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THE ADDITIONAL BENEFITS OF TREND-FOLLOWING WHEN INTEREST RATES ARE HIGH

Why a higher cash rate makes trend-following more – and not less – attractive.

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Executive summary

In this research note, we provide a simple framework that illustrates why in a higher cash rate environment, trend-following CTAs become more – not less – attractive relative to bonds.

Our results are based on a basic three-asset portfolio, consisting of US equities, US government bonds, and a proxy index for diversified trend-following CTA strategies. We evaluate the historical excess returns of the three assets over the last 35 years, conditional on the level of the US risk-free rate, the 3-month US Treasury bill rate. We do not find a statistically significant difference in the future expected excess returns for these assets conditioned on the US cash rate. However, we do observe a statistically significant difference between low and high cash rate environments in a variable that is crucial to portfolio construction: the correlation between US equities and US government bonds. Specifically, we show that when the US cash rate has historically been above 3%, the average equity-bond correlation has been significantly less negative than when the cash rate has been below 3%.

These findings have important implications for adjusting portfolio allocations in response to a higher level of the cash rate. Using a set of simplified but conservative assumptions, we show that while a 55/35/10 equity/bond/trend-following portfolio may be more optimal than the traditional 60/40 equity/bond allocation in a low cash rate environment, the optimal allocation shifts to a 55/25/20 portfolio with a higher trend-following CTA weight when the cash rate is high.

The increased optimal allocation to trend-following in a high cash rate environment is mainly driven by the change in the equity/bond correlation. Specifically, we show that under the same simplified assumptions, a 10% increase in US equity-bond correlation is expected to raise the optimal trend-following allocation by 2.5%, offset by an equal reduction in bond allocation. This is because, while the diversification benefits of bonds diminish in a higher cash rate environment, trend-following CTAs maintain an average near-zero correlation to both equities and bonds, regardless of the cash rate level. As a result, the optimal allocation to trend-following increases in a high cash rate environment, primarily by reducing the bond allocation, while the allocation to equities remains largely unchanged.

In summary, our analysis demonstrates that trend-following CTAs may offer key diversification benefits to equity/bond portfolios across various market conditions, with these advantages becoming even more pronounced when cash rates are higher than average. Therefore, incorporating a trend-following allocation into an equity/bond portfolio can improve its risk-return profile by making it more resilient to the key risk of shifting equity/bond correlations.

Introduction

Between March 2022 and July 2023, the US Federal Reserve raised the federal funds rate by 525 basis points. In September 2024, more than a year later, the US 3-month Treasury rate remains at 4.5%. This is in stark contrast to the 0.5% average that prevailed from 2010 to 2021. Such a significant shift has profound implications for investment portfolios, requiring investors to reassess how this higher-rate environment impacts their asset allocation - particularly with regard to equities, bonds, and liquid alternative investments.

Some investors have argued that a higher interest rate environment calls for a higher allocation to high quality government bonds, citing attractive income competing with equity yields, potential equity diversification benefits, and potential upside from falling rates going forward.

In this note, we aim to quantify the optimal asset allocation to maximize the expected Sharpe ratio for a basic three-asset portfolio composed of equities, bonds, and trend-following CTA strategies. We conduct this analysis across both high and low cash rate environments to understand how these different regimes affect optimal portfolio allocations. Typical portfolio optimization requires assumptions about the expected returns, volatilities, and correlations of the individual assets.

We start by evaluating the excess returns[1], their volatilities and cross-asset correlations over a quarterly time horizon, conditioned on the prevailing 3-month US Treasury bill rate. By classifying each day into one of two distinct cash rate regimes - low or high - we aim to identify any statistically significant differences in excess returns, volatilities, and correlations for each asset between these regimes.

[1] Returns generated in excess of the risk-free rate.

As a result of this analysis, we can adopt simplifying, yet conservative assumptions about the key input variables used in the portfolio optimization, thereby minimizing the risk of introducing any unintended bias. Notably, the outcomes of such optimizations are particularly sensitive to the assumptions regarding expected returns.

For both low and high cash rate regimes, we will construct the optimal portfolio of equities, bonds, and trend-following that maximizes the Sharpe ratio, using empirically derived assumptions about asset risk-adjusted returns and cross-asset correlations specific to each regime. Specifically, we will demonstrate how the optimal allocation between equities, bonds, and trend-following shifts as we move from a low to a high cash rate environment.

