S&P Dow Jones Indices

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Research

The Hare and the Tortoise

Assessing Passive's Potential in Bonds

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"The hare laughed at the tortoise's feet but the tortoise declared, 'I will beat you in a race!'"

Aesop's Fables, translated by Laura Gibbs (2002)

After the ATM, the index fund has been claimed by some to be the most useful invention the financial sector has ever created. The relative success of index funds in equities faced a tide of professional skepticism, but they nonetheless became popular. A similar revolution may be due to occur in the bond markets, where passive investing appears to be climbing a path paved by the equity markets around a decade or so earlier.

A range of practical and theoretical (or even theological) arguments distinguish the potential for indexing in the larger and more granular fixed income markets. The choice between active and passive exposures is also relatively newer to the fixed income markets, due in part to a historical scarcity of well-known benchmarks and the practical difficulty of tracking them.

The impact of passive investing on equities since the turn of the century has been such as to fundamentally change an industry. As the data have accumulated and the range of available products has expanded, and based on a comparison of their trajectories, the stage may now be set for similar developments in professional fixed income management.

This paper explores the practical, theoretical and empirical case for an indexed approach in fixed income, outlining why passive investing came later and examining whether its growth might continue to echo, or even catch up to, that of equity markets.

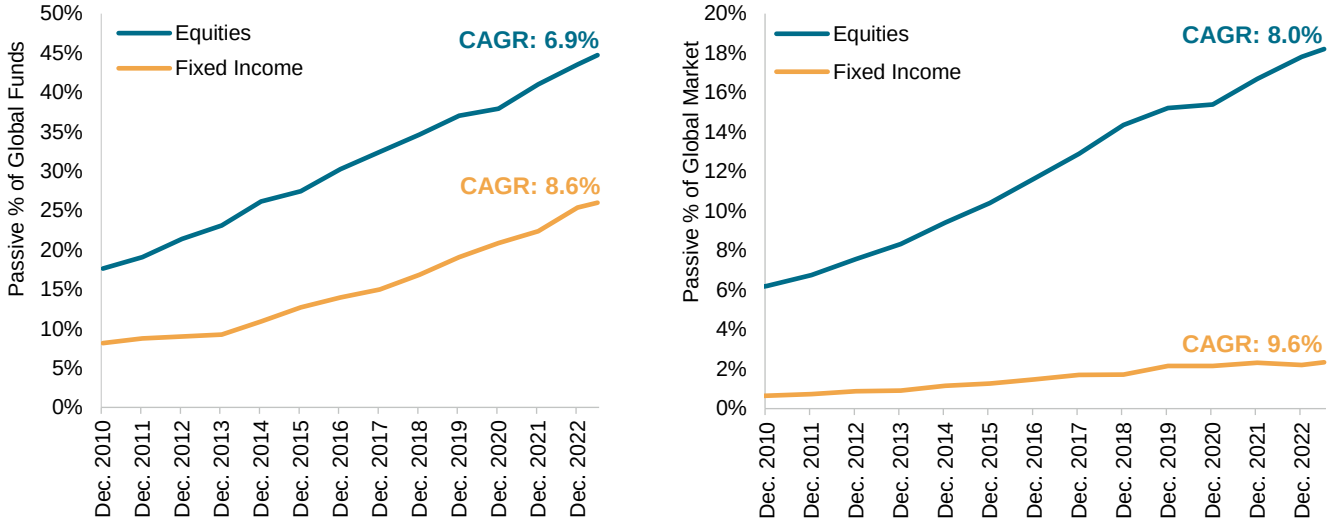
The Growth of Indexing in Fixed Income

"To win a race, the swiftness of a dart availeth not without a timely start."

Jean de La Fontaine; The Hare and the Tortoise (1668-1694)

Estimating the aggregated magnitude of passive investing in any given market is difficult, not least because not all market participants report their investment strategy. The data on a particular subset of passive investment vehicles—namely global mutual funds and exchange-traded funds (ETFs)—are relatively easier to obtain and may offer representative statistics. Based on this sample, Exhibit 1 compares two measures of passive adoption in equities and fixed income, specifically the percentage of all mutual fund and ETF assets that are managed passively, and the percentage of the total equities and fixed income markets, respectively, that is represented in aggregate by those funds.

Exhibit 1: Trends in Passive Global Mutual Fund and ETF Assets



Source: S&P Dow Jones Indices LLC, Investment Company Institute, Morningstar LLC, Bank for International Settlements. Data as of Dec. 29, 2023. Total market size for equities provided by the market capitalization of the S&P Global BMI. Total market size for fixed income globally provided by total debt securities outstanding reported by the Bank for International Settlements. Charts are provided for illustrative purposes.

Exhibit 1 shows that the adoption of index funds in fixed income has lagged that in equities. This is partly because their story began later: the first equity index funds were created in the early 1970s, but the first passive bond fund was not introduced until 1986.[1] A similar near-decade lag separates the launch of the first ETFs tracking the equity markets in the early 1990s and the 2002 launch of the first fixed income ETFs.[2]

[1] The creation of the first index funds and ETFs is comprehensively examined in Wigglesworth, Robin, "Trillions: How a Band of Wall Street Renegades Invented the Index Fund and Changed Finance Forever," Penguin Random House LLC (2021)

[2] Wigglesworth, *Op. Cit.*

We note that despite their later start, the early history of bond index funds expanded beyond the largest and most liquid bond markets at a moderate pace. As well as U.S. Treasuries, those first-ever bond ETFs included an index fund tracking investment grade corporate bonds. A high yield equivalent came just five years later in 2007. Euro-denominated equivalents were first launched on the other side of the Atlantic in 2003 and 2010, respectively.

More intriguingly, Exhibit 1 also indicates that the fixed income markets are on an aggregate trajectory that approximates that of the equity markets from a decade or two earlier, but with a growth rate (highlighted in the exhibit) that has in fact been higher. Whether they continue to catch up depends, naturally, on whether a similarly increasing range of investors will decide to use them.

Why Later? Practical Complications and Active Theology

Bond index funds came later for both practical and theoretical reasons. In practical terms, it generally was and remains harder to replicate a bond index than an equity index. Further, although there are many theoretical arguments that apply to both bonds and stocks, the case for active investing in the two asset classes has important differences, particularly—as we shall see—in the corporate credit markets. We begin with the practical considerations.

Practical Causes: Availability of Indices and the Challenge of Replication

One simple reason that bond index funds were introduced later is that every index fund requires an index, and the first bond indices were introduced nearly a century after the first equity indices.[3] The S&P 500® was already well established as a benchmark when the first fund tracking it was launched in 1973.[4] Conversely, the first bond indices *ever* were created independently by investment banks Salomon Brothers and Kuhn, Loeb & Co. in the very same year.[5]

As well as benefiting from a longer history, equity indices such as The Dow Industrial Average® and the S&P 500 were traditionally the property of media and publishing houses; their levels and characteristics were made widely available. In contrast, the first fixed income benchmarks were maintained by brokerage houses seeking to facilitate the trading activities of bond market participants. That has changed in recent years, notably with the transfer of the original Kuhn

[3] Charles Dow began publication of his "Industrial Average" in 1896. An earlier "Railroad Average" index began in 1884.

