
The Case for Systematic Investing in Fixed Income

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May 2024

KEY TAKEAWAYS

- ▶ Differences in current expected returns across bonds of different durations, credit qualities, and currencies of issuance have reliable information about future return differences.
- ▶ Systematic strategies can use information in market prices to target bonds with higher expected returns and improve investment outcomes in the long run.
- ▶ This approach can also address needs, goals, and risk preferences around inflation protection, sustainability, and currency hedging.

This paper shows that a systematic investing approach can be a compelling alternative to traditional active and traditional passive investment approaches for bond investors. Because forward rates contain reliable information about the expected returns of global government and corporate bonds, systematic fixed income portfolios that target bonds with higher forward rates across different durations, credit qualities, and currencies can outperform their benchmarks by over 1% per year on average. We also demonstrate that this systematic approach to fixed income investing can meet many investor goals and risk preferences, including inflation protection and a sustainability focus.

We thank Savina Rizova, Wei Dai, Kaitlin Hendrix, Dave Plecha, Joe Kolerich, Doug Longo, Jacobo Rodriguez, Mingzhe Yi, David Min, and Yuxiao Feng for their insightful comments and help with the analysis.

Introduction

Investors use fixed income investments to meet different goals, including volatility dampening, liability matching, and protecting the purchasing power of capital. To achieve these goals, investors typically choose between two approaches: a traditional active approach or a traditional passive approach. The key drawback of the traditional active approach is that it relies on forecasting changes in yield curves, which is inherently unreliable. On the other hand, the traditional passive approach (also known as indexing) generally ignores information embedded in current market prices about a bond's expected return and, as a result, fails to maximize value for investors over the long term. We show a better way: Investors can benefit in the long run from systematic strategies that account for differences in expected returns across bonds.

The expected return on a default-free bond has three components: yield, expected capital appreciation (roll-down), and the expected change in interest rates over the investment horizon. The first two components are observable from current market prices. The third component is not observable. Moreover, ample academic research (e.g., Fama 1984; Campbell and Shiller 1991; Duffee 2002) concludes that changes in interest rates cannot be predicted systematically. So, the expected return boils down to the first two components, which are jointly known as the forward rate.¹ Forward rates contain reliable information about the expected returns on corporate bonds, mortgage-backed securities (MBS), and to-be-announced forward contracts (TBAs).² Hence, investors can use forward rates to build systematic fixed income strategies that emphasize government, corporate, and securitized bonds with higher expected returns. This paper aims to provide a thorough empirical investigation into such systematic fixed income strategies.³

Our analysis uses issue-level data from Bloomberg and index-level data from Bloomberg and FTSE, including global investment-grade government and corporate bonds. We divide the analysis into three parts. First, our regression analysis confirms the three main sources of higher expected bond returns: term, credit, and currency of issuance. Results from time-series regressions show that current differences in yields have reliable information about future term and credit premiums. For example, between 1976 and 2023, a term spread between the Bloomberg US Treasury 3–10 Year and 1–3 Year indices of 100 basis points (bps) is associated with a 20-bps average difference in realized returns, with a t-statistic of 3.00. Similarly, between 1973 and 2023, a credit spread of 100 bps between the Bloomberg US Credit Intermediate AAA and Bloomberg US Government Intermediate bond indices is associated with a 26-bps

1. To be technically precise, even if the expected change in interest rates is zero, the third term does not fully disappear. In continuous time, it yields a convexity term. This convexity term is negligibly small for short- and intermediate-term bonds, so we exclude it from the simulations and the discussion, but practitioners may incorporate it when computing the expected returns on long-term bonds.
2. Lee et al. (2022) show that the expected return on a corporate bond is a function of its forward rate, the expected future change in its yield, the probability of default, and the expected rate of recovery. For investment-grade and BB corporate bonds, the probability of default is negligible and hence forward rates are the main driver of differences in expected returns. Rizova et al. (2023) model the expected return of agency MBS as the forward rate of key-rate-duration-matched Treasury portfolio and option-adjusted-spread and show that this proxy reliably forecasts future MBS and TBA returns.
3. Many academic papers study fixed income factors. However, Lee et al. (2022) find that many corporate bond issue- and issuer-level variables do not provide additional information about expected bond returns after controlling for forward rates with the only exception being short-term equity momentum. Wang (2022) uses municipal bond yields as a proxy for expected returns and shows that a systematic municipal bond strategy that targets higher expected returns can also reliably outperform the municipal bond market.

average return difference, with a t-statistic of 5.36. Additionally, cross-sectional regressions show differences in current forward rates across bonds of different currencies of issuance and maturities have reliable information about future differences in their returns. For example, between 1985 and 2023, a 100-bps difference in the hedged forward rate across global intermediate government bonds yields an 83-bps difference in the subsequent month's hedged return on average, with a t-statistic of 3.96.

Second, we construct variable maturity, variable credit, and variable currency simulations, which vary the portfolio allocations to target differences in expected bond returns along the duration, credit quality, and currency of issuance dimensions. These simulations outperformed their respective benchmarks by an annualized 28 bps, 45 bps, and 41 bps on average. Furthermore, they outperformed their respective benchmarks in 72%, 78%, and 61% of the calendar years.

Lastly, we design systematic core strategies that invest in government and corporate bonds. These strategies simultaneously determine the duration, credit, and currency allocation based on expected returns and investor risk preferences. The US and global core simulations outperform their benchmarks by an annualized 41 bps and 140 bps, respectively, over their sample periods. We show that systematic investing can also add value when applied to strategies focused on sustainable investing, inflation protection, and selective currency hedging. Being both evidence-based and flexible is what sets the systematic approach apart from both traditional active and traditional passive investing.

The rest of the paper is organized as follows. Section 2 covers the theoretical rationale and empirical evidence behind the premiums. Section 3 covers the variable credit, duration, and currency simulations followed by the core systematic simulations and some examples of customizations that systematically target the premiums. We conclude the paper and highlight our key findings in Section 4.

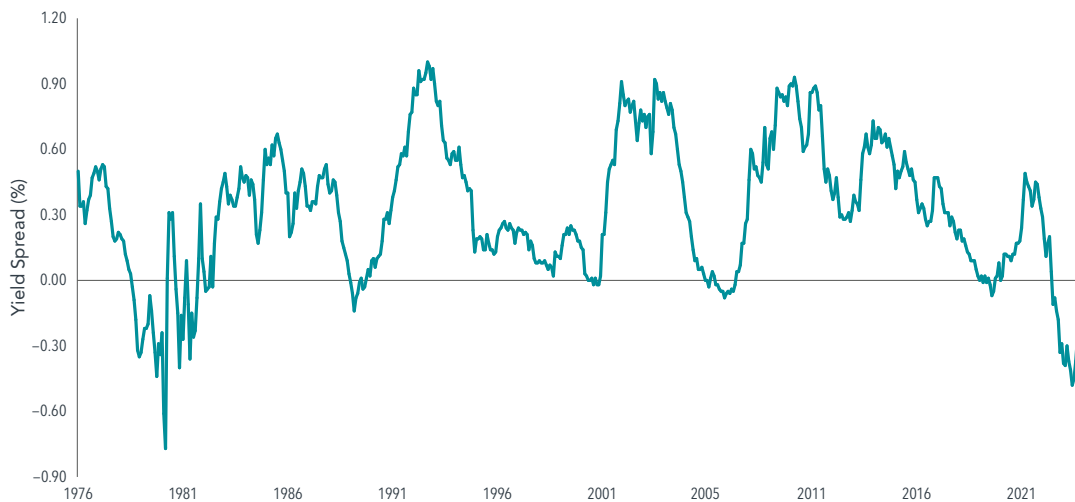
Systematic Differences in Expected Bond Returns

The expected returns of global government and corporate bonds vary across three dimensions: term, credit, and currency of issuance. In this section, we present updated evidence on the relation between yields/forward rates and differences in expected returns along these dimensions.