Visualizing High and Low Interest Rate Regimes Over the Past 35 Years

Between 1990 and 2024, the annualized 3-month US Treasury bill rate has varied in a range between 0% and 8%, averaging at 3% over the period, as can be seen in Figure 1. A 3% threshold is a natural choice for classifying time periods into low (<3%) or high (>3%) interest rate regimes. Using this definition, each regime covers roughly 50% of the period from 1990 to 2024.

Figure 1: 3-month US Treasury Bill rate and high- and low- cash-rate regimes
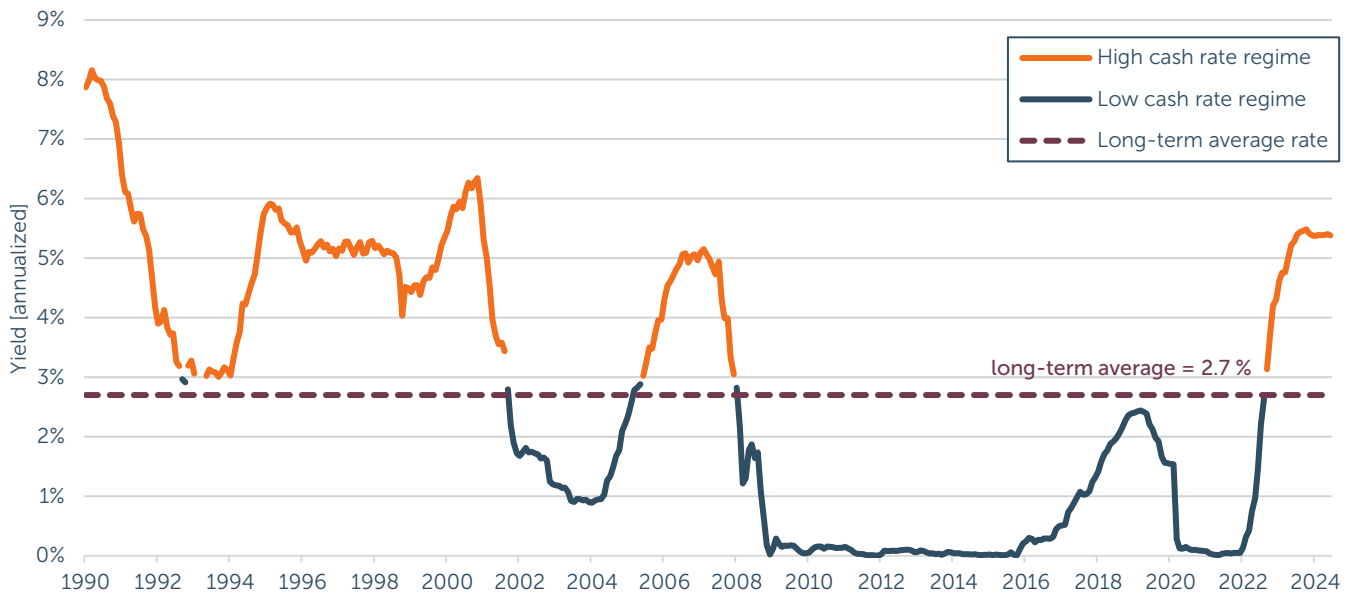

Figure 1: 3-month US Treasury bill rate from January 1990 to June 2024, including a classification of high- and low- cash rate regimes. A high cash rate regime (in orange) is defined as periods when the risk-free rate exceeds 3%, while a low cash rate regime (in blue) represents periods when the rate is below 3%. Source: Bloomberg, Quantica Capital.

US Equity and Government Bond Return Characteristics by Cash Rate Regime

With the low and high cash rate regimes defined, we aim to quantify how these regimes influence the optimal allocation within an equity/bond portfolio that includes a complementary allocation to trend-following strategies. For both the low and high cash rate regimes defined above, we construct the optimal, Sharpe ratio-maximizing portfolio using empirically derived assumptions about expected asset returns, volatilities, and cross-asset correlations specific to each regime.

That is, in a first step, we quantify the regime-specific characteristics of the three key variables - returns, volatilities, and correlations - that are

essential for portfolio construction and serve as inputs for portfolio optimization.

We start by quantifying the regime-conditional excess returns[2], their volatilities and correlations for US equities and US government bonds, represented for simplicity by the S&P 500 Index futures and US 10-year Treasury bond futures, respectively. More specifically, we compute daily average excess returns, volatilities, and correlations of each asset over the next quarter conditional on the daily 3-month US Treasury bill rate[3]. Figure 2 presents an overview of the three metrics, along with their 95% confidence intervals[4], for US equities and Treasuries across both cash rate regimes since 1990.