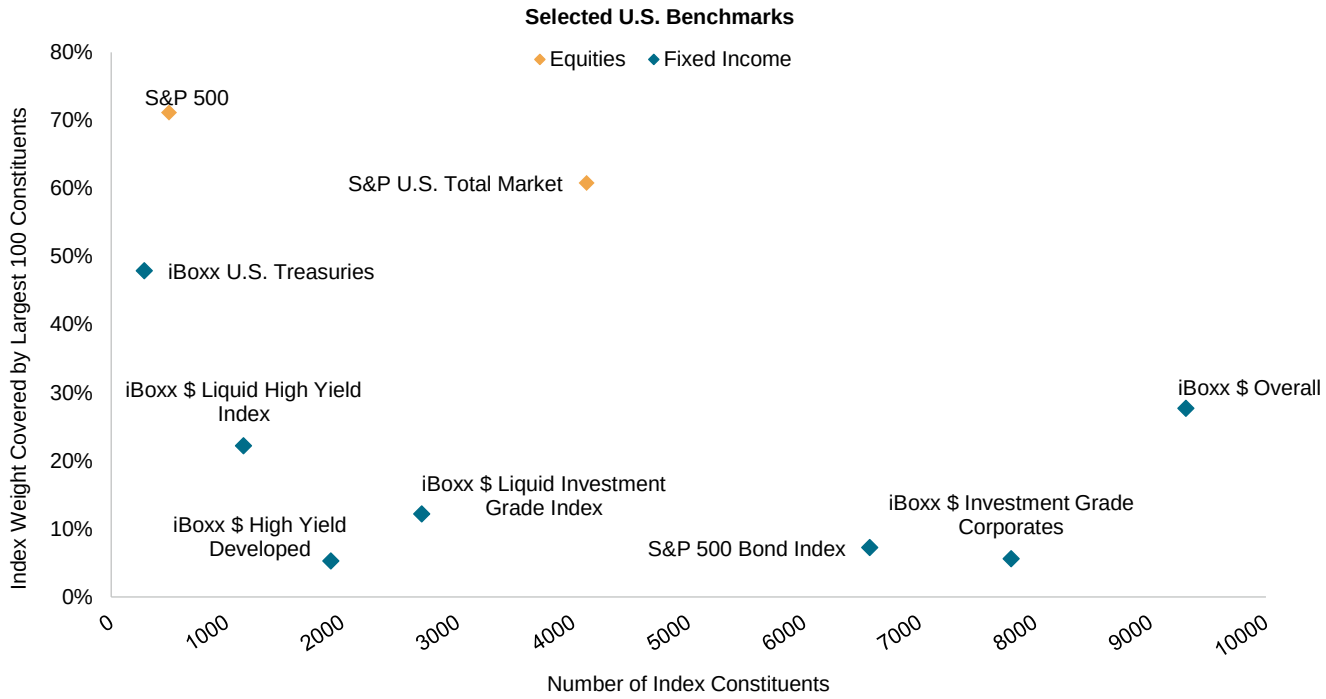
[4] The S&P 500 began publication in its present form in 1957, although it had predecessors that began in 1926. For a description of the various funds launched in the early 1970s that might claim to be the first equity index fund, see Wigglesworth, *Op. Cit.*

[5] Stephen Flagel, "Single-Dealer Vs. Multidealer Fixed-Income Indexes," Journal of Indexes (2009)

Loeb indices to financial data provider Bloomberg (via Lehman Brothers and Barclays Capital), and the addition of the iBoxx™ range to S&P Dow Jones Indices' (S&P DJI) index suite following the merger of IHS Markit with S&P Global. Perhaps not coincidentally, the transition of benchmarks from trading desks to financial data providers was accompanied by an increase in the range of widely available indices and the passive vehicles tracking them.

Yet just creating an index does not mean it is easy to build a portfolio that will replicate it. In comparison to just half a thousand stocks, S&P DJI's index of corporate bonds issued by the S&P 500's constituent companies contains over 6,000 distinct securities.[6] The 100 largest stocks capture three-fifths of the total U.S. equity market capitalization, while the 100 largest U.S. Treasury bond issuances compose under half of the iBoxx U.S. Treasuries Index, and the 100 largest investment grade corporate bond issuances compose just 6% of the iBoxx $ Investment Grade Corporate Bond Index. Exhibit 2 illustrates equivalent statistics for selected broad and tradeable fixed income indices in U.S. dollars and euros. Selected equity indices are included for purposes of comparison.

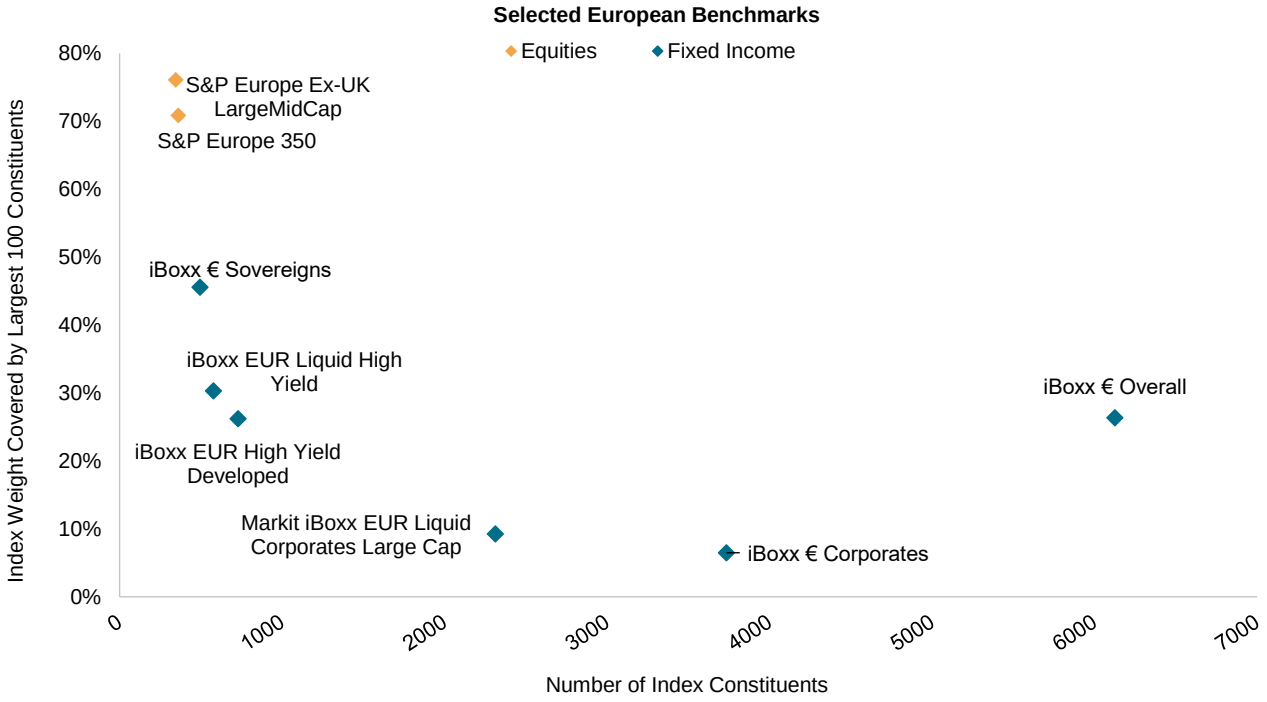
Exhibit 2: Fixed Income Benchmarks Are Broader and Less Concentrated



Source: S&P Dow Jones Indices LLC. Data as of Dec. 29, 2023. Charts are provided for illustrative purposes.

