

BLUEMOUNTAIN INVESTMENT RESEARCH

Looking for Easy Games in Bonds

Markets are always evolving. One of the biggest changes in recent years has been the rise of index funds. These passive funds, which include traditional index funds and exchange-traded funds that follow specific rules, have received the majority of flows from investors in the past decade. While active managers continue to play a critical role in gathering information and reflecting it in prices, passive managers are growing their share of the market in stocks and bonds.

The most popular indexes in the U.S. are the S&P 500 for stocks and the Bloomberg Barclays US Aggregate Bond Index for bonds. Passive funds can mimic the S&P 500's returns closely and cheaply, but mimicking the returns for the Bloomberg Barclays US Aggregate Bond Index is substantially more challenging because it has 20 times the number of securities, higher turnover, and more frequent rebalancing than the S&P 500.

The difficulty in matching the Bloomberg Barclays US Aggregate Bond Index spells opportunity for active managers. Indeed, a much higher percentage of bond managers than stock managers beat their passive peers over time. One result is that U.S. active bond managers have received \$0.9 trillion in inflows while active equity managers have suffered \$1.1 trillion in outflows over the past decade.

In this report, Michael reviews the shift from active to passive, discusses the role of skill, takes measure of the opportunities for active bond managers, considers what these developments mean for asset managers, and examines the history of pre-fee excess returns for bond managers. We always welcome your questions and comments.

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The shift from active to passive management remains one of the hottest issues in the investment industry. In this report we examine the shift from active to passive investing in bonds. The migration in stocks has received more attention than that in bonds because the move has been more dramatic. The transition in bonds has been less rapid because active bond investors have outperformed passive alternatives at a higher rate than equity managers have, even if much of that outperformance can be explained by exposure to risk premiums.

We document the shift by examining trends in assets under management and flows for active and passive taxable bond funds. Next, we describe the challenges that investors face in identifying skillful managers. We turn to methods for measuring easy games, including a comparison of popular bond and stock indexes and a consideration of the participants in the markets. Finally, we review the implications for asset managers and conclude with a novel framework for gauging the value that active managers generate.

Introduction