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[2] For this analysis, we focus on daily excess returns, defined as the difference between the return on a given asset and the return on the 3-month U.S. Treasury bill, which is calculated based on the annualized yield of a continuously rolled 3-month Treasury bill index. Returns on futures instruments are considered as excess returns.

[3] The choice of a quarterly time period is consistent with a time horizon that allows an investor to tactically adjust their portfolio allocation in response to changing market conditions. Additionally, calculating conditional returns over quarterly time intervals based on higher-frequency daily data (as opposed to calculating over the full regime sample) enables to estimate the distribution of the conditional returns.

[4] To obtain an estimate of the distribution of the mean of each variable (e.g., conditional quarterly excess returns, volatilities, and correlations), we begin by selecting a random starting point between 0 and 63. From the starting point, we construct a series of these statistics at quarterly intervals. We then resample this series with replacement to generate bootstrap samples and compute the mean for each sample. By repeating this procedure multiple times, we obtain a distribution of the mean based on the resampled data.

While the average historical excess returns on equities and bonds differ slightly in the two cash rate regimes, the differences are far too small to be statistically significant. Based on the past 35 years of data, the level of the US risk-free rate had little to no predictive power for the strength or weakness of the future excess returns of US equities and US bonds[5].

If excess returns of US equities and US government bonds have shown little dependency to the level of the cash rate since the 1990s, the same cannot be said of their cross-correlation.

As Figure 2 also shows, in the low interest rate environment, the average correlation between equities and bonds was -0.31, ranging from -0.38 to -0.25. In contrast, in the high cash rate environment, the average correlation was significantly higher at 0.19, with a range from +0.1 to +0.28. The results reveal a statistically significant increase in equity/bond correlations in a high cash rate environment at a 95% confidence level.

Figure 2: Distribution of average quarterly excess returns and volatilities and their correlations for US equities and US bonds by low and high cash rate regime since 1990
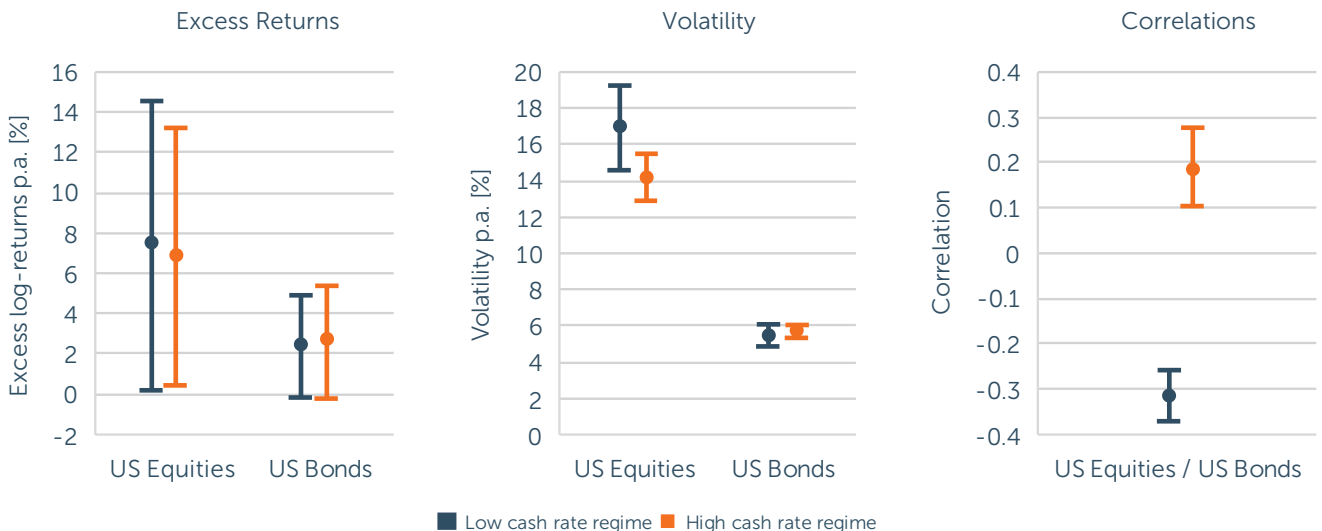

Figure 2: Average quarterly annualized excess log-returns, volatilities, and cross-correlations for US equities (S&P 500 index) and US bonds (10-year US Treasuries) for low and high cash rate regimes from 1990 to 2024. Each day is classified as a high (low) cash rate day if the daily 3-month US Treasury bill rate is above (below) 3%. Correlations are calculated based on daily returns. The average of each variable is shown along with the 95% confidence bands representing the distribution. Please refer to Appendix 1 for a tabular overview of the data. Source: Bloomberg, Quantica Capital. Data as per June 2024.

