traditional 60/40 model. Specifically, the risks of doing so fall into two categories. First, the 60% allocation to stocks is largely responsible for the direction of the portfolio given its relative volatility against bonds. Second, with rates near historic lows, the likelihood that bonds produce above average returns over the next rising rate period is low. How might an advisor simply and economically limit downside exposure should either asset class decline in any meaningful way? Our answer at Blueprint utilizes both the asset class diversification discussed previously, while also incorporating time diversification or trend following.

Using simple models to show the robust properties of this approach, we tested the effects of utilizing a trend following model applied to a 60/40 portfolio during each of the U.S. interest rate regimes vs. buy-and-hold. Using 8 and 12 month moving averages[4] (T8 and T12 respectively), we analyzed the absolute and risk-adjusted returns to determine if the addition of trend following could benefit a traditionally allocated portfolio during rising and/or falling rate environments. The moving averages are applied to both stocks and bonds with exposure adjusted on a monthly basis dependent on whether the close of either respective asset was above or below its moving average. Additionally, the two trend following strategies include a 20% buy-and-hold component and 80% trend following component.

4. The trend following technique utilized in this study calculates a moving average of past prices, specifically an exponential moving average (EMA). The lookback window for the EMA can be changed to suit the goals of the investor, but for the purposes of this paper, we will use two time periods, 8 and 12 months. These trend following strategies will be called T8 and T12, respectively. When using T8 and T12, an investor increases exposure to a given asset when its monthly closing price is above the EMA for the previous specified number of periods. Conversely, asset exposure is decreased when the current closing price is below than the EMA.

The buy-and-hold component was included for two reasons. First, the 20% exposure to buy-and-hold allows an investor to benefit from asset diversification (i.e. the portfolio benefits of correlation). Secondly, the 20% allocation to "beta" is, from a behavioral standpoint, a much more tenable position as it increases the likelihood that the portfolio will have a higher correlation to equities thus helping investors to avoid common biases such as Availability Bias and Hindsight Bias.

Regarding trend following strategy rules, when the most recent month's closing price was above the moving average, the asset was determined to be in an uptrend. When the most recent month's closing price was below the moving average, the asset was determined to be in a downtrend. Portfolio allocations for various conditions are detailed in the table below. Exhibit D shows the portfolio allocations for each potential state of the trend.

Exhibit D - Trend Following Portfolio Allocations

Trend		Actual Allocation		
Equities	**Bonds**	**Equities**	**Bonds**	**Cash (T-Bills)**
Uptrend	Uptrend	60%	40%	0%
Uptrend	Downtrend	60%	8%	32%
Downtrend	Uptrend	12%	88%	0%
Downtrend	Downtrend	12%	8%	80%

As Exhibit E on the next page shows, applying a trend following strategy to a 60/40 buy-and-hold portfolio improves the risk-adjusted performance across every interest rate regime since 1900. In fact, the absolute performance was improved across all time periods except the '41-'81 period where B&H outperformed by 20 and 10 basis points respectively. However, we believe the tradeoff of 20bps of CAGR for a 19% increase in Sharpe with a lower drawdown is a good one. Looking specifically at rising rate environments, trend following allowed an investor to achieve higher risk-adjusted returns without having to make a prediction about, or be beholden to, future bond yields or stock returns.