Differences in Expected Returns across Durations

The term premium is the return difference between longer-term bonds and shorter-term bonds with similar credit quality. On average, longer-term bonds tend to outperform shorter-term bonds. For example, between 1976 and 2023, the Bloomberg US Intermediate Government Bond Index outperformed the 1–3 year index by an average of 57 bps annually. The term spread is the yield difference between a longer-term bond and a shorter-term bond. While the term spread has historically been positive because investors demand a return premium for bearing the additional volatility of longer-duration bonds, **Exhibit 1** shows that it varies over time. The theoretical framework for expected bond returns implies that the size of the current term spread should have information about the size of the future term premium. But what do the data say?

EXHIBIT 1: US Term Spread, 1976–2023



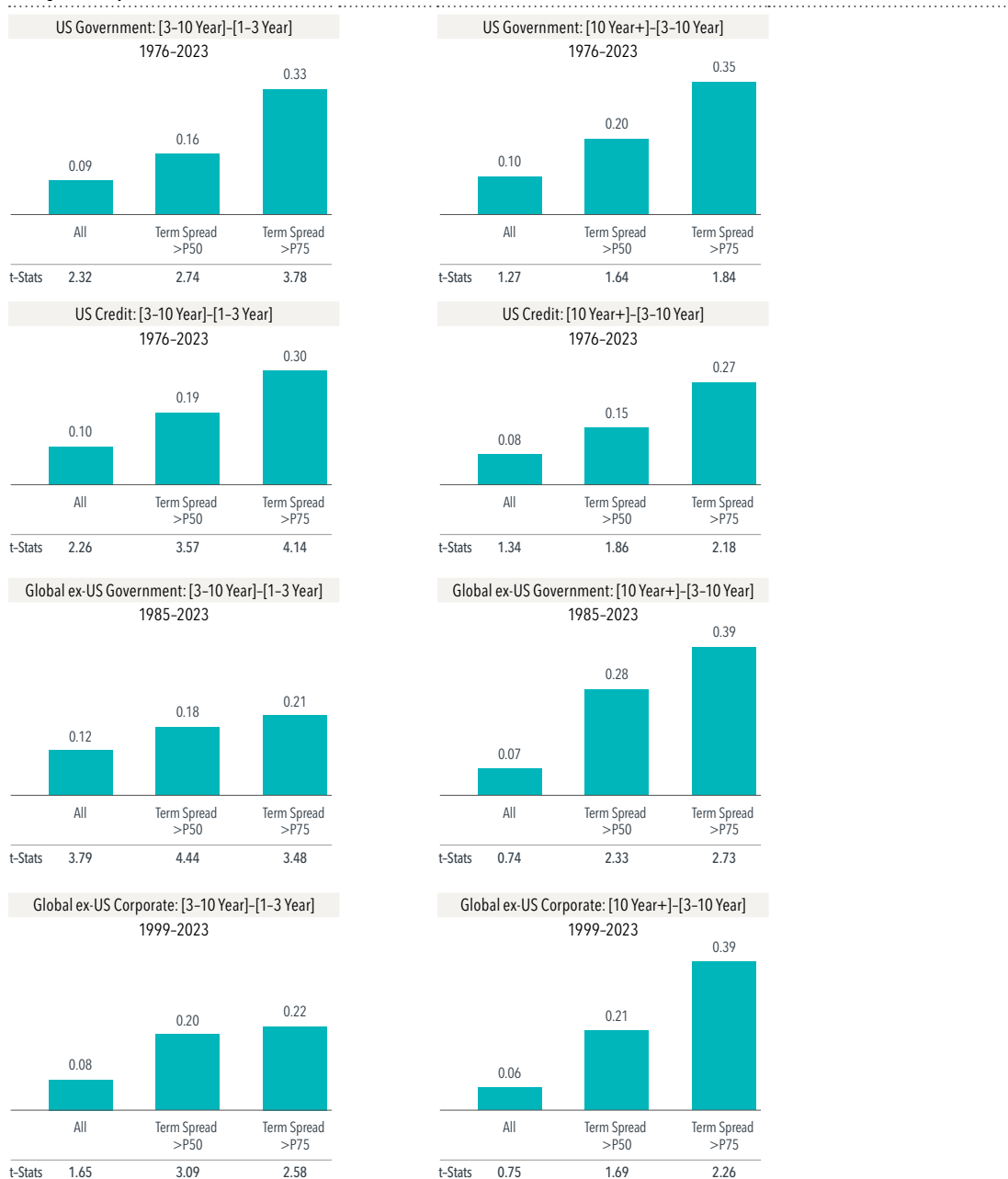
This figure plots the monthly difference in annualized yields between the Bloomberg US Intermediate Government and Bloomberg US Government 1–3 Year bond indices. The monthly time series of yield data are provided by Bloomberg. Past performance is not a guarantee of future results. Indices are not available for direct investment; therefore, their performance does not reflect the expenses associated with the management of an actual portfolio.

Fama (1984) and Fama and Bliss (1987) find there is a reliable relation between the current term spread and future term premium for US Treasuries. Using subindices for different maturity ranges, we regress the term premium in month $(t+1)$ on the term spread in month (t) to test whether this relation holds for US and global government and credit bonds. We find that the relation is positive across US and global ex US Treasury and corporate bonds (**Table 1**). All but three t -statistics are bigger than 2, which indicates that the slope estimates are reliably larger than zero.

Exhibit 2 shows the average monthly term premium is 9 bps from 1976 to 2023 between US 3–10 year and 1–3 year government bonds. When the term spread is greater than the 50th and 75th percentiles in the sample period, the average term premium in the following months increases to 16 bps and 33 bps, respectively. The results are similar when we examine the term spread and term premium between US government bonds with maturities longer than 10 years and US government bonds with 3–10 year maturities. We also find an increasing relation between term spreads and subsequent-month term premiums for US credit, global ex US government, and global ex US corporate bonds.

EXHIBIT 2: Term Premiums

Average monthly return difference (%)