In the next step, we extend the analysis to trend-following CTAs. To proxy the historical return and correlation characteristics of a trend-following CTA allocation, we rely on the daily returns of the SG Trend Index, a representative industry benchmark, rebalanced annually, which tracks the average returns of ten of the largest trend-following CTA managers globally.

Because daily returns for this index are available only since January 2000, we calculate average excess returns, volatilities, and correlations over a quarterly time horizon conditional on the daily 3-month US Treasury bill rate for the period from 2000 to 2024. *Excess* index returns are estimated by subtracting the daily 3-month Treasury bill return from the daily reported index returns.

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[5] Note that by adding the average risk-free rate to the excess return, the expected total return of both US equities and US bonds was substantially higher in the high cash rate regime. However, this is not relevant in the context of our optimal portfolio allocation analysis, as only the risky portion of each asset's return (i.e., the excess return) is considered.

As illustrated in Figure 3, the return opportunities for trend-following CTAs, much like those for equities and bonds, appear unaffected by the cash rate level[6]. While historical excess returns of trend-following CTAs have been largely independent of the US risk-free rate, their correlation with US bonds exhibits a clearer dependency on the cash rate. In a high-rate regime, the average correlation between trend-following and bonds has been negative, averaging -0.17 and ranging from -0.37 to 0. In contrast, in a low-rate environment, the correlation is significantly higher, averaging 0.15 and varying between 0.05 and 0.24. Conversely, the correlation between trend-following and US equity returns remains close to zero across both interest rate regimes, with no statistically significant difference between them. As the bond's equity diversification benefits weaken in a higher rate environment, as we have noted, trend-following diversification benefits against bonds strengthen, making trend-following CTAs an even more attractive complementary diversifier to bonds.

Overall, these results reinforce our earlier finding that the cash rate has minimal predictive power on excess returns for all three assets, as asset returns are influenced by a variety of other market risk factors. The same is true for expected volatilities: we find no significant differences in the average conditional volatilities across different cash rate regimes for all three assets.[7]

In summary, we have identified two factors that differ statistically significantly between high and low cash rate periods: the correlation between equities and bonds, and the correlation between trend-following strategies and bonds.

Figure 3: Distribution of average quarterly excess returns, volatility, and cross-correlations with US equities and bonds for trend-following CTAs by low and high cash rate regime since 2000
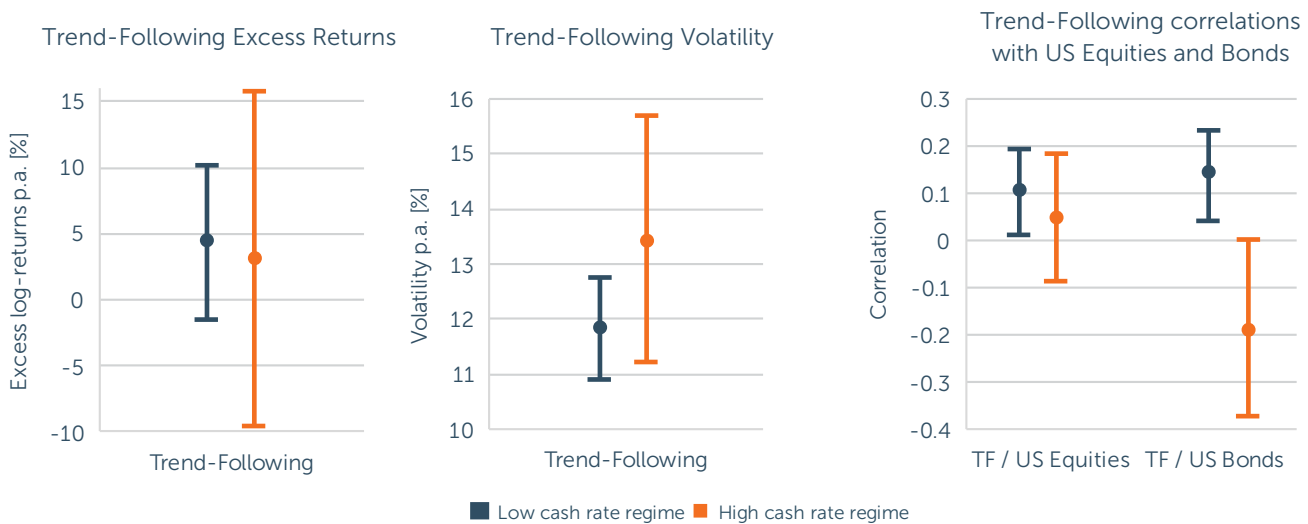
Figure 3: Average quarterly annualized excess log returns and volatilities of the SG Trend Index and cross-correlations with US equities (S&P 500 index) and US bonds (10-year US Treasuries) for low and high cash rate regimes from 2000 to 2024. Each day is classified as a high (low) cash rate day if the daily 3-month US Treasury bill rate is above (below) 3%. Correlations are calculated based on daily returns. The average of each variable is shown along with the 95% confidence bands representing the distribution. Please refer to the Appendix 2 for a tabular overview of the data. Source: Bloomberg, Societe Generale, Quantica Capital. Data as per June 2024.