[6] As of Dec. 29, 2023.

Exhibit 2: Fixed Income Benchmarks Are Broader and Less Concentrated (cont.)



Source: S&P Dow Jones Indices LLC. Data as of Dec. 29, 2023. Charts are provided for illustrative purposes.

Other factors act to compound the challenge of benchmark replication. The cost of buying one bond is normally much more than the typical price of a single share of stock, meaning that the minimum cost of establishing a position in every security is higher.[7] Adding to the complexity, index-tracking bond portfolios typically require more maintenance than their equity equivalents: nearly all bonds mature, and some bonds default. Before that, bonds might be promoted or downgraded from their investment grade or high yield categories. And in the meantime, new bonds are issued. In quantitative terms, the amount of trading required might be *10 times* that in equities.[8]

All of which means that it is harder in practice to build and maintain a broad-based index-tracking bond portfolio. A degree of "sampling" is common, in which a smaller portfolio will be designed with the goal of replicating the characteristics and risk factors of the broad universe.[9] The skills to do so, as well as the technical (and computational) tools to do this effectively, were largely prohibitively expensive or unavailable when the first equity index funds were introduced in the early 1970s.

[7] The average cost per share of each S&P 500 company was around USD 200 at the end of December 2023. Most U.S. corporate bonds are issued in denominations around five times larger, while face values of up to USD 10,000 are not considered unusual. Source: S&P Dow Jones Indices LLC.

[8] For example, the largest (as of December 2023) total U.S. equity market index fund had a turnover of 3% of net asset value in fiscal-year 2023, while the largest total U.S. bond market index fund had a turnover of 40%. Source: Vanguard

[9] Such narrowing of the investment universe may also be implemented at the benchmark level, examples of which are included in Exhibit 2 via the "Liquid" series of indices.

Theoretical Causes: Perceptions and Efficiency

The comparison of index with active returns has a long tradition in equities, with nearly a century's worth of data suggesting that beating equity benchmarks is difficult in the long term.[10] **Another nearly-as-old tradition holds that bonds are different. They are more naturally conducive to active management.** Some of the arguments are familiar from the equity markets: benchmarks can be concentrated; active managers can hold securities outside of, or ahead of a benchmark; active managers can reduce risk at the right times; they can avoid participation in bubbles, and so on.[11] However, **there are also features of fixed income that make the case for active management in bonds genuinely distinct.** If we are to look for differences that may persist in the future, such distinctions are more interesting. The most important include:

1) The supposed perils of capitalization weightings in bonds;
2) The impact of turnover on the "Arithmetic of Active Management";
3) The tempting presence of non-profit-maximizing market participants; and
4) Negative skew and the outperformance potential of concentrated credit portfolios.

We address each of these in turn, noting that some are more complicated than others. Following that, we consider the evidence presented by the reported performance of actively managed funds in comparison to appropriate benchmarks.

The Consequences of Market Capitalization Weighting

By definition, market capitalization weighting in bonds implies holding the greatest exposure to the most heavily indebted entities, which at first glance seems like a terrible idea. But it is important not to confuse size with creditworthiness. The largest debt issuer in the world is the U.S. government. The next largest issuers are sovereign states with commensurately large economies, or entities backed by sovereign states. These are typically considered among the most secure of creditors.

Similarly, companies with more debt are mainly just larger companies. Exhibit 3 illustrates this for the non-Financials constituents of the S&P Global BMI, obtained by first ranking every company in the global equity index by its total outstanding debt, and then within each debt decile, calculating the average, median, 10th and 90th percentile of market capitalizations within each debt decile.

[10] One such example was published almost a century ago. See Cowles, Alfred, "Can Stock Market Forecasters Forecast?," Econometrica Vol. 1 (1933). We return in a later section to comparisons of active and passive returns in bond markets.

[11] See for example the S&P DJI research papers: "Shooting the Messenger" (2017), "Fooled by Conviction" (2015) and "The Slings and Arrows of Passive Fortune" (2018), among others available at www.spglobal.com/spdji

Exhibit 3: Debt Deciles of the S&P Global BMI Ex-Financials

Debt Deciles		Equity Market Capitalization Statistics			
Decile	Average Total Debt	Average	Median	10th Percentile	90th Percentile
1	20,589	63,317	21,394	3,395	121,243
2	3,658	11,898	5,717	1,384	24,771
3	1,612	6,078	2,800	646	12,075
4	837	3,721	1,634	413	7,112
5	459	2,122	1,004	259	4,680
6	233	1,992	711	199	3,916
7	109	1,875	527	166	3,217
8	45	1,429	373	125	2,965
9	14	974	418	120	2,242
10	1	811	354	123	2,069

Source: S&P Dow Jones Indices LLC, Factset. Data as of Nov. 30, 2023. Figures in USD millions. To represent the "average" corporate, we excluded constituents from the Financials sector from the sample, as they tend to have higher debt ratios but tend to also be subject to requirements to hold collateral. The overall trend remains the same were they to be included. Table is provided for illustrative purposes.

The reader may object that there remains some value in the commonsense objection: it is prudent that one or another measure of creditworthiness should be incorporated to qualify securities for preference. But market capitalization weightings are not *just* a proxy for the size of a debt issuer. They also account for market perceptions of creditworthiness: an untrustworthy issuer's bonds will be worth less and will have therefore a lower market capitalization.[12]

Beyond the obvious, market capitalization weightings have further characteristics that qualify them of special interest to the practitioner. By definition, the "demand" for each constituent within a capitalization-weighted portfolio is precisely proportional to their available "supply."[13] This can act to limit the costs of establishing or liquidating a position, as well as balancing the impacts of ownership.

Finally, capitalization-weighted portfolios have another special characteristic: absent all trading costs and fees, the return of all investors in aggregate is represented by the capitalization-weighted portfolio. This is a special argument, which deserves further consideration.

[12] Moreover, bond benchmark methodologies also typically specify guard rails on the quality of the credits included—such as including only Treasury bonds or only those rated as investment grade.

[13] Many bond indices also adjust market capitalizations down by the amounts—if any—held by central banks.

The Arithmetic of Active Bond Management

In a compelling thought experiment published in a two-page paper in 1991, the Nobel laureate economist William F. Sharpe defined "passive investing" as holding every security in a market segment, strictly in capitalization-weighted proportions. His groundbreaking idea was to define "active investing" as absolutely anything else. Consequently, active and passive investors must have the same aggregate return.[14] Assuming that the costs of active management must be higher, Sharpe concluded that "properly measured, the average actively managed dollar *must* underperform the average passively managed dollar, net of costs."[15]

Yet the costs of active investing are *not necessarily* higher. As already noted, passive fixed income investors also face trading costs if they are to maintain their index-tracking characteristics—a fact emphatically deployed by Lasse Pederson in a 2017 riposte to Sharpe's paper, in which he countered that once all the index additions, deletions and coupons are accounted for, a typical high yield bond index fund might require up to 100% in annual turnover.[16] The problem appears surmountable in practice.