Exhibit E - 60/40 Portfolio Trend Following vs. Buy-and-Hold, 1900-2018

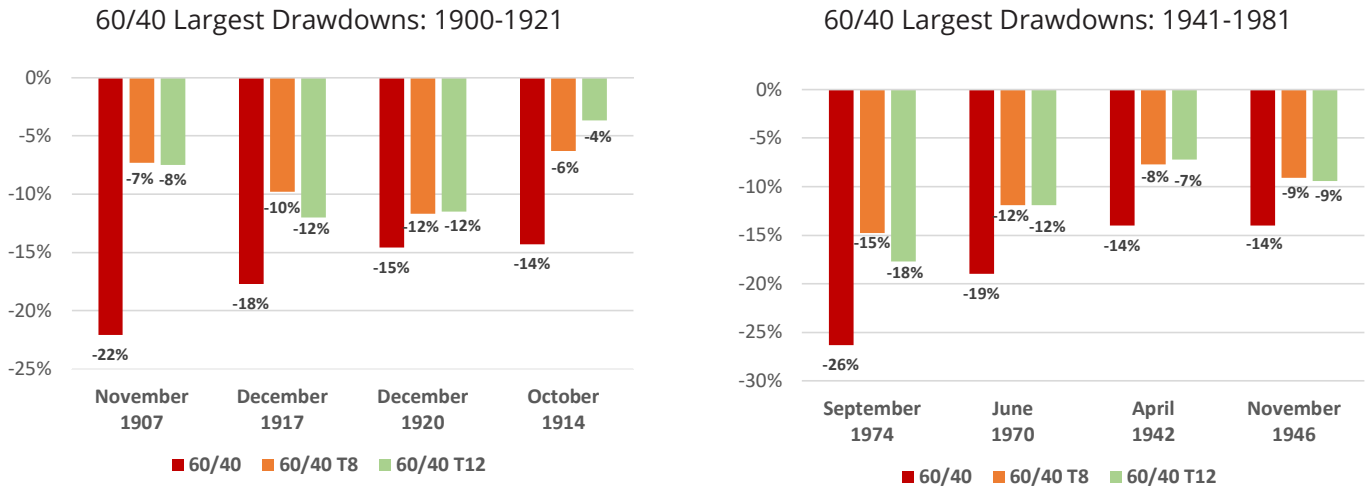
Interest Rate Direction	Time Period & Strategy	CAGR	Annualized Vol	Max Drawdown	Sharpe Ratio (1%)	Improvement in Sharpe vs. Buy-and-Hold
Rising	Jan 1900 – Jan '21					
	B&H	4.7%	7.9%	-22.1%	0.47	
	T8	5.7%	6.1%	-11.7%	0.77	+63.8%
	T12	5.7%	6.1%	-12.4%	0.78	+66.0%
Falling	Feb '21 – Jan '41					
	B&H	7.1%	17.2%	-61.8%	0.35	
	T8	7.3%	10.9%	-36.2%	0.58	+65.7%
	T12	7.3%	11.1%	-29.9%	0.57	+62.9%
Rising	Feb '41 - Sep '81					
	B&H	8.0%	8.9%	-14.7%	0.78	
	T8	7.8%	7.3%	-26.3%	0.93	+19.2%
	T12	7.9%	7.4%	-17.7%	0.93	+19.2%
Falling	Oct '81 - Jul '16					
	B&H	10.7%	9.7%	-26.4%	1.00	
	T8	11.1%	8.6%	-16.3%	1.17	+17.0%
	T12	11.3%	8.9%	-16.4%	1.16	+16.0%
Rising	Aug '16 - Jul '18					
	B&H	7.6%	4.9%	-4.1%	1.33	
	T8	8.6%	5.2%	-4.4%	1.48	+11.3%
	T12	8.3%	5.0%	-4.1%	1.48	+11.3%

Sources: Blueprint Investment Partners and Global Financial Data (GFD). Analysis is for the time period January 1900–July 2018. T8 and T12 data represents a hypothetical trend following strategy. All performance results are reflective of a backtest and assume annual rebalances. Hypothetical performance results have inherent limitations, some of which are disclosed at the end of this document. All portfolios rebalanced annually. Performance does not include fees and expenses. Past performance is not a guarantee of future performance.

Drawdowns in Rising Rate Regimes

The two rising rate regimes experienced several bear markets in equities and thus generated many severe drawdowns for the 60/40 buy-and-hold portfolio. Exhibit F on the next page shows the four largest drawdowns for the 60/40 buy-and-hold portfolio during these periods and the corresponding trend following drawdowns. As the graphs indicate, the trend following portfolios outperformed buy-and-hold during its eight largest drawdowns in rising rate environments.

Exhibit F - Rising Rate Regimes and 60/40 Drawdowns vs. Trend Following



Sources: Blueprint Investment Partners and Global Financial Data (GFD). T8 and T12 data represents a hypothetical trend following strategy. All performance results are reflective of a backtest and assume annual rebalances. Hypothetical performance results have inherent limitations, some of which are disclosed at the end of this document. Performance does not include fees and expenses. Past performance is not a guarantee of future performance.

One key reason for these results is related to the inherent structure of trend following strategies. Historically, bear markets have not been the result of an overnight shock but instead have occurred gradually over a period of months and sometimes years. Therefore, a trend following strategy, agnostic to market structure, asset type, and underlying fundamentals, will gradually exit a market exhibiting a downtrend in prices over a significant (weeks/months) time period.

What if rates don't rise?

Let's assume that rates don't rise and they continue to fall into negative territory for a sustained period, similar to what we are seeing in Europe and Japan. Again, the addition of the risk management process inherent to trend following historically outperformed a B&H portfolio in falling rate environments as well. Exhibit G displays the Sharpe Ratios for 60/40 buy-and-hold and trend following portfolios. Looking back over the two falling rate environments, we see that 60/40 trend following portfolios generated higher Sharpes in each regime with an average improvement of 40% over buy-and-hold.