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[6] The expected excess return of trend-following CTAs remains independent of the risk-free rate environment, as these strategies typically trade on margin, allowing them to earn risk-free cash returns on nearly all of their capital.

[7] Over the shorter time frame since 2000, we again find no statistically significant difference in the average regime-conditional excess returns for US equities and US government bonds. For completeness, these results are detailed in the appendix. Additionally, the average regime-conditional excess return for US equities since 2000 differs significantly from the period since 1990, highlighting the sensitivity of returns to the selected look-back period. The average equity/bond correlation remains statistically significantly different between low and high-rate regimes, consistent with our findings since 1990.

A High Cash Rate Environment Favours Trend-Following CTAs Over Bonds

Based on these empirical observations of asset returns and cross-asset correlations conditioned on the cash rate, we aim to determine how the cash rate environment influences the optimal allocation of a 60/40 portfolio, including a potential allocation to trend-following CTA strategies, in order to maximize portfolio risk-adjusted returns.

Since we do not find that the level of the risk-free rate provides any information about the expected excess returns and volatilities of the three assets considered, we fix the expected return and risk parameters irrespective of the cash rate regime. The assumed expected Sharpe ratio of 0.45 for US equities and for US government bonds applies indifferently in both low and high cash rate regimes and correspond to their long-term empirically observed values since 1990 (see Appendix 1). This approach minimizes the sensitivity to small variations in these parameters that would affect the outcome of portfolio optimization.

Additionally, we intentionally stay on the conservative side and deliberately set the expected Sharpe ratio for trend-following CTAs to 0.30 regardless of the level of the risk-free rate, a level that is inferior to its historically realized value, and below that of equities and bonds. A summary of the excess return and volatility assumptions that will be used for deriving the optimal asset allocations are provided in Table 1. In addition, we use the previously empirically estimated regime-conditional distribution of average quarterly correlations between equity, bond and trend-following CTA returns since 2000. In summary, correlations (equity/bond, equity/trend, and bond/trend correlations) will be the only variable in our portfolio optimization that vary with the cash rate.

For each cash rate regime, we construct the optimal portfolio that minimizes its volatility while targeting an excess return equivalent to that of a 60/40 portfolio, using the empirical assumptions for individual asset excess returns in Table 1. Based on such assumptions, the target portfolio excess return is 5.2% per annum. In other words, we aim to determine the allocation weights that maximize the portfolio's Sharpe ratio and targeting the long-term empirically observed excess return of a standard US 60/40 portfolio.

Table 2 displays the optimal asset allocation weights for both low and high-rate regimes, along with their 95% confidence intervals.

Table 1: Assumptions regarding the input parameters for solving an optimal asset allocation problem

	Excess Return p.a.	Volatility p.a.	Sharpe ratio
US Equities	7.0%	16.0%	0.45
US Bonds	2.5%	5.5%	0.45
Trend-Following CTAs	3.5%	12.0%	0.30

Table 1: Empirically derived and simplified assumptions regarding excess returns and volatilities for US equities, US Treasuries, and trend-following CTAs to construct an optimal 60/40 portfolio, including a potential allocation to trend-following strategies. Sharpe ratios are defined as the ratio of excess return to volatility for each asset Source: Quantica Capital.

Table 2: Optimal allocation of a portfolio of US equities, US bonds, and trend-following CTAs by cash rate regimes

Cash rate regime	US Equities		US Bonds		Trend-Following CTAs	
	Mean	95% confidence	Mean	95% confidence	Mean	95% confidence
High	55%	53%, 57%	24%	17%, 30%	21%	13%, 30%
Low	58%	57%, 60%	34%	28%, 39%	8%	1%, 15%

Table 2: Optimal allocation of a portfolio of US equities, US Treasuries and trend-following strategies, targeting the excess return of a 60/40 equity/bond portfolio while minimizing volatility, conditional on the US cash rate environment. The average allocation for each asset is shown along with the 95% confidence bands representing the distribution. All calculations are based on simplified and conservative assumptions about individual asset excess returns and regime conditional cross-asset correlations (see Table 1). Source: Quantica Capital.