Exhibit 4 offers anecdotal evidence collected from the five fixed income index funds mentioned earlier.[17] To construct the exhibit, we calculated the ratio over time of (i) the cumulative total return series of each fund net of fees and assuming the immediate reinvestment of gross dividends, divided by (ii) the total return of the index that each fund tracks, adjusted by the associated fund management fee. If trading costs were unduly damaging returns, we would expect the series to decline over time. However, if trading costs were limited to a near-minimal level, we would expect the series to remain roughly flat. We should also expect some "tracking error" arising from the fact that each fund does not replicate its underlying index exactly, and we might also expect to see a positive impact if the fund sponsor is passing on a portion of revenues from lending out portfolio securities. The series for U.S. high yield corporate bonds is shown separately for emphasis; the other series is an average of the other four funds.

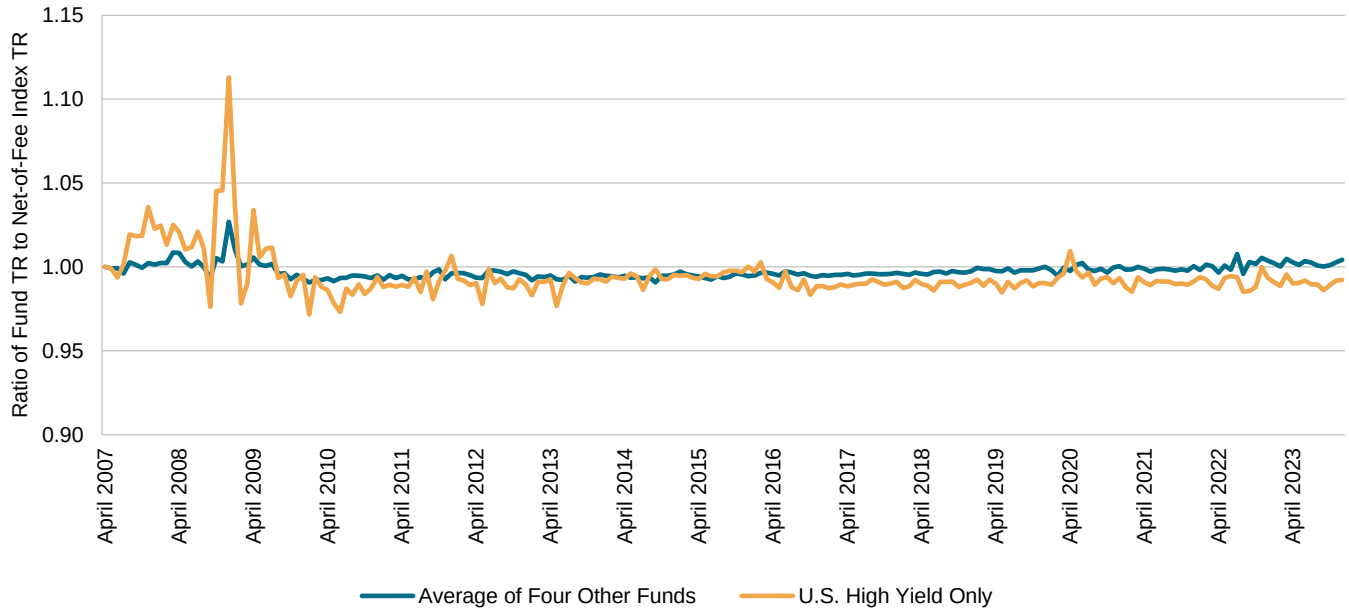
[14] This is because at any point in time, all the investors not holding the capitalization-weighted market portfolio hold, in aggregate, a capitalization-weighted market portfolio. It is analogous to the statement that all the people who are not average are, on average, average.

[15] Our emphasis. Sharpe, William F., "The Arithmetic of Active Management," Financial Analysts Journal, January 1991, p. 7-9.

[16] This is two-way turnover. Source: Pedersen, Lasse Heje, "Sharpening the Arithmetic of Active Management," Financial Analysts Journal (2018), 74 (1): 21-36

[17] These were: the first bond index fund, launched by Vanguard in 1986 and tracking a broad aggregate U.S. bond index, and four exchange-traded funds issued by BGI (later Blackrock) tracking the iBoxx $ Liquid Investment Grade Index, the iBoxx $ Liquid High Yield Index, the iBoxx Euro Liquid Investment Grade Index and the iBoxx Euro Liquid High Yield Index, launched in 2002, 2007, 2003 and 2010, respectively.

Exhibit 4: Cumulative Passive High Yield Fund Returns Relative to "Net-of-Fee" Index Returns



Source: S&P Dow Jones Indices LLC, Blackrock, Vanguard, Bloomberg LLC. Data as of Dec. 28, 2023. The associated indices comprise broad U.S. aggregate and U.S. dollar- and euro-denominated investment grade and high yield corporate bond indices. Includes Euro High Yield after Sept. 31, 2010. Past performance is no guarantee of future results. Chart is provided for illustrative purposes.

Coincident with the April 2007 introduction of the U.S. high yield index fund, the earliest period of Exhibit 4 does indeed illustrate that tracking a high yield benchmark with a relatively small portfolio amidst the turmoil of a global financial crisis might be difficult. Yet the evolution of the series over subsequent years shows benchmark replication net of trading costs was *possible*—even during the volatility of a later global pandemic. And "possible" is all that is required to resurrect Sharpe's argument and its conclusions.

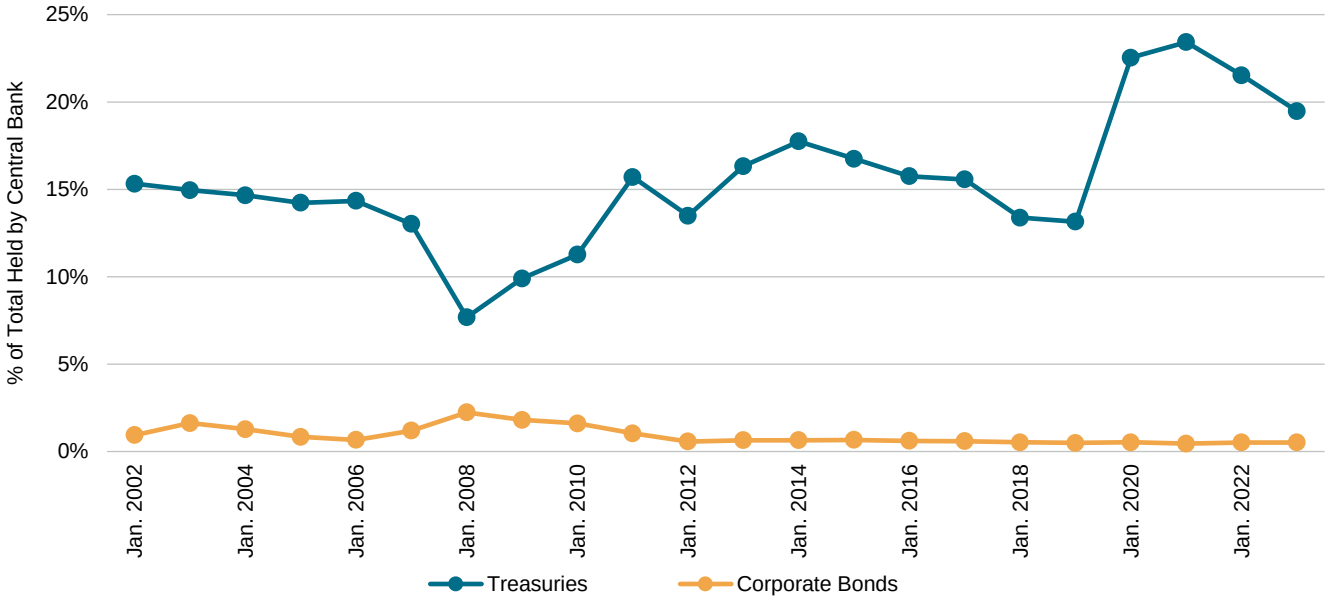
There is, however, another objection. Opposed to Sharpe's binary classification, why not split investors into three categories, perhaps "active," "passive" and "other"? The "other" might provide excess returns to the "active," with their combined aggregate return still matching that of the "passive." And there are candidates for such "other" market participants in fixed income.