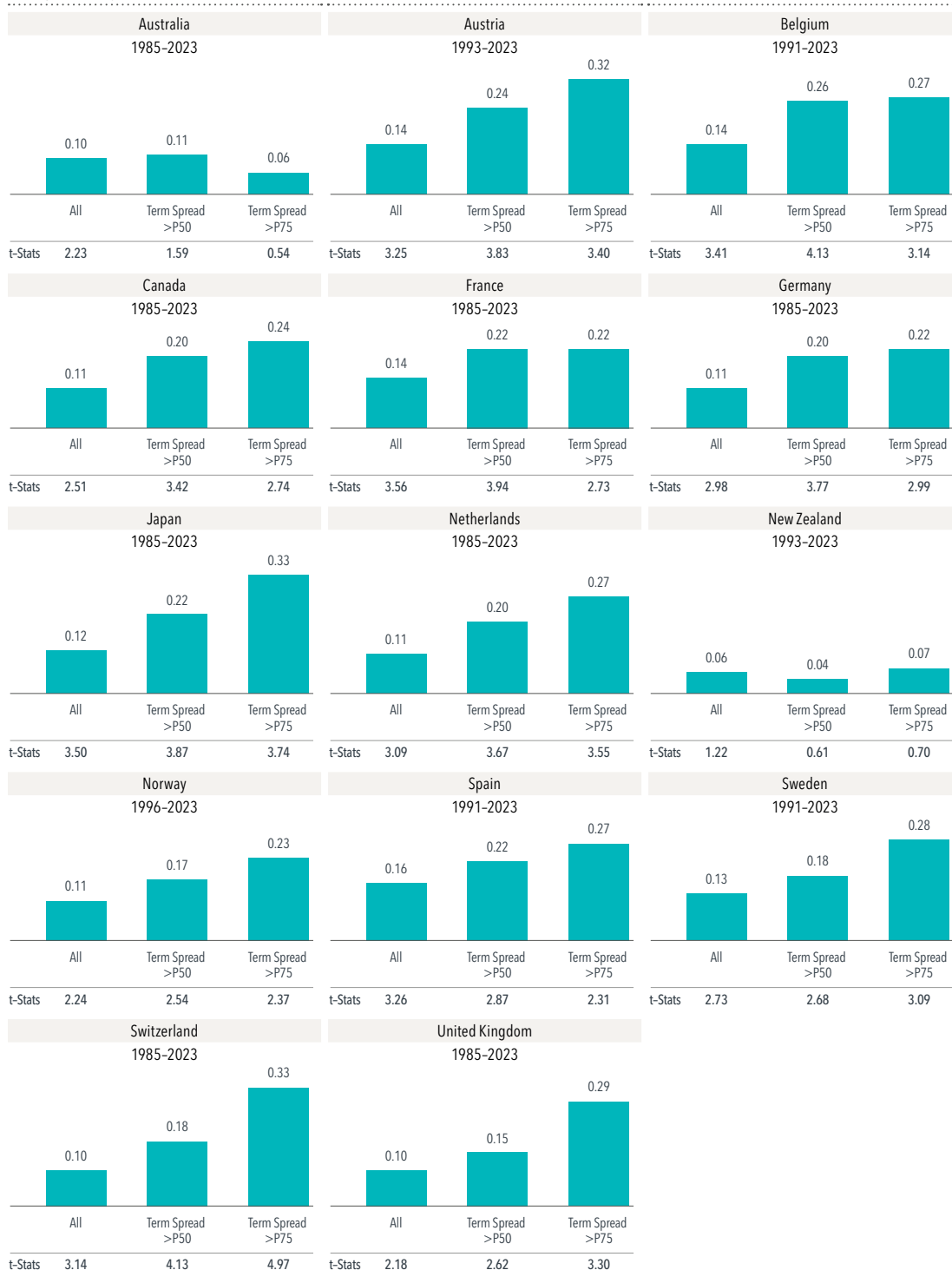


The bar plots in this figure are the average monthly difference in returns between longer-maturity and shorter-maturity bond indices. The first bar in each chart represents the average USD return difference unconditional on the term spread, while the second and third bars are average USD return differences conditional on the beginning-of-month term spread being greater than the median (P50) and 75th percentile (P75) of all months. Short-term bond indices include bonds with 1–3 year maturities, intermediate-term indices include bonds with 3–10 year maturities, and long-term indices include bonds with maturities longer than 10 years. The monthly time series of yield and return data are provided by Bloomberg and FTSE. Past performance is not a guarantee of future results. Indices are not available for direct investment; therefore, their performance does not reflect the expenses associated with the management of an actual portfolio.

We extend this analysis to government bonds from 14 countries across major developed markets. **Exhibit 3** shows similar results in 12 countries, except for Australia and New Zealand, highlighting how pervasive the positive relation between current term spreads and future term premiums is across different markets.

EXHIBIT 3: Term Premiums in Major Non-US Developed Countries

Average monthly return difference (%)

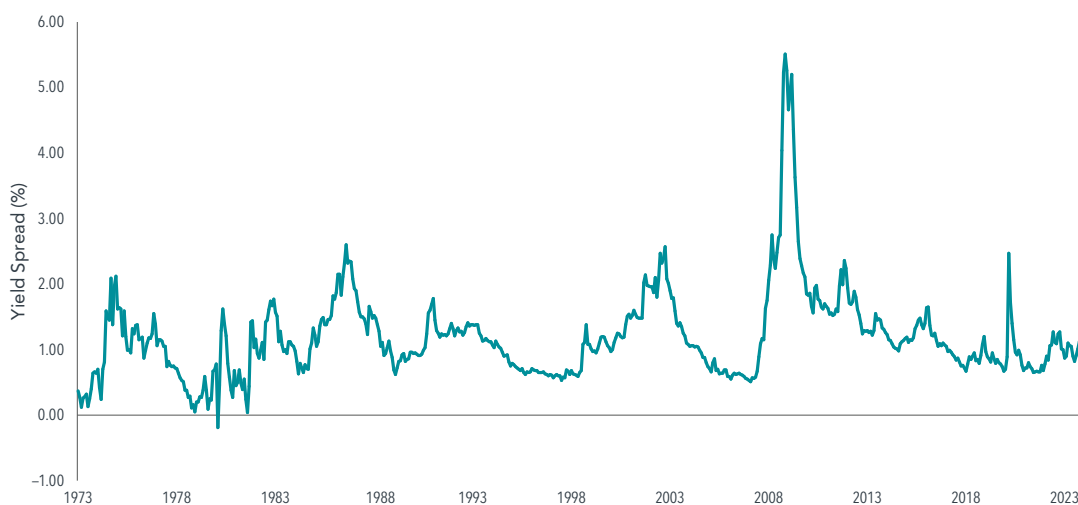


The bar plots in this figure are the average monthly difference in returns between intermediate-maturity (3–10 years) and short-maturity (1–3 years) government bond indices. The first bar in each chart represents the average USD return difference unconditional on the term spread, while the second and third bars are average USD return differences conditional on the beginning-of-month term spread being greater than the median (P50) and 75th percentile (P75) of all months. The monthly time series of yield and return data are provided by FTSE. Past performance is not a guarantee of future results. Indices are not available for direct investment; therefore, their performance does not reflect the expenses associated with the management of an actual portfolio.

Differences in Expected Returns across Credit Qualities

The credit premium is the return difference between bonds of higher and lower credit quality but with similar maturities or durations. On average, the credit premium has been positive. For example, the Bloomberg US Intermediate Credit Bond Index outperformed the Bloomberg US Intermediate Government Bond Index by 93 bps annually from 1976 to 2023. Generally, investors demand a higher yield from a bond with higher credit risk. This difference in yields is called the credit spread and is generally positive (**Exhibit 4**). The theoretical framework for expected bond returns predicts that the size of the current credit spread should contain reliable information about the future credit premium.

EXHIBIT 4: US Credit Spread, 1973–2023



This figure plots the monthly difference in annualized yields between the Bloomberg US Intermediate Credit Bond Index and Bloomberg US Intermediate Government Bond Index. The monthly time series of yield data are provided by Bloomberg. Past performance is not a guarantee of future results. Indices are not available for direct investment; therefore, their performance does not reflect the expenses associated with the management of an actual portfolio.

To test this, we regress the credit premium in month $(t+1)$ on the credit spread in month (t) . We run a series of regressions for bonds across different credit quality groups and report the results in **Table 2**. The slopes are all positive with t-statistics above 2 for 29 out of 30 combinations.⁴ Indeed, there is a reliably positive relation between current credit spreads and future credit premiums across different markets.

4. The time series of the duration difference between intermediate Global ex US Corporate AA and Global ex US Corporate A is varying and can be as high as a year in the sample period; hence, there could be interaction between the term and credit premiums.

Similarly, we find an increasing relation between credit spreads and subsequent credit premiums in **Exhibit 5**. For example, the monthly credit premium between bonds in the Bloomberg US Credit 1–3 Year and Bloomberg US Government 1–3 Year indices is 5 bps on average from 1976 to 2023. This premium increases to 11 bps and 16 bps for months when the beginning-of-month credit spread is greater than the 50th and 75th percentiles in the sample period, respectively. Results are similar for US intermediate, global ex US short, and global ex US intermediate bonds but less reliable for US long bonds and global ex US long bonds, as shown in **Table 2** and **Exhibit 5**.⁵

EXHIBIT 5: Credit Premiums (Credit Bonds vs. Government Bonds)

Average monthly return difference (%)



The bar plots in this figure are the average monthly difference in USD returns between credit/corporate bond and government bond indices with similar maturities. The first bar in each chart represents the average return difference unconditional on the credit spread, while the second and third bars are average return differences conditional on the beginning-of-month credit spread being greater than the median (P50) and 75th percentile (P75) of all months. Short-term indices include bonds with 1–3 year maturities, intermediate-term indices include bonds with 1–10 year maturities, and long-term indices include bonds with 10-year+ maturities. The monthly time series of yield and return data are provided by Bloomberg. Past performance is not a guarantee of future results. Indices are not available for direct investment; therefore, their performance does not reflect the expenses associated with the management of an actual portfolio.