We see that under these admittedly simplified but reasonable assumptions, it is always beneficial to incorporate trend-following CTAs to a 60/40 portfolio regardless of the prevailing cash rate regime. In a high-rate regime, a 55/24/21 (equity/bond/trend-following) combination achieves the same expected excess return as the 60/40 portfolio but with a lower volatility. Similarly, in a low-rate environment, a 58/34/8 combination achieves the same excess return as the 60/40 portfolio, but with a higher expected Sharpe ratio. In summary, under a set of reasonable and conservative assumptions, we find that in a low cash rate environment, a 55/35/10 portfolio may be a more optimal allocation than the traditional 60/40 portfolio. Additionally, we show that in a higher cash rate environment, the optimal allocation shifts to a 55/25/20 portfolio, with an increased weight in trend-following strategies at the expense of the bond allocation.

Indeed, as we move from a low to a high cash rate environment, the optimal allocation to trend-following increases by roughly 10%, rising from 10% to 20%, while the allocation to bonds decreases by around 10%, falling from 35% to 25%. Essentially, higher interest rates make trend-following CTAs more attractive relative to bonds. This is largely because bonds tend to lose some of their diversification benefits as their correlation with equities becomes less negative, as highlighted above.

How Equity/Bond Correlations Impact the Optimal Trend-Following Allocation

The variation between the two optimal portfolio allocations in the high and low cash rate regimes is due to one key differing input assumption: the equity/bond correlation in each regime. To further explore the sensitivity of our three-asset portfolios to the equity/bond correlations, we extend the previous analysis by calculating the minimum-volatility portfolio, targeting a fixed excess return of 5.2%, across a range of expected equity/bond correlations from -0.5 to 0.5, while keeping all other parameters unchanged. The results are provided in Figure 4.

The results show that regardless of the equity/bond correlation scenario, the optimal allocation to trend-following CTAs is consistently positive.

As the correlation between equities and bonds increases, the equity diversification benefits of government bonds decline, making a bond allocation less effective for reducing portfolio risk. Since the expected correlation of trend-following strategies with equities and bonds is largely unaffected by the level of interest rates, trend-following remains a valuable diversifier regardless of the cash rate environment. Thus, increasing the allocation to trend-following CTAs is particularly advantageous in a higher cash rate environment, where the diversification benefits from bonds are diminished.

As further illustrated in Figure 4, the relationship between changes in equity/bond correlation and the optimal allocations to trend-following and bonds is nearly linear. Under our simplified assumptions, a 10% increase in equity-bond correlation leads to an approximately 2.5% increase in the optimal allocation to trend-following, accompanied by a corresponding 2.5% reduction in bond allocation, while the equity allocation remains largely unaffected. For example, if the equity/bond correlation rises from -20% to 20%, the optimal allocation to trend-following increases from 13% to 24%, mainly at the expense of bonds, which decrease from 30% to 21%[8].