The Presence of Non-Profit-Maximizing Participants

Economic models treating all investors as rational agents are not appropriate to every market. In the fixed income jungle, there are elephants. Central banks around the world frequently move bond markets by changing interest rates. They also buy and sell securities with the hope of influencing various economic variables including (but not limited to) the money supply, the exchange rate and the level of liquidity in the financial system. Provided that a significant proportion of market participants are serving policy rather than profit, does this not invite active investors to take advantage?

There are famous occasions when this occurred, such as when financier George Soros took on the Bank of England and succeeded both in making his fortune and breaking a government.[18] Of course, such historic events are now appreciated by both central banks and adventurers: some lessons will have been learned. Meanwhile, the impact of central banks is more important in some markets than others. The relative scale of the U.S. Federal Reserve's participation in the Treasury and corporate bond markets is shown in Exhibit 5.[19] Despite highly publicized stimulus programs in the aftermath of the 2008 financial crisis and during the early 2020s pandemic era, the direct participation of the U.S. monetary authorities in the corporate bond markets has remained relatively insignificant.

Exhibit 5: U.S. Federal Reserve Ownership



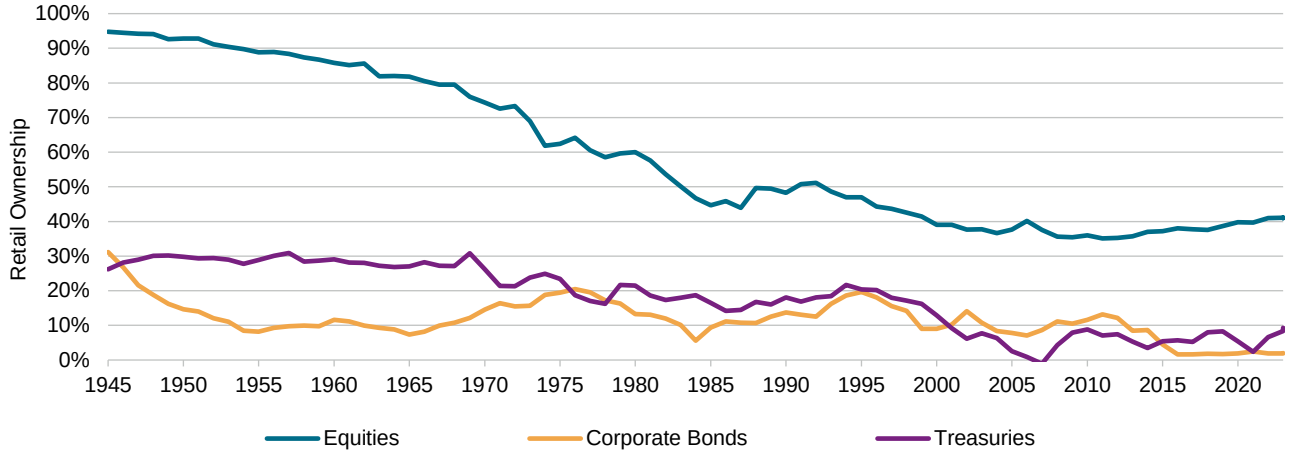
Source: S&P Dow Jones Indices LLC, U.S. Federal Reserve. Data as of Sept. 30, 2023. Corporate bond participation is likely overestimated, as it includes all assets in stimulus programs that could hold corporate bonds or corporate bond ETFs. Chart is provided for illustrative purposes.

Retail investors are another candidate "other" whose relatively uniformed actions might also qualify them for the role of supplying outperformance to "active" investors. But their direct participation in the bond markets is relatively small. Exhibit 6 shows the evolution over time of the degree of ownership of various asset classes held by "Households and Non-Profits," as reported in the U.S. National Accounts. It shows that direct retail participation in bonds is low and has been declining for decades. Further, it has always been much less material than in equities.

[18] We return in a later section to the question of individual active managers. Another example is PIMCO taking advantage of Fed intervention in the agency mortgage-backed securities market; see "Special Report: Pimco shook hands with the Fed – and made a killing"

[19] Here and in Exhibit 7, we follow the U.S. Federal Reserve's convention of grouping together corporate and international bonds.

Exhibit 6: Retail Ownership across Asset Classes



Source: S&P Dow Jones Indices LLC, U.S. Federal Reserve. Data as of Sept. 30, 2023. Chart is provided for illustrative purposes.

Predicting the future is hard. In the sovereign and currency markets, history has shown that it requires uncommon foresight. Buffeted by the winds of broader yield and spread movements, the more granular corporate bond markets may promise distinction in performance, but in either case, neither the elephants of central banks nor the massed hordes of retail investors seem to offer easy pickings for active investors to harvest outperformance.

Negative Skew and the Curious Consequences of Concentration

"A turtle beating me, a rabbit? A natural speed merchant! Why, I'm in the pink!"

Bugs Bunny – "Tortoise Wins by a Hare" (Merrie Melodies, 1943)

We turn now to one of the most subtle, and yet nonetheless important, aspects that distinguish the case for active management in bonds compared to equities—one that applies most directly to the so-called "junk" or "high yield" bond categories, where there is a significant risk that a non-trivial proportion of the available investment universe will default.

Consider the following thought experiment: suppose you knew in advance that some percentage of bonds within a particular market segment will default, but that the returns of all non-defaulting bonds will be otherwise similar. **You might then easily construct an active strategy that has a high probability of outperformance; simply pick one bond at random! So long as you are not unlucky, you should outperform a broad benchmark whose otherwise similar return will necessarily be diminished by those rare defaults.**

The important feature of the credit markets that makes this thought experiment possible is the *negative skew* in the cross section of bond returns. The most an investor can receive if a bond is held to maturity is a yield and the return of principal. In return, the investor takes the risk of losing both. Such a capped upside, along with a possible significant loss, creates a negatively

skewed distribution of bond returns in the cross section, and means that it is not uncommon for most bonds to perform better than the average bond.