Differences in Expected Returns across Currencies

Dai and Schneller (2020) show that the expected return of a fully hedged foreign bond can be written as the sum of the expected unhedged return and the forward currency premium (FCP).⁶ They also highlight how currency returns are much more volatile than bond returns and can dominate the unhedged foreign bond return. Thus, when it comes to investing in foreign

5. There is interaction between the credit and term premiums especially in long bonds because the average duration of the long government bond index is longer than the average duration of long credit bond index in both US and global ex US universes. For example, from 1989 to 2023, the period for which duration data are available, the average durations of the Bloomberg US Long Credit Bond Index and Bloomberg US Long Government Bond Index are 10.94 years and 12.98 years, respectively.

6. The forward currency premium is the expected return from holding the 1-month currency (FX) forward contract, which is based on the currency FX forward rate and FX spot rate. In the full decomposition of the unhedged expected return, there is an additional term, the expected currency return. Empirical data have shown that currency returns are not reliably different from zero over long time horizons. See Dai and Schneller (2020) for additional details.

bonds, many investors prefer to hedge their foreign currency investments to avoid being exposed to currency risk.

To test the relation between current expected hedged returns (forward rates) and subsequent-month realized hedged returns, we run Fama-MacBeth regressions on a cross-section of global intermediate-maturity Treasury bonds, represented by subindices from 15 developed countries included in the FTSE World Government Bond Index (WGBI).⁷ The results in **Table 3** show that differences in hedged forward rates strongly predict differences in returns across countries. This relation holds true across different maturity ranges as well, including 1–3 year, 3–5 year, 5–7 year, and 7–10 year.⁸

In addition, for global corporate bonds, Lee et al. (2022) show that hedged forward rates contain reliable information about cross-sectional differences in future hedged returns using both cross-sectional regressions and portfolio analysis. Therefore, the same expected return framework can be used to identify cross-sectional differences in expected hedged returns of government and corporate bonds across different currency denominations.

Systematic Bond Strategies

Since forward rates contain reliable information about future returns across different durations, credit qualities, and currencies, one can design portfolios that use this information to dynamically adjust portfolio exposures across the duration, credit, and currency spectrum. This approach does not require forecasting changes in the yield curve; instead, it uses information in the current yield curves to target higher expected returns.

Variable Maturity

The positive relation between the term spread and term premium informs our variable maturity (duration) approach, in which we overweight longer-duration bonds (compared to market/benchmark weights) when the term spread is wide and underweight them when the term spread is narrow.

Putting variable maturity to the test, we construct a simple US variable maturity simulation that weights the Bloomberg US Government/Credit 3–10 Year (intermediate) Index up to 75% when the term spread is wide and the Bloomberg US Government/Credit 1–3 Year (short) Index up to 75% when the term spread is narrow, while maintaining an average 50%/50% weight between the short and intermediate indices over the full sample period. In **Table 4**, we compare the performance of this simulation to a fixed 50% short-term/50% intermediate-term benchmark index. The variable maturity simulation outperformed the fixed weight index from February 1976 to December 2023 by 28 bps annually, with an annualized tracking error of 0.50%. It also beat the benchmark in 72% of calendar years.

7. Countries included in the analysis are Austria, Australia, Belgium, Canada, France, Germany, Japan, the Netherlands, New Zealand, Norway, Spain, Sweden, Switzerland, the United Kingdom, and the US, as data become available.

8. Using the same cross-sectional regressions, we also find that differences in unhedged yields (local yields) strongly predict next-month differences in unhedged USD returns in global government bonds.

Variable Credit

The positive relation between the credit spread and credit premium informs our variable credit approach, in which we overweight bonds with lower credit quality (compared to market/benchmark weights) when the credit spread is wide and underweight them when the credit spread is narrow.

In **Table 5**, we summarize the US variable credit simulation, which is constructed by overweighting the Bloomberg US Intermediate Credit Index up to 50% of market weight when the credit spread is wide and overweighting the Bloomberg US Intermediate Government Index up to 50% when credit spread is narrow. The simulation outperformed a fixed 50% intermediate government/50% intermediate credit benchmark index from February 1973 to December 2023 by 45 bps annually with an annualized tracking error of 0.66%, and beat the benchmark in 78% of calendar years.

Variable Currency

Using the information in global yield curves, we can target bonds and segments with higher expected returns and over-/underweight currencies accordingly. We call this the variable currency approach.

To test the value-add from a variable currency approach, we create a simulation using only FTSE 1–10 Year global government bond indices of 15 developed countries. Expected and realized returns are fully hedged to the US dollar (USD). Each month, the simulation selects the top 60% of countries by market weight with the highest expected return. (Results are qualitatively similar for other choices of market coverage.) We also repeat this exercise for the FTSE 10+ Year indices. Between 1985 and 2023, the two variable currency simulations outperformed their respective market-weighted indices annually by 41 bps and 79 bps with annualized tracking errors of 0.92% and 2.50%, respectively. They also beat their market indices in 62% and 64% of the calendar years in the sample period, respectively (**Table 6**).

US Core

While the three sources of higher expected bond returns can be targeted separately, a core strategy that integrates multiple systematic sources of higher returns can help provide better outcomes for investors. To explore this, we construct a US core and a global core simulation.

The US core strategy combines the variable maturity and variable credit approaches, and targets term and credit premiums simultaneously within the US investment-grade government and corporate bond universe. It allocates between the Bloomberg US Government, Credit AAA, Credit AA, Credit A, and Credit BBB (1-3Y and 3-10Y) bond subindices using information in term and credit spreads between the indices. The duration of the simulation is based on the term spread between US 5–10 year government/credit bonds and US 1–3 year government/credit bonds. When the term spread is wide, the duration of the simulation can be longer than the duration of the Bloomberg US Aggregate Index by 0.25 years. When the term spread is narrow, the duration of the simulation can be shorter than the duration of the index by up to 1 year.

Similarly, credit spreads between different intermediate government and credit indices help determine the credit allocations. When the credit spreads are wide, the total allocation to credit bonds can be as high as 60%, and specifically credit A and credit BBB bonds can be higher than their market weights in the Bloomberg US Intermediate Government/Credit Bond Index and vice versa.

Between February 1999 and December 2023, the simulation outperformed the Bloomberg US Aggregate Bond Index on average by 41 bps annualized, with a tracking error of 1.10% (Table 7). Since the simulation has a higher average allocation to credit than the index, we construct a custom benchmark that has a fixed credit allocation to match the core simulation's average credit weights. With the same average credit allocation and a similar average duration, the core simulation still outperformed this benchmark by 29 bps, highlighting that the outperformance vs. the US Aggregate Bond Index is not just due to a higher allocation to lower-rated credit bonds.

Global Core

While the US core strategy is limited to USD bonds, the global core strategy includes global investment-grade and BB rated high-yield bonds by issuers from several developed market countries and denominated in seven major global currencies: the US dollar, euro, British pound, Japanese yen, Australian dollar, Swiss franc, and Canadian dollar. To avoid currency risk, the simulation is hedged to USD. It uses monthly bond data from the Bloomberg US Aggregate, US High Yield, Global Aggregate, and Global High Yield bond index constituents starting in January 1999.

The global core simulation targeted higher expected returns using information in global yield curves while subject to duration, credit, currency, and turnover constraints. The government bonds can vary from 15% to 35% based on credit spreads, and corporate BB rated bonds can have up to 20% allocation based on their credit spread with A rated bonds. Table 8 summarizes the performance. From February 1999 to December 2023, the simulation targeted higher expected returns (on average, its forward rate is 124 bps higher than the forward rate of the Bloomberg Global Aggregate Bond Index) and outperformed the index by an annualized 140 bps on average, with an annualized tracking error of 2.95%. In part, the outperformance comes from a systematically higher allocation to corporate bonds. When compared to a fixed credit weight global government/credit benchmark, the simulation outperforms by an annualized 80 bps. Hence, most of the outperformance arises from the dynamic allocation across currencies, durations, and credit qualities.