Figure 4: Optimal portfolio allocation for different equity/bond correlation levels
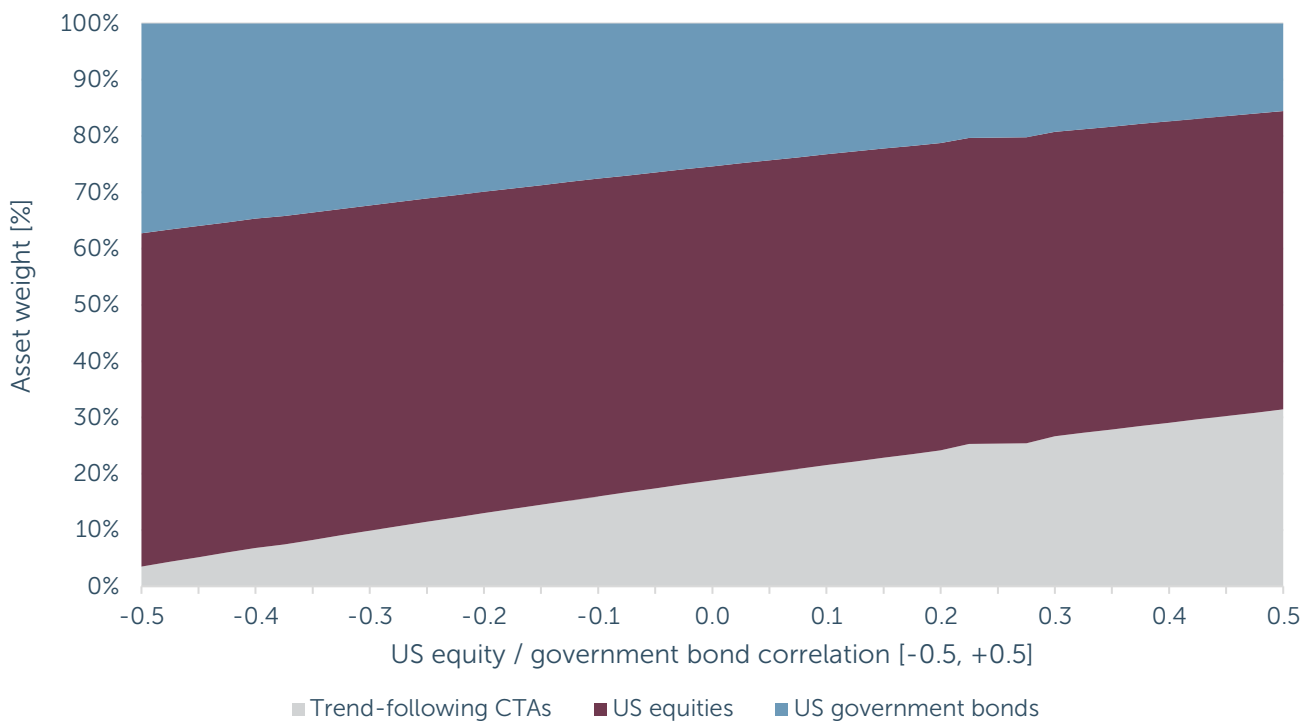
Figure 4: Optimal asset allocation of a portfolio consisting of US equities (S&P 500 index), US government bonds (10-year US Treasuries) and trend-following strategies (SG Trend Index), targeting the excess return of a standard 60/40 equity/bond portfolio while minimizing volatility, for various US equity/bond correlation levels ranging from -0.5 to 0.5, based on simplified but conservative assumptions about individual asset excess returns and regime conditional cross-asset correlations (see Table 1). Source: Quantica Capital.

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[8] It should be highlighted that this relationship between the change in the equity/bond correlation and the change in the optimal trend-following allocation depends on the target excess return of the overall portfolio, the underlying assumption about the excess returns of individual assets and, to a lesser extent, cross-asset correlations other than the equity/bond correlation.

Conclusion

In this research note, we have quantified the impact of a higher US cash rate on the optimal asset allocation for a basic three-asset portfolio consisting of US equities, US government bonds and trend-following CTAs.

We have evaluated average excess returns, volatilities and cross-correlations for these three assets in high and low cash rate regimes, relying on historical data going back to the 1990s. We do not find that the cash rate is a reliable predictor of future excess returns for any of the three assets. However, our analysis reveals a statistically significant difference in the correlation between US equities and US bonds during higher cash rate periods compared to periods with lower cash rates.

These results have meaningful implications for the asset allocation in response to a higher cash rate regime. While equity-to-trend-following correlations are unaffected by the cash rate, higher cash rates are associated to less negative equity/bond correlations, reducing the diversification benefits of bonds. As a result, the diversification benefits of trend-following CTAs increase relative to that of bonds for higher cash rates.

Using a set of simplified but conservative assumptions, we have shown that in a low cash rate environment, a 55/35/10 portfolio may be a more optimal allocation than the traditional 60/40 portfolio. At the same time, we have highlighted that in a higher cash rate environment, the optimal allocation shifts toward a 55/25/20 portfolio with a larger trend-following allocation. Specifically, under the same set of simplified expected risk-return assumptions, a 10% increase in the expected correlation between US equities and US bonds results in a 2.5% increase in the optimal allocation to trend-following, at the expense of the allocation to bonds by the same amount.

These empirical results suggest that in a higher cash rate environment, trend-following CTAs become more - not less - attractive relative to bonds in order to maximize the risk-adjusted performance of a 60/40-type portfolio. More generally, our results highlight that integrating a trend-following CTA strategy into a traditional 60/40 equity/bond portfolio can significantly reduce its sensitivity to shifts in the equity/bond correlation regime, resulting in a more stable return profile under varying market conditions.