It is perhaps worth emphasizing that this is an important difference between stocks and bonds. A stock may fall by up to 100%, but it can appreciate much more than that. Even in the relatively short term, the cross-sectional distribution of stock returns tends to be *positively skewed*.[20] In a positively skewed distribution, the average is driven up by a small number of outperformers, and a randomized "stock-picker" has a *less* than 50/50 chance of being above average with each pick.[21] Consequently, concentrated stock portfolios can be at greater risk of short term underperformance in comparison to diversified portfolios—which can sometimes be an important factor in understanding outperformance rates in equities.[22]

Because of all this, the existence of negative skew in the bond markets has been used by some to argue that bonds are more suited to active management.[23] But, unfortunately for putative "bond-pickers," the greater probability of short-term outperformance carried by concentrated portfolios must be balanced against the greater relative impact of any rare defaults that do sneak in, and the increasing risk that this might happen *at some point* if the strategy is maintained over longer time horizons. Because as we will shortly demonstrate, **accepting greater risk in exchange for an expected short-term performance boost may indeed result in a *lower* long-term expected return**.[24]

A little more theory extends our thought experiment. To construct the next exhibit, we simulated hundreds of thousands of hypothetical 20-year performances of "bonds" and associated annually rebalanced "portfolios" with varying levels of concentration. The "bond" performances were generated at random to either deliver a fixed 8% return each "year," or to "default" with a probability of 4% and a presumed recovery value of 25%. We also set (pairwise) annual default correlations to 0.2. The "benchmark" return was set to a hypothetical return of 8% on 96% of the portfolio, minus a loss of 75% on 4% of the portfolio. Details of the simulation are provided in the Appendix. The point of all of this is shown in Exhibit 7, which plots the resulting frequency of benchmark outperformance observed for (randomly selected) 1-bond and 50-bond (equally weighted) portfolios over various simulated time horizons.

[20] Lazzara, Craig J., "The Skew Is Not New," S&P Dow Jones Indices LLC, February 2018.

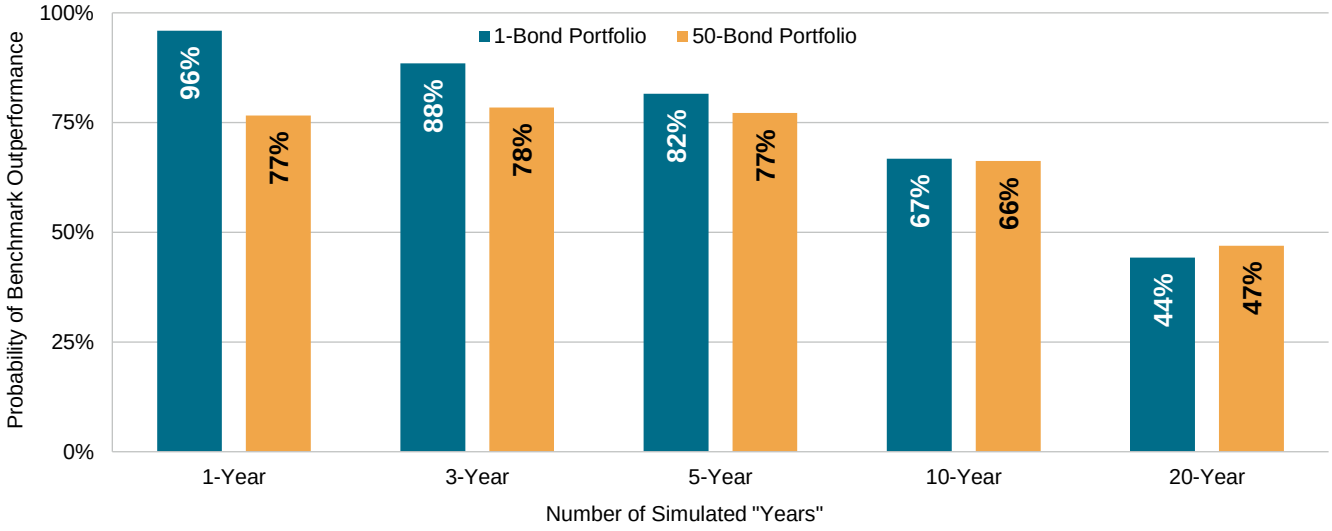
[21] Edwards, Tim, Craig J. Lazzara, "Fooled by Conviction," S&P Dow Jones Indices LLC, July 2016.

[22] Ganti, Anu, and Craig J. Lazzara, "Shooting the Messenger," *op. cit.*

[23] Moore, James, "All Skewed Up? The Active Versus Passive Debate," Barron's, July 2017

[24] This is in part a consequence of the mathematics of compounded returns. For example: recovering from a 5.0% loss requires a 5.2% gain, but a 52% gain recovers only about half of a 50% loss. It follows that the optimal strategy to maximise *multi-period* returns may require lower risk than that for single-period returns. The importance of this observation was first made in Ed Thorp's celebrated "Beat the Market – A Scientific Stock Market System" (1957), and is nowadays more commonly recognized in the form of the "Kelly Criterion" for position sizing.

Exhibit 7: Concentrated Outperformance Probabilities over Various Horizons



Source: S&P Dow Jones Indices LLC. See Appendix for details of the model used to produce these results. Chart is provided for illustrative purposes.

Exhibit 7 supports the initial thought experiment: if just 4% of bonds default and the returns of all the other, non-defaulting bonds are similar, then a randomly selected single-bond portfolio has a 96% chance of outperforming the benchmark. In our simulation, even the relatively diversified 50-bond portfolio has a high chance of outperforming over a single year. However, as the time horizon extends, the data reverses: **at the 20-year point, a majority of the more concentrated portfolios underperformed**.

Famously, the "only free lunch" in finance is a reduction in risk that can be achieved by diversification.[25] **Both active *and* passive funds can offer diversification benefits**. Indeed, the putative benefits of diversification in fixed income lay behind the creation of the first mutual fund, which made its own debut almost 250 years ago in 18th century Holland—and whose holdings were indeed actively selected.[26]

Unfortunately, **for active managers seeking short-term outperformance in credit markets, there may be a temptation to eschew diversification's blessings**. Unfortunate because, while concentrated "bond-picking" might improve the chance of outperformance in the short term, it may also require uncommonly good luck to avoid wiping out decades of outperformance in the long term.

[25] The phrase is attributed to the Nobel laureate Harry Markowitz, speaking about the theory introduced in "Portfolio Selection" (1952). Measures of bond correlations vary across regions, credit quality and time horizon, but are reliably less than one.

[26] According to Rouwenhorst, K. Geert, "The Origins of Mutual Funds"(2004), the *Eendragt Maakt Magt* ("Unity Creates Strength") fund was launched in 1774 with the goal of providing "small investors with limited means an opportunity to diversify." It invested in a range of global sovereign and private credits.

Such a difference between short- and long-term results is remarkable and, more importantly, **not entirely hypothetical.** The evidence of similar results in the real world leads us to the final item on our list: the historical performance of actively managed fixed income funds.

The Empirical Record of Active Funds

"'Who will mark out the track and serve as our umpire?' 'The fox,' replied the tortoise, 'since she is honest and highly intelligent.'"