In summary, systematic investing can add meaningful value over time by using information in current market prices to target bonds with higher expected returns. Since it is a rules-based approach, it can be applied to a broadly diversified set of bonds and can incorporate additional investor needs, goals, and risk preferences. Below, we present a few examples.

Systematic Investing with Inflation Protection

Investors can integrate inflation protection into a systematic strategy. To illustrate that, we construct a short-duration real return simulation. It targets term and credit premiums within shorter-maturity bonds in addition to providing protection against an unexpected increase in inflation. The simulation allocates between the Bloomberg US Government, Credit AAA, Credit AA, Credit A, and Credit BBB (1-3Y and 3-5Y) bond subindices using information in real term and credit spreads each month. For inflation protection, we add to the simulation the returns from a duration-matched zero-coupon inflation swap that receives variable payments linked to an inflation rate (CPI-U) in exchange for a fixed rate (swap rate) payment. The total return of the simulation is the sum of the returns of the fixed income component (a systematic strategy investing in US government and credit bonds) and the inflation swap.⁹

The performance summary in **Table 9** shows that in addition to hedging inflation risk, the short-duration real return simulation outperformed both benchmarks, the Bloomberg US TIPS 1–5 Year Index and the Bloomberg US Government/Credit 1–5 Year Index, by an annualized 23 bps and 56 bps, respectively, between December 2006 and December 2023, with a tracking error of 1.49% to the TIPS benchmark.

Systematic Investing with Sustainability Considerations

We construct a global corporate bond sustainability strategy that aims to exclude bonds issued by companies that have high carbon emissions intensity and high potential emissions from reserves, among other sustainability considerations. Since sustainability data are not available in our full sample period, we instead exclude the following Bloomberg industry sectors from our investable universe: utilities, energy, basic industry, tobacco, and aerospace/defense. These excluded sectors jointly represent around 21% of the market cap in the Bloomberg Global Aggregate Corporate Bond Index on average in the sample period and in general capture the companies with lower sustainability scores. Despite the exclusions, the performance of the market-weighted corporate bonds index remains very similar for the sample period.

By using variable credit, currency, and maturity simultaneously, the custom sustainability simulation targeted a higher yield (a proxy for expected return) and outperformed the Bloomberg benchmark by an annualized 22 bps between January 2001 and December 2023, with a tracking error of 0.59% (see **Table 10**).

Systematic Investing with Selective Currency Hedging

In the previous global simulations, we have hedged all bond returns to USD all the time. If investors are willing to take on some currency risk, they can combine a systematic approach to bond investing with a systematic approach to currency hedging. Dimensional research by Dai and Schneller (2020) shows that the difference between expected hedged and unhedged asset returns is the forward currency premium. Hence, investors can apply a selectively hedged

9. An inflation swap is a derivative in which the buyer agrees to pay the seller fixed payments in exchange for floating payments tied to the inflation rate for a given notional amount and period. The fixed rate, or swap rate, is negotiated so that there are no cash flows exchanged at the inception of the swap.

approach that hedges the foreign currencies to the base currency only when their forward currency premium is above a threshold.

Let's take the example of a US investor who is looking to invest in short-term global government and corporate bonds. Two options here could be to (1) always hedge the portfolio to the US dollar or (2) apply dynamic hedging of global bonds based on their forward currency premium. Dynamic hedging can be implemented for any currency such that, if its forward currency premium is above a threshold, we hedge the currency to the US dollar; otherwise, we leave the currency unhedged. The results in **Table 11** show that the selectively hedged simulation with a forward currency premium threshold of –25 bps achieved an annualized return 46 bps higher than that of the fully hedged simulation from October 2000 to December 2023. It is worth noting that the selectively hedged simulation had a much higher annualized volatility (4.28%) than the fully hedged simulation (2.43%).¹⁰

Conclusion

Current bond prices (as reflected through yields and forward rates) contain reliable information about differences in expected bond returns across different durations, credit qualities, and currency denominations. In this paper, we show how investors can build broadly diversified systematic fixed income strategies to pursue higher expected returns across all three dimensions while incorporating different investor constraints and preferences. Unlike traditional passive strategies, these strategies can reliably outperform market indices. And unlike traditional active strategies, the success of systematic strategies does not depend on picking bonds or forecasting the movement of future interest rates.

10. The threshold of –25 bps reflects how we hedge a currency in the simulation. When the FCP is below –25 bps for a non-USD bond, its expected unhedged return is greater than its expected hedged return by at least 25 bps. We do not hedge the currency in this case.

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Tables

TABLE 1: Term Regressions

Regression of monthly term premium on beginning-of-month term spread for US and global ex US bonds.

This table reports the results of monthly time series regressions of subsequent-month term premiums on current term spreads:

$$\text{Term Premium}_{t,t+1} = \alpha + \beta \cdot \text{Term Spread}_t + \epsilon_{t+1}.$$

Term Premium_{t,t+1} is the return difference from period t to t+1 between bonds of similar credit quality with longer maturity and shorter maturity. Term Spread_t is the yield difference between the longer- and shorter-maturity bonds at time t. ϵ_{t+1} is the error term. We report the slope estimators (β) and the t-statistics of the slopes (in parentheses). US government and credit bond indices are from Bloomberg. Global ex US Treasury and global ex US corporate bonds include bonds in the Bloomberg Global Aggregate Bond Index issued in the following currencies: JPY, EUR, GBP, CAD, CHF, and AUD. Bloomberg Global Aggregate Bond Index data is from Bloomberg.

Measure of Term Spread/Premium	US Government Bonds (Jan-1976 to Dec-2023)	Global ex US Treasury Bonds (Jan-1999 to Dec-2023)	US Credit Bonds (Jan-1976 to Dec-2023)	Global ex US Corporate Bonds (Jan-1999 to Dec-2023)
[3-10 Year]-[1-3 Year]	0.20 (3.00)	0.29 (2.05)	0.16 (3.08)	0.29 (1.81)
[10 Year+]-[3-10 Year]	0.24 (1.99)	0.51 (2.60)	0.15 (1.66)	0.34 (2.74)

TABLE 2: Credit Regressions

Regression of monthly credit premiums on beginning-of-month credit spreads for US and global intermediate government and credit bonds.

This table reports the results of monthly time series regressions of subsequent-month credit premiums on current credit spreads:

$$\text{Credit Premium}_{t,t+1} = \alpha + \beta \cdot \text{Credit Spread}_t + \epsilon_{t+1}.$$

is the return difference from period t to t+1 between bonds of similar maturity with lower and higher credit quality. is the yield difference between the lower-credit-quality and higher-credit-quality bonds at time t. ϵ_{t+1} is the error term. We report the slope estimators (β) and the t-statistics of the slopes (in parentheses). US and global ex US bond data is from Bloomberg. Global ex US bonds include bonds in the Bloomberg Global Aggregate and High Yield index universe that are issued in the following currencies: JPY, EUR, GBP, CAD, CHF, and AUD.