Exhibit G - Sharpe Ratio in Falling Rate Regimes: 60/40 Portfolio - Buy-and-Hold & Trend Following

	Feb '21 – Jan '41	Oct '81 - Jul '16
B&H	0.35	1.00
T8	0.58	1.17
T12	0.57	1.16
Rate Environment	Falling	Falling

Sources: Blueprint Investment Partners and Global Financial Data (GFD). T8 and T12 data represents a hypothetical trend following strategy. All performance results are reflective of a backtest and assume annual rebalances. Hypothetical performance results have inherent limitations, some of which are disclosed at the end of this document. Performance does not include fees and expenses. Past performance is not a guarantee of future performance.

Similarly, the two falling rate periods include the two largest financial crises since 1900 - the Great Depression and the Great Recession. As in rising rate regime scenarios, a trend following strategy allowed investors to sidestep a significant portion of the maximum drawdown in '29-'31 and '07-'09 periods by shifting exposure away from equities and toward bonds or cash.

Again, these shifts required no predictions or reliance on past relationships - they resulted merely from a simple strategy driven by data.

The most recent example of a long-term falling interest rate environment with persistent low-to-negative rates is Japan since 1989.

Exhibit H - History of Japanese 10-Year Government Bond Yields: January 1989 - August 2018

Sources: Federal Reserve Bank of St. Louis and Global Financial Data (GFD). Analysis is for the time period January 1989–August 2018. The above analysis is using the Japanese 10-Year Government Bond Yield as a proxy for "yields". Past performance is not a guarantee of future performance.

As you can see in Exhibit H on the previous page, Japanese 10-year government bond rates have been in a decline after peaking in September of 1990. As a result, Japanese government bond prices have continually hit new all-time highs throughout this 29-year period while Japanese equity markets are still substantially below their 1989 highs. The Japanese situation is unique in modern financial history but not an entirely implausible analog for other developed economies looking forward from 2018. That said, how did the addition of trend following to a 60/40 portfolio of Japanese stocks and bonds perform over this period? Exhibit I contains the comparative performance statistics of these portfolios against buy-and-hold.

Exhibit I - Japanese 60/40 Portfolio: Trend Following vs. Buy-and-Hold, 1989-2018

	CAGR	Annualized Vol	Max Drawdown	Sharpe Ratio (1%)	Improvement in Sharpe vs. Buy-and-Hold
B&H	1.4%	12.4%	-41.1%	0.03	--
T8	5.0%	7.4%	-16.4%	0.54	+1535%
T12	4.9%	7.5%	-13.7%	0.52	+1474%

Sources: Blueprint Investment Partners and Global Financial Data (GFD). T8 and T12 data represents a hypothetical trend following strategy. All performance results are reflective of a backtest and assume annual rebalances. Hypothetical performance results have inherent limitations, some of which are disclosed at the end of this document. Performance does not include fees and expenses. Past performance is not a guarantee of future performance.

Trend following outperforms buy-and-hold over the sample on both an absolute and risk-adjusted basis. Another benefit of trend following is the ability to react and adapt when something happens that has never happened before. In this case, the continuing decline in rates, and to some extent, Japanese equities was unexpected and could not have been predicted beforehand. However, trend following strategies, not being privy to any information except the monthly closing price of Japanese stocks and bonds, adapted to the changing conditions and reacted accordingly.

Another benefit of trend following is the ability to react and adapt when something happens that has never happened before.

Conclusion

Adding a trend following strategy to a buy-and-hold portfolio has increased positive outcomes on both an absolute and risk-adjusted basis in both rising and falling interest rate environments over the past century. Given the historical uniqueness of the current period for traditional asset classes, we encourage advisors to explore incorporating efficient, robust risk management processes to solve their 60/40 problem. While trend following will not guarantee continued outperformance as seen in the historical sample, the future is always unknowable. Advisors/investors should therefore have a time-tested plan by which to operate in environments that have and, most importantly, have not happened yet.

"What I realized is nobody knows and nobody ever will. So I have to design an asset allocation that, even if I'm wrong, I'll still be okay."

- Ray Dalio

At Blueprint we believe that investing with discipline is more important than investing in instruments.

Adding a highly transparent, repeatable and systematic process to an advisor's investment apparatus allows clients to understand the logic behind decision making and increases their likelihood of sticking with the specific, prescribed financial plan. Similarly, by looking at the historical interest rate regime data, financial planners can more precisely calibrate the expected return assumptions used in the financial planning process to give clients a more accurate look at the risks they need to incur to achieve their goals. As the Dalio quote above states, it's not about knowing what is going to happen but about having a process that gives you the best probability of meeting your goals in any environment.

The 60/40 Problem
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BLUEPRINT
INVESTMENT PARTNERS

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