Aesop's Fables

In both equity and fixed income markets, *relative* performance is critical to understanding the popularity of passive investing. It seems foolish to settle for an "average" return when superior alternatives are available, and superior performance records are advertised in every popular finance magazine. Yet one of the reasons for the popularity of index funds in large-cap U.S. equities is that in nearly every one of the past 20 years, a majority of actively managed U.S. large-cap funds *underperformed* the S&P 500. We know this because since 2002, S&P DJI has published regular SPIVA® Scorecards comparing the performance of actively managed funds to appropriate S&P DJI benchmarks on a global scale.[27]

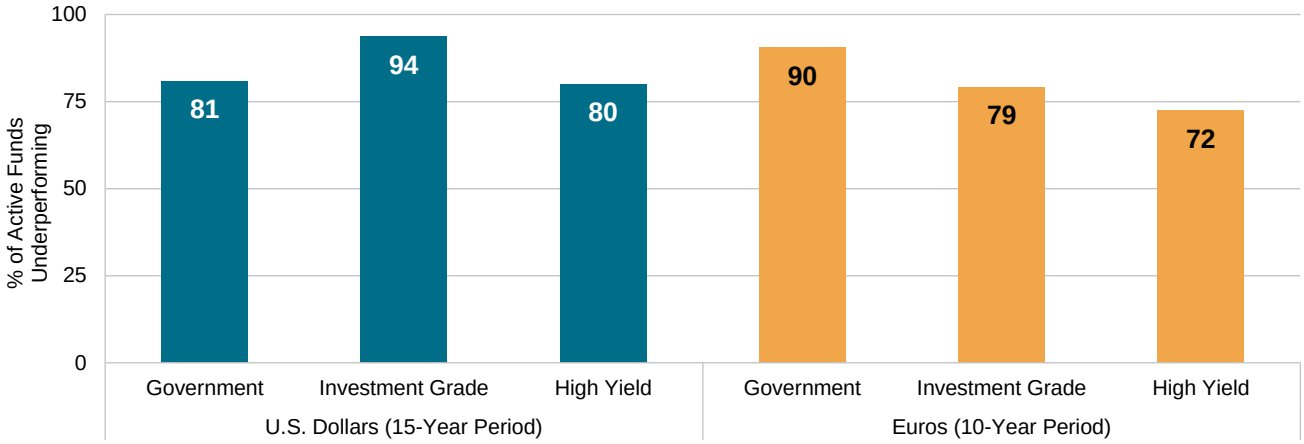
Our SPIVA Scorecards did not initially report on the fixed income markets. In part, **this is because to compare one's performance to a benchmark, one needs a benchmark**. As the availability of fixed income indices and related lower-cost index products increased, it became more tangible to compare their performance to that of actively managed funds. We now have data with time horizons of 10 and 15 years (in euros and U.S. dollars, respectively), during which time index funds were available in several major bond categories.[28]

Exhibit 8 shows the long-term record of actively managed mutual funds, as compared to the main S&P DJI category benchmarks representing the major government, investment grade and high yield categories, as reported in the most recent SPIVA Scorecards for the U.S. and Europe. Casting a broader net and narrowing our investment time horizon, Exhibit 9 shows equivalent results for active fixed income funds across a range of global geographies covered by the SPIVA Scorecards, at the 1-, 3- and 5-year performance horizons.

[27] Further information on S&P DJI's SPIVA Scorecards may be found at www.spglobal.com/spiva/.

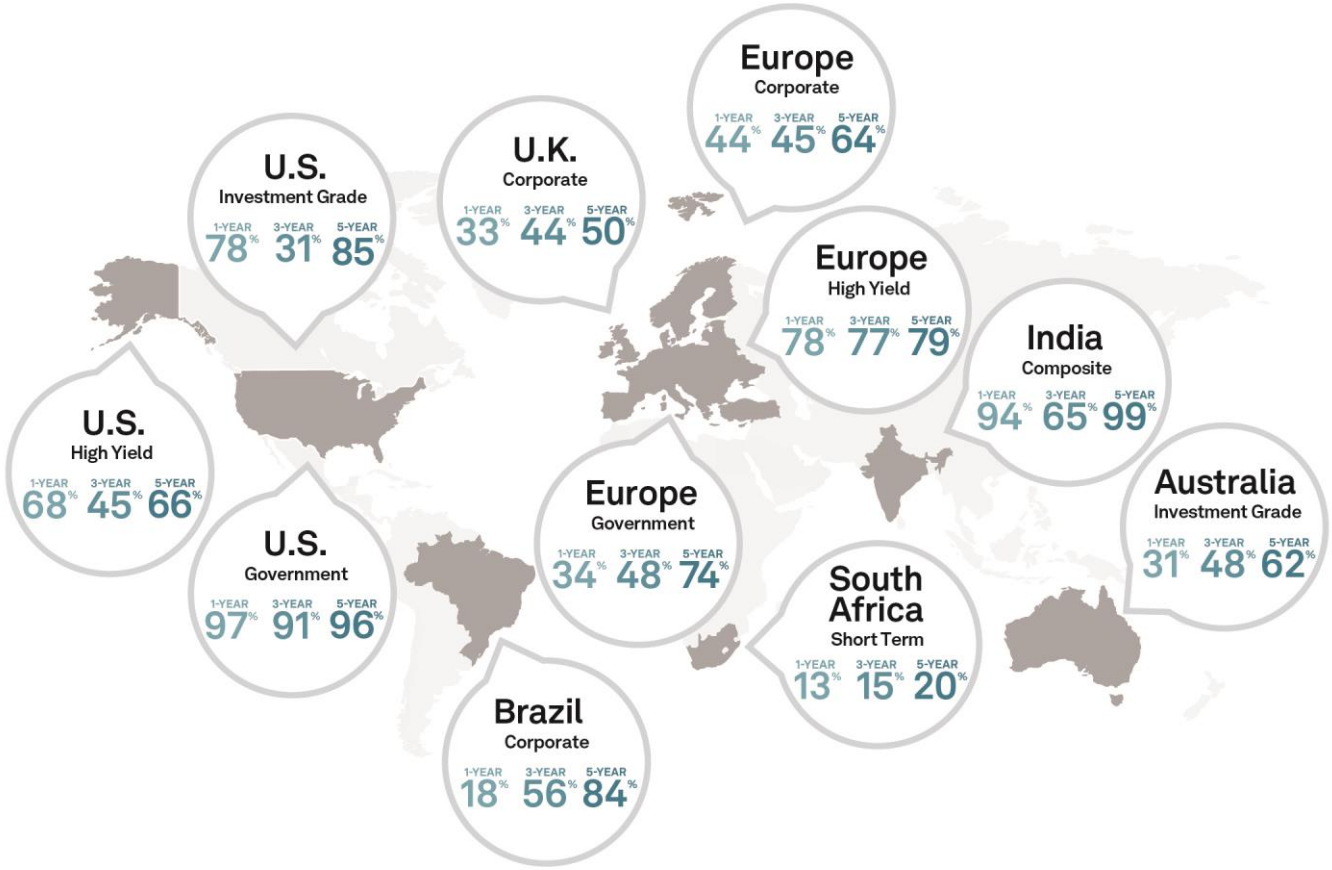
[28] The relative launch dates of index funds in each category were provided in the first section.

Exhibit 8: Long-Term U.S. and European Active Underperformance Statistics



Source: S&P Dow Jones Indices LLC, Morninsgar, CRSP. Data as of June 30, 2023. Includes data from the Government Bond (EUR), Corporate Bond (EUR) and High Yield Bond (EUR) categories of the SPIVA Europe Mid-Year 2023 Scorecard and the General Government, General Investment-Grade and High Yield fund categories of the SPIVA U.S. Mid-Year 2023 Scorecard. Past performance is no guarantee of future results. Chart is provided for illustrative purposes.

Exhibit 9: Global Fixed Income SPIVA Results (Mid-Year 2023)



Source: S&P Dow Jones Indices LLC, Morningstar, CRSP. Data as of June 30, 2023. Past performance is no guarantee of future results. Chart is provided for illustrative purposes. Figures are underperformance rates over 1, 3 and 5 years from left to right. As reported in S&P DJI's Mid-Year 2023 SPIVA Scorecards, available at www.spglobal.com/spiva.