US Intermediate Bonds (Credit AAA–BBB: 1973–2023, Credit BB: 1987–2023)					
	Credit AAA	Credit AA	Credit A	Credit BBB	Credit BB
Government	0.26 (5.36)	0.18 (4.09)	0.19 (4.25)	0.27 (5.86)	0.19 (3.51)
Credit AAA	–	0.15 (3.82)	0.18 (4.19)	0.28 (5.99)	0.23 (3.93)
Credit AA	–	–	0.23 (4.60)	0.35 (6.45)	0.23 (3.66)
Credit A	–	–	–	0.46 (6.15)	0.21 (3.07)
Credit BBB	–	–	–	–	0.19 (2.89)

Global ex-US intermediate bonds (Credit AAA–BB: 1999–2023)					
	Credit AAA	Credit AA	Credit A	Credit BBB	Credit BB
Government	0.21 (3.37)	0.23 (3.45)	0.11 (2.01)	0.26 (4.97)	0.28 (5.09)
Credit AAA	–	0.26 (2.75)	0.20 (2.78)	0.35 (5.36)	0.31 (5.25)
Credit AA	–	–	0.06 (1.06)	0.26 (5.06)	0.28 (5.11)
Credit A	–	–	–	0.25 (4.47)	0.31 (5.45)
Credit BBB	–	–	–	–	0.31 (5.45)

TABLE 3: Global Treasury Bond Regressions

This table reports the results of Fama-MacBeth cross-sectional regressions of bond index returns on hedged forward rates from 1985 to 2023:

$$R_{i,t+1} = \alpha + \beta \cdot \text{Hedged Forward Rate}_{i,t}/12 + \epsilon_{t+1}$$

$R_{i,t+1}$ is the hedged-to-USD return on the bond subindex issued in country i from period t to $t+1$. **Hedged Forward Rate** $_{i,t}$ is the forward rate hedged to USD for the bond subindex i in month t . ϵ_{t+1} is the error term. We report the average of monthly slope estimators (β) and the average t-statistics of the slope. Countries included in the analysis are Austria, Australia, Belgium, Canada, France, Germany, Japan, the Netherlands, New Zealand, Norway, Spain, Sweden, Switzerland, United Kingdom, and the US, as data become available. Global Treasury bond index data are from FTSE.

Maturity Subindex	Average β	Average t-Statistics	Average R-squared
1-10 Year	0.83	3.96	0.19
1-3 Year	0.89	5.14	0.21
3-5 Year	0.73	3.76	0.20
5-7 Year	0.69	3.37	0.19
7-10 Year	0.81	3.31	0.19

TABLE 4: Value-Add from Variable Maturity

This table summarizes the return and volatility performance of the Bloomberg US Government/Credit 1-3 Year Index, Bloomberg US Government/Credit 3-10 Year Index, 50% Short/50% Intermediate Fixed Weight Index, and US Variable Maturity Simulation. The Fixed Weight Index applies a constant 50% weight to Bloomberg US Government/Credit 1-3 Year and 50% weight to Bloomberg US Government/Credit 3-10 Year indices each month. When the term spread between intermediate and short bond indices is large, the US Variable Maturity Simulation has a higher-than-50% allocation to the Bloomberg US Government/Credit 3-10 Year Index and vice versa. Returns are in USD. Data provided by Bloomberg.

Feb-76 to Dec-23, Returns in USD (%)	Bloomberg US Government/Credit 1-3 Year Index (Short)	Bloomberg US Government/Credit 3-10 Year Index (Intermediate)	50% Short/50% Intermediate Fixed Weight Index	US Variable Maturity Simulation
Annualized Compound Return	5.60	6.78	6.20	6.48
Annualized Standard Deviation	2.61	5.39	3.90	3.87
Annualized Premium (vs. 50/50 Index)	–	–	–	0.28
Annualized Tracking Error (vs. 50/50 Index)	–	–	–	0.50
% Years Outperforming	–	–	–	72.3%
Average Weight 1-3 Year	100.0%	0.0%	50.0%	50.7%
Average Weight 3-10 Year	0.0%	100.0%	50.0%	49.3%

Past performance, including simulated performance, is not a guarantee of future results. Simulated strategy returns are based on model/backtested performance. See Disclosures: Important information about simulated performance. Indices are not available for direct investment; therefore, their performance does not reflect the expenses associated with the management of an actual portfolio.

TABLE 5: Value-Add from Variable Credit

This table summarizes the return and volatility performance of the Bloomberg US Intermediate Government Bond Index, Bloomberg US Intermediate Credit Bond Index, 50% US Intermediate Government/50% US Intermediate Credit Fixed Weight Index, and US Variable Credit Simulation. The Fixed Weight Index applies a constant 50% weight to the Bloomberg US Intermediate Government Bond Index and 50% weight to the Bloomberg US Intermediate Credit Bond Index each month. When the credit spread between credit and government bond indices is large, the US Variable Credit Simulation has a higher-than-50% allocation to Bloomberg US Intermediate Credit Bond Index and vice versa. Returns are in USD. Data provided by Bloomberg.

Feb-73 to Dec-23, Returns in USD (%)	Bloomberg US Intermediate Government Bond Index	Bloomberg US Intermediate Credit Bond Index	50% US Intermediate Government Index/50% US Intermediate Credit Fixed Weight Index	US Variable Credit Simulation
Annualized Compound Return	6.07	6.91	6.50	6.95
Annualized Standard Deviation	4.01	4.95	4.31	4.43
Annualized Premium (vs. 50/50 Index)	–	–	–	0.45
Annualized Tracking Error (vs. 50/50 Index)	–	–	–	0.66
% Years Outperforming	–	–	–	78.0%
Average Weight Government	100.0%	0.0%	50.0%	50.0%
Average Weight Credit	0.0%	100.0%	50.0%	50.0%

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TABLE 6: Value-Add from Variable Currency

This table summarizes the return and volatility performance of the Global Government 1–10 Year bond market(simulation), Global Government 1–10 Year variable currency simulation, Global Government 10 Year+ bond market(simulation), and Global Government 10 Year+ variable currency simulation. The simulations include securities in the FTSE World Government Bond 1–10 Year and 10 Year+ indices, respectively. Countries included are Austria, Australia, Belgium, Canada, France, Germany, Japan, the Netherlands, New Zealand, Norway, Spain, Sweden, Switzerland, the United Kingdom, and the US, as data becomes available. The simulations overweight the countries with the steepest yield curves with respect to their market-cap weight. Currency exposure is hedged to USD. Rebalanced monthly.

Feb-85 to Dec-23, Returns Hedged to USD (%)	Global Government 1–10 Year Bond Market (Simulation)	Global Government 1–10 Year Variable Currency Simulation	Global Government 10 Year+ Bond Market (Simulation)	Global Government 10 Year+ Variable Currency Simulation
Annualized Compound Return	5.29	5.70	7.30	8.09
Annualized Standard Deviation	2.70	2.94	7.69	8.80
Annualized Premium (vs. Market)	–	0.41	–	0.79
Annualized Tracking Error (vs. Market)	–	0.92	–	2.50
Average Expected Return	4.52	4.98	5.62	6.32
Average Duration (in Years)	3.99	4.00	12.54	12.59
% Years Outperforming	–	61.5%	–	64.1%
Average Weight in USD	38.7%	41.7%	39.8%	47.8%
Average Weight in AUD	1.2%	0.9%	0.7%	0.5%
Average Weight in CAD	2.6%	2.3%	4.0%	3.0%
Average Weight in CHF	0.4%	0.4%	0.5%	0.5%
Average Weight in EUR	24.1%	28.6%	19.1%	25.8%
Average Weight in GBP	4.6%	2.9%	13.8%	7.2%
Average Weight in JPY	27.2%	22.1%	21.6%	14.8%
Average Weight in NOK	0.2%	0.2%	0.0%	0.0%
Average Weight in NZD	0.1%	0.1%	0.1%	0.0%
Average Weight in SEK	0.8%	0.8%	0.5%	0.4%

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TABLE 7: US Core Strategy

This table summarizes the return and volatility performance of the Bloomberg US Aggregate Bond Index, Bloomberg US Gov/Credit Bond Index, Fixed Credit Weight Simulation, and Custom US Core Simulation. The Fixed Credit Weight Simulation applies constant credit weights to the bonds in the Bloomberg US Government 1–24 Year, Credit 1–24 Year AAA, AA, A, and BAA bond universe such that the weights and average duration are the same as the time series average in the custom US Core Simulation. The US Core Simulation includes securities in the Bloomberg US Government, US Credit AAA, AA, A, and BAA indices (1–3 Year and 3–10 Year).