Appendix

Appendix 1: Distribution of average quarterly excess returns and volatilities and their correlations for US equities and US bonds by low and high cash rate regime since 1990

		US Equities		US Bonds	
		Mean	95% confidence	Mean	95% confidence
High-rate regime	Excess return p.a.	6.8%	0.5%, 13.2%	2.7%	0.0%, 5.5%
	Volatility p.a.	14.0%	12.8%, 15.4%	5.6%	5.3%, 6.0%
	Correlation to US Equites		1	0.19	+0.10, +0.28
	Total return p.a.	11.7%	5.8%, 18.1%	7.7%	4.8%, 10.6%
Low-rate regime	Excess return p.a.	7.2%	0.3%, 14.6%	2.5%	-0.2%, 5.0%
	Volatility p.a.	16.9%	14.5%, 19.2%	5.6%	5.1%, 6.1%
	Correlation to US Equites		1	-0.31	-0.38, -0.25
	Total return p.a.	8.0%	1.3%, 15.4%	3.3%	0.7%, 5.8%
Full Period	Excess return p.a.	7.1%	2.3%, 11.7%	2.6%	0.8%, 4.5%
	Volatility p.a.	15.6%	14.2%, 16.9%	5.6%	5.3%, 5.9%
	Correlation to US Equites		1	-0.09	-0.15, -0.02
	Total return p.a.	9.7%	4.9%, 14.7%	5.3%	3.4%, 7.1%

Table 3: Average quarterly annualized excess log-returns, volatilities, and cross-correlations for US equities (S&P 500 index) and US bonds (10-year US Treasuries) for low and high interest rate regimes from 1990 to 2024. Each day is classified as a high (low) cash rate day if the daily 3-month US Treasury bill rate is above (below) 3%. Correlations are based on daily returns. The average of each variable is shown along with the 95% confidence bands representing the distribution. Source: Bloomberg, Quantica Capital. Data as per June 2024.

Appendix 2: Distribution of average quarterly excess returns, volatility, and cross-correlations with US equities and bonds for trend-following CTAs by low and high cash rate regime since 2000

		US Equities		US Bonds		Trend-Following CTAs	
		Mean	95% confidence	Mean	95% confidence	Mean	95% confidence
High-rate regime	Excess return p.a.	-1.1%	-11.1%, 10.8%	2.7%	-1.9%, 7.5%	2.5%	-9.7%, 15.4%
	Volatility p.a.	15.3%	12.6%, 17.5%	5.6%	4.9%, 6.3%	13.5%	11.3%, 15.7%
	Correlation to US Equites		1	-0.07	-0.19, +0.05	0.04	-0.08, +0.19
	Correlation to US Bonds				1	-0.17	-0.37, +0.00
	Total return p.a.	3.6%	-7.1%, 14.7%	7.4%	2.8%, 12.4%	7.2%	-5.5%, 18.4%
Low-rate regime	Excess return p.a.	6.7%	-0.8%, 15.1%	2.5%	-0.1%, 5.0%	4.4%	-1.4%, 10.3%
	Volatility p.a.	17.0%	14.4%, 19.2%	5.6%	5.1%, 6.1%	11.9%	11.0%, 12.8%
	Correlation to US Equites		1	-0.32	-0.38, -0.27	0.11	+0.02, +0.20
	Correlation to US Bonds				1	0.15	+0.05, +0.24
	Total return p.a.	7.5%	0.0%, 15.2%	3.3%	0.4%, 5.9%	5.2%	-0.6%, 10.9%
Full Period	Excess return p.a.	4.9%	-1.3%, 11.5%	2.5%	0.2%, 4.8%	4.0%	-1.3%, 9.2%
	Volatility p.a.	16.6%	14.6%, 18.4%	5.6%	5.2%, 6.0%	12.2%	11.5%, 13.0%
	Correlation to US Equites		1	-0.25	-0.31, -0.20	0.10	+0.02, +0.18
	Correlation to US Bonds				1	0.01	-0.07, +0.15
	Total return p.a.	6.6%	1.0%, 12.8%	4.3%	1.9%, 6.7%	5.7%	0.4%, 10.6%

Table 4: Average quarterly annualized excess log-returns, volatilities, and cross-correlations for US equities (S&P 500 index) and US bonds (10-year US Treasuries) for low and high interest rate regimes from 2000 to 2024. Each day is classified as a high (low) cash rate day if the daily 3-month US Treasury bill rate is above (below) 3%. Correlations are based on daily returns. The average of each variable is shown along with the 95% confidence bands representing the distribution. Source: Bloomberg, Quantica Capital. Data as per June 2024.

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