Exhibit 8 confirms that outperforming S&P DJI's fixed income benchmarks proved difficult over the past decade or so, with 72% to 94% of actively managed funds underperforming across the major domestic European and U.S. fixed income categories over the past 10 and 15 years, respectively. Meanwhile, Exhibit 9 showed that active performance did not disappoint everywhere, all of the time. Instead, relatively low short-term underperformance rates were quite common across a range of global fixed income markets.

Inflection Points: Benefits of Scale

Exhibit 10 compares statistics measuring the breadth and range of index funds for two asset classes at two different points in time. The data for bonds reflect the latest available at the point of publication. The data for equities are as of (or as close as possible to) December 2012—an admittedly arbitrary date, picked because it is a little over a decade ago.

Exhibit 10: Passive Fixed Income versus an Earlier Era in Equities

Statistic	Equities (2012)	Bonds (2023)
Aggregate Assets in Index-Based Mutual Funds and ETFs (Global)	USD 2.7 Trillion	USD 3.2 Trillion
Number of Index-Based Mutual Funds and ETFs (Global)	5,162	4,113
% of All Mutual Funds and ETF Assets That Are Index-Based (Global)	21%	26%
% of Total Market in Index-Based Mutual Funds and ETFs (Global)	7.6%	2.3%
Number of Distinct Categories Reported in the SPIVA U.S. Scorecard	16	17
Percentage of Active Mutual Funds Underperforming over Trailing Five Years, Largest SPIVA U.S. Category	69%	66%

Source: S&P Dow Jones Indices LLC, Morningstar, CRSP. Data as of June 30, 2023. Total market size for equities provided by the market capitalization of the S&P Global BMI. Total market size for fixed income globally provided by total debt securities outstanding reported by the Bank for International Settlements. "Largest" SPIVA category determined by the category with the greatest number of distinct active funds studied. Past performance is no guarantee of future results. Table is provided for illustrative purposes.

When there was just one index fund, it was of limited use to market participants seeking to construct portfolios of evolving allocations between global asset classes and market segments. A range of vehicles is more useful, ideally each of sufficient size and with a track record that suggests they can replicate their benchmarks. One might nowadays also hope for a range of other market participants with differing views providing liquidity to each other. Moreover, with an increasing range of low-cost indexed alternatives, the task of comparing active returns to benchmarks becomes easier. And if a passive option to track that index is also possible, the results are also more consequential.

There are, in other words, benefits to scale in passive investing.

Another change from increased passive investment is that **there are also network effects that can make it harder for the remaining active managers**. This arises when considering where the newly deployed capital into index-based vehicles is coming *from*. It is likely to include some, or even many, market participants disappointed by their own prior adventures or disappointed by their appointed active managers—as Exhibits 8 and 9 illustrated. Exhibit 6 further suggests that the bond markets are also becoming more professionalized. The evidence points to a declining capital base among the unfortunate, the untrained or the hapless whose underperformance once provided the source of another's market-beating returns.[29] **Flows into passive funds may indicate that a net supply of "alpha" has diminished and that, consequently, outperformance will become even harder for active managers.**

Conclusion

This paper explores the practical, theoretical and empirical case for an indexed approach in fixed income, outlining why passive investing came later and examining whether its growth might continue to echo, or even catch up to, that of equity markets. In the novelist Vikram Seth's comic retelling of the fable, the victory of the slow-and-steady tortoise is largely ignored by the assembled press. Promising the glamor and the possibility of speed, the hare:

"Suddenly was everywhere.
Stories of her quotes and capers
Made front page in all the papers."[30]

The story of indexing in fixed income might be appreciated by our neglected reptilian champion. Compared to their active counterparts, index funds are boring by design. They do not make bold calls or challenge governments—and their managers are less frequently invited to share their hot takes. Meanwhile, the more tumultuous tale of equity index funds, ETFs and their more famous benchmarks drew more attention from both investors and the media.

However, much like the tortoise's feet, many of the arguments mocking indexing in fixed income have been either importantly qualified or outright refuted by empirical evidence—despite their commonsense appearance. The tortoise won in the end by sticking resolutely to a clear goal. Perhaps fixed income indices will too.

[29] This is an argument particularly familiar from equities, where the outflows from actively managed mutual funds have recently near-matched the inflows into passive funds. See Ganti, Anu and Lazzara, Craig, "Slings and Arrows of Passive Fortune," p. 8-9. See also "The Risk Mitigation Advantage in Active Fixed-Income Management," Guggenheim Investments, June 2023.

[30] Seth, Vikram, "Beastly Tales from Here and There" (1991)

Appendix

We created a hypothetical simulation of 20 years where portfolios are formed each year from up to 50 different "bonds" that individually either default that year or do not—as determined by a series of carefully constructed random numbers. The probability of any individual bond defaulting in any year was set at 4%, and the pairwise correlation between annual defaults was set equal to 0.2. To ensure that hypothetical concentrated investors remain in the simulation despite their misfortunes, we assumed that defaulting bonds had a recovery value of 25% (corresponding to a 75% loss). Otherwise, bonds that did not default benefited each year from a constant annual return of 8%.

We simulated 50 individual bond performances over 20 years from identically distributed random uniform [0,1] variables $Z_{i,t}$ where *i* ranges between 0 and 50, and t ranges between 1 and 20. We created new *correlated* random binary variables A_t, $B_{i,t}$ and $X_{i,t}$ by

$$A_t = \begin{cases} 1 & if\ Z_{0,t} < c \\ 0 & otherwise \end{cases}, \quad B_{i,t} = \begin{cases} 1 & if\ Z_{i,t} < c \\ 0 & otherwise \end{cases}, \text{ and } \quad X_{i,t} = \begin{cases} A_t & if\ Z_{i,t} < Q \\ B_{i,t} & otherwise \end{cases}$$

Where c = 0.04 is the default rate and $Q = \sqrt{0.2} \approx 0.447$ determined the pairwise default correlations. For each "bond" *i* in year *t*, we simulated the return on the bond by

$$\text{Bond } i \text{ return in year } t = \begin{cases} +8\% & if\ X_{i,t} = 0 \\ -75\% & if\ X_{i,t} = 1 \end{cases}$$

That is, the "bond" either returns an 8% "yield", or "defaults" with a "recovery value" of 25% of its current value. Simple algebra also confirms that the probability of any individual bond defaulting in any year is $c = 4\%$, and the pairwise correlation of annual defaults is $Q^2 = 0.2$. Since the goal was to illustrate the potential positive impact of diversification, the model deliberately errs on the side of *overestimating* default correlations.[31] We also perhaps underestimate credit premiums. Recovery values are perhaps slightly underestimated (although they require patience to realize, and we assume our hypothetical investor must reinvest by the start of the next year). Finally, an average default rate of 4% is close to the long-term average among high yield U.S. corporates—according to S&P Global Ratings.[32]

[31] Measures of default correlation vary, but Nagpal, Krishan and Bahar, Reza, "Measuring Default Correlation" offers a long-term view of default correlations, while Javadi and Mollagholamali, "Debt Market Illiquidity and Correlated Default Risk" offers an illustration and potential explanation for why default correlations tend to increase in times of market stress.

[32] Kraemer, Nick W. and Palmer, Jon, "Default, Transition, and Recovery: 2022 Annual Global Corporate Default and Rating Transition Study," S&P Global Ratings, April 25, 2023.

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