Securities can be over- or underweighted based on government/credit spreads. When the difference in yields between credit and government bonds is narrow, government bonds may be held up to 60%. When the difference in yields between credit and government bonds is wide, government bonds may be held as low as 40%.

Securities can be over- or underweighted with respect to their market-cap weight based on credit spreads. When the difference in yields between AAA+AA and A+BBB is narrow, AAA+AA bonds may be held up to 50% above their market-cap weight. When the difference in yields between AAA+AA and A+BBB is wide, AAA+AA bonds may be held up to their market-cap weight. When the difference in yields between AAA+AA and BBB is narrow, BBB bonds may be held up to 20% below their market-cap weight. When the difference in yields between AAA+AA and BBB is wide, BBB bonds may be held up to their market-cap weight.

The duration of the simulation is based on the term spread between 5–10 year government/credit bonds and 1–3 year government/credit bonds. When the term spread is wide, the duration of the simulation can be longer than the duration of the Bloomberg US Aggregate Bond Index by 0.25 year. When the term spread is narrow, the duration of the simulation can be shorter than the duration of the Bloomberg US Aggregate Index by up to 1 year.

The duration of the government component is based on the term spread between 5–10 year government bonds and 1–3 year government bonds. When the term spread is wide, the duration of the government component can be longer than the duration of the Bloomberg US Government Index by 0.25 year. When the term spread is narrow, the duration of the index can be shorter than the duration of Bloomberg US Government Bond Index by up to 1 year. Returns are in USD. Data provided by Bloomberg.

Feb-99 to Dec-23, Returns in USD (%)	Bloomberg US Aggregate Bond Index	Bloomberg US Gov/ Credit Bond Index	Fixed Credit Weight Simulation	US Core Simulation
Annualized Compound Return	3.83	3.90	3.95	4.24
Annualized Standard Deviation	4.10	4.60	4.15	4.28
Annualized Premium (vs. US Aggregate)	–	0.06	0.12	0.41
Annualized Tracking Error (vs. US Aggregate)	–	0.84	0.99	1.10
Average Yield	3.72	3.50	3.59	3.60
Average Duration (in Years)	5.16	5.92	4.93	4.93
Average Weight in Government	38.2%	59.0%	44.8%	44.8%
Average Weight in Credit AAA+AA	6.1%	9.5%	21.4%	21.4%
Average Weight in Credit A	10.2%	15.7%	15.8%	15.8%
Average Weight in Credit BBB	10.4%	15.8%	18.0%	18.0%
Average Weight in Securitized	35.2%	–	–	–

Past performance, including simulated performance, is not a guarantee of future results. Simulated strategy returns are based on model/backtested performance. See Disclosures: Important information about simulated performance. Indices are not available for direct investment; therefore, their performance does not reflect the expenses associated with the management of an actual portfolio.

TABLE 8: Global Core Strategy

This table summarizes the return and volatility performance of the Bloomberg Global Aggregate Bond Index, Fixed Credit Weight Simulation, and the Custom Global Core Simulation. The Fixed Credit Weight Simulation applies constant credit weights to the Bloomberg Global Government, Corporate AAA/AA, A, and BAA bond indices such that the weights are the same as the time series average weights of the Custom Global Core Simulation.

Within the universe, the Global Core simulation identifies the yield curves that offer the highest expected returns and the duration ranges on those yield curves offering the highest expected returns, and assesses the increased expected returns associated with allocations to bonds with different credit qualities. It then overweights (with respect to their market-cap weight) bonds of yield curves, duration ranges, and credit qualities that offer higher expected returns. It also employs credit quality, currency, and duration requirements relative to the eligible market.

The duration of the simulation is based on the term spread between 5–10 year government/credit bonds and 1–3 year government/credit bonds. When the term spread is wide, the duration of the simulation can be longer than the duration of Bloomberg Global Aggregate Index by 0.5 year. When the term spread is narrow, the duration of the simulation can be shorter than the duration of Bloomberg Global Aggregate Index by up to 1 year.

Securities can be over- or underweighted based on government/credit spreads. When the difference in yields between credit and government bonds is narrow, government bonds may be held up to 35%. When the difference in yields between credit and government bonds is wide, government bonds may be held as low as 15%.

Securities can be over- or underweighted with respect to their market-cap weight based on credit spreads. When the difference in yields between AAA+AA and A+BBB is narrow, AAA+AA bonds may be held up to 40% above their market-cap weight. When the difference in yields between AAA+AA and A+BBB is wide, AAA+AA bonds may be held up to their market-cap weight. When the difference in yields between AAA+AA and BBB is narrow, BBB bonds may be held up to 20% below their market-cap weight. When the difference in yields between AAA+AA and BBB is wide, BBB bonds may be held up to their market-cap weight. When the difference in yields between A and BB is narrow, BB bonds may be held as low as a 0% weight in the portfolio. When the difference in yields between A and BB is wide, BB bonds may be held up to a 20% weight in the portfolio.

Currency weights can deviate by 10% from the benchmark currency weights. Currency exposure is hedged to US dollars. The Custom Global Core Simulation includes investment-grade bonds issued in the following currencies: USD, JPY, EUR, GBP, AUD, CAD, and CHF. Data provided by Bloomberg.

Feb-99 to Dec-23, Returns Hedged to USD (%)	Bloomberg Global Aggregate Bond Index	Fixed Credit Weight Simulation	Custom Global Core Simulation
Annualized Compound Return	3.88	4.47	5.27
Annualized Standard Deviation	3.27	4.40	5.01
Annualized Premium (vs. Global Aggregate Index)	–	0.59	1.40
Annualized Tracking Error (vs. Global Aggregate Index)	–	2.32	2.95
Average Yield	3.44	4.28	4.68
Average Duration (in Years)	5.95	5.98	6.43
Average Weight in Government	65.4%	23.9%	23.9%
Average Weight in Corporate AAA+AA	3.5%	16.4%	16.4%
Average Weight in Corporate A	7.2%	25.2%	25.2%
Average Weight in Corporate BBB	6.3%	21.9%	21.9%
Average Weight in Corporate BB	0.0%	12.5%	12.5%
Average Weight in Securitized	17.7%	–	–
Average Weight in USD	42.7%	–	42.0%
Average Weight in EUR	26.9%	–	31.5%
Average Weight in GBP	5.0%	–	4.9%
Average Weight in JPY	16.7%	–	17.0%
Average Weight in CAD	2.3%	–	3.6%
Average Weight in AUD	0.9%	–	0.7%
Average Weight in CHF	0.4%	–	0.2%

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TABLE 9: Short-Duration Real Return Strategy

This table summarizes the return and volatility performance of the Bloomberg US TIPS 1–5 Year Bond Index, Bloomberg US Government/Credit 1–5 Year Bond Index, and Custom US Short-Duration Real Return Simulation.

The Custom US Short-Duration Real Return Simulation includes securities in the Bloomberg US Government, Credit AAA, AA, A, and BAA indices; Bloomberg US Government 1–3 Year, Credit AAA, AA, A, and BAA indices (1–3 Year and 3–5 Year); Bloomberg Inflation Swap USD 2 Year Zero Coupon Index (Excess Return); and Bloomberg Inflation Swap USD 5 Year Zero Coupon Index (Excess Return).

For the fixed income component of the simulation, we do the following:

- 1. Securities can be over- or underweighted based on government/credit spreads. When the difference in yields between credit and government bonds is narrow, government bonds may be overweighted. When the difference in yields between credit and government bonds is wide, government bonds may be underweighted.*
- 2. Securities can be over- or underweighted with respect to their market-cap weight based on credit spreads. When the difference in yields between AAA+AA and A+BBB is narrow, AAA+AA bonds may be held above market-cap weight. When the difference in yields between AAA+AA and A+BBB is wide, AAA+AA bonds may be held below market-cap weight. When the difference in yields between AAA+AA and BBB is narrow, BBB bonds may be held below market-cap weight. When the difference in yields between AAA+AA and BBB is wide, BBB bonds may be held above market-cap weight.*
- 3. The duration of the simulation is based on the term spread (of real yields) between the real yields of the 3–5 year and 1–3 year credit bonds. Real yield is defined as (nominal yield – inflation swap rate). When the term spread is wide, the duration of the simulation can be longer than the duration of Bloomberg US Credit 1–5 Year Index. When the term spread is narrow, the duration of the index can be shorter than the duration of Bloomberg US Credit 1–5 Year Index.*
- 4. The duration of the government component is based on the term spread (of real yields) between 3–5 year government bonds and 1–3 year government bonds. When the term spread is wide, the duration of the government component can be longer than the duration of Bloomberg US Government 1–5 Year Bond Index. When the term spread is narrow, the duration of the index can be shorter than the duration of Bloomberg US Government 1–5 Year Bond Index.*

We use the 2 Year and 5 Year inflation swap indices to construct an inflation swap index to match the duration of the fixed income component. The Custom US Short-Duration Real Return Simulation is the sum of the fixed income component and the Inflation Swap Index Return component. Rebalanced monthly.

Dec-06 to Dec-23 Returns in USD (%)	Bloomberg US TIPS 1–5 Year Bond Index	Bloomberg US Government/ Credit 1–5 Year Bond Index	Custom US Short-Duration Real Return Simulation
Annualized Compound Return	2.74	2.41	2.97
Annualized Standard Deviation	3.28	2.07	3.47
Annualized Premium (vs. Bloomberg US TIPS 1–5 Year Index)		-0.33	0.23
Annualized Tracking Error (vs. Bloomberg US TIPS 1–5 Year Index)		2.61	1.49
Average Yield	1.99	2.05	2.36
Average Duration (in Years)	1.88	2.65	2.51
Average Government Weight	100.0%	68.0%	28.8%
Average Credit AAA+AA Weight	0.0%	9.9%	43.6%
Average Credit A Weight	0.0%	12.0%	13.7%
Average Credit BBB Weight	0.0%	10.2%	13.9%

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TABLE 10: Sustainability Strategy

This table summarizes the return and volatility performance of the Bloomberg Global Aggregate Corporate Bond Index, Global Investment Grade Corporate Market (Simulation), Global Investment Grade Corporate Sustainability Market (Simulation), and Custom Global Corporate Sustainability Simulation.

The Global Investment Grade Corporate Sustainability Market (Simulation) and Custom Global Corporate Sustainability Simulation exclude bonds issued by companies in the following sectors as defined by Bloomberg: utility, energy, basic industry, tobacco, aerospace/defense. Within the universe of eligible bonds, the Custom Global Corporate Sustainability Simulation identifies the yield curves that offer the highest expected returns and the duration ranges on those yield curves offering the highest expected returns, and assesses the increased expected returns associated with allocations to bonds with different credit qualities. It then overweights (with respect to their market-cap weight) bonds of yield curves, duration ranges, and credit qualities that offer higher expected returns. It also employs credit quality, currency, and duration requirements relative to the eligible market.

Currency exposure is hedged to US dollars and rebalanced monthly. The Custom Global Corporate Sustainability Simulation includes investment-grade bonds issued in the following currencies: USD, JPY, EUR, GBP, AUD, CAD, and CHF. Data provided by Bloomberg.

Jan-01 to Dec-23, Returns Hedged to USD (%)	Bloomberg Global Aggregate Corporate Bond Index	Global Investment Grade Corporate Market (Simulation)	Global Investment Grade Corporate Sustainability Market (Simulation)	Custom Global Corporate Sustainability Simulation
Annualized Compound Return	4.44	4.44	4.42	4.66
Annualized Standard Deviation	5.06	5.08	4.93	5.20
Annualized Premium (vs. Bloomberg Global Aggregate Corporate Index)	–	0.00	–0.02	0.22
Annualized Tracking Error (vs. Bloomberg Global Aggregate Corporate Index)	–	0.05	0.47	0.59
Average Yield	–	4.03	4.00	4.18
Average Duration (in Years)	5.99	6.00	5.74	5.92
Average Corporate AAA+AA Weight	–	20.0%	21.7%	19.6%
Average Corporate A Weight	–	42.5%	44.2%	44.3%
Average Corporate BBB Weight	–	37.5%	34.1%	36.1%
Average No. of Issues in Universe	–	8007	6060	6060
Average No. of Issues Excluded	–	–	1946	1946
Average Exclusion in Market Value (%)	–	–	21.1%	21.1%

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TABLE 11: Selectively Hedged Strategy

This table summarizes the return and volatility performance of the Bloomberg Global Aggregate 1–5 Year Unhedged Bond Index, Bloomberg Global Aggregate 1–5 Year Hedged Bond Index, Global Government/Credit 1–5 Year Selective Hedged Market (Simulation), Custom Global 1–5 Year Selective Hedged Simulation, and Custom Global 1–5 Year Fully Hedged Simulation.

The Custom Global 1–5 Year Selective Hedged Simulation uses a (–25 bps) forward currency premium threshold to decide if a non-USD currency exposure should be hedged back to the base currency (USD) each month.

Within the universe of eligible bonds, the Custom Global simulations identify the yield curves that offer the highest expected returns and the duration ranges on those yield curves offering the highest expected returns, and assesses the increased expected returns associated with allocations to bonds with different credit qualities. It then overweights (with respect to their market-cap weight) bonds of yield curves, duration ranges, and credit qualities that offer higher expected returns. It also employs credit quality, currency, and duration requirements relative to the eligible market.

Rebalanced monthly. The Custom Global Simulations include investment-grade bonds issued in the following currencies: USD, JPY, EUR, GBP, AUD, CAD, and CHF. Data provided by Bloomberg. The average exposure in a currency is the time series average of simulation weights that are unhedged in that currency during the sample period.

Oct-00 to Dec-23, Returns in USD (%)	Bloomberg Global Aggregate 1–5 Year Unhedged Bond Index (1)	Bloomberg Global Aggregate 1–5 Year Hedged Bond Index (2)	Global Government/ Credit 1–5 Year Selective Hedged Market (Simulation)	Custom Global 1–5 Year Selective Hedged Simulation	Custom Global 1–5 Year Fully Hedged Simulation
Annualized Compound Return	2.74	3.09	3.47	4.29	3.83
Annualized Standard Deviation	4.92	1.55	2.77	4.28	2.43
Annualized Premium (vs. 1)	–	–	0.73	1.55	1.10
Annualized Tracking Error (vs. 1)	–	–	3.34	3.33	4.03
Annualized Premium (vs. 2)	–	–	0.38	1.20	0.74
Annualized Tracking Error (vs. 2)	–	–	1.98	3.53	1.41
Average Hedge Ratio (excluding USD)	–	–	82.9%	70.5%	100.0%
Average Expected Return	–	–	2.65	3.52	3.31
Average Duration (in Years)	2.66	2.66	2.70	3.02	3.02
Average Government Weight	–	–	76.6%	39.8%	38.1%
Average Corporate AAA+AA Weight	–	–	5.3%	27.5%	29.1%
Average Corporate A Weight	–	–	10.2%	17.2%	17.6%
Average Corporate BBB Weight	–	–	7.8%	15.4%	15.2%
Average Exposure in USD	–	–	89.5%	82.7%	100.0%
Average Exposure in EUR	–	–	7.3%	8.3%	0.0%
Average Exposure in JPY	–	–	0.0%	0.0%	0.0%
Average Exposure in GBP	–	–	1.4%	3.7%	0.0%
Average Exposure in AUD	–	–	0.7%	2.7%	0.0%
Average Exposure in CAD	–	–	1.1%	2.4%	0.0%
Average Exposure in CHF	–	–	0.0%	0.0%	0.0%

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Bloomberg data provided by Bloomberg. FTSE data provided by FTSE Russell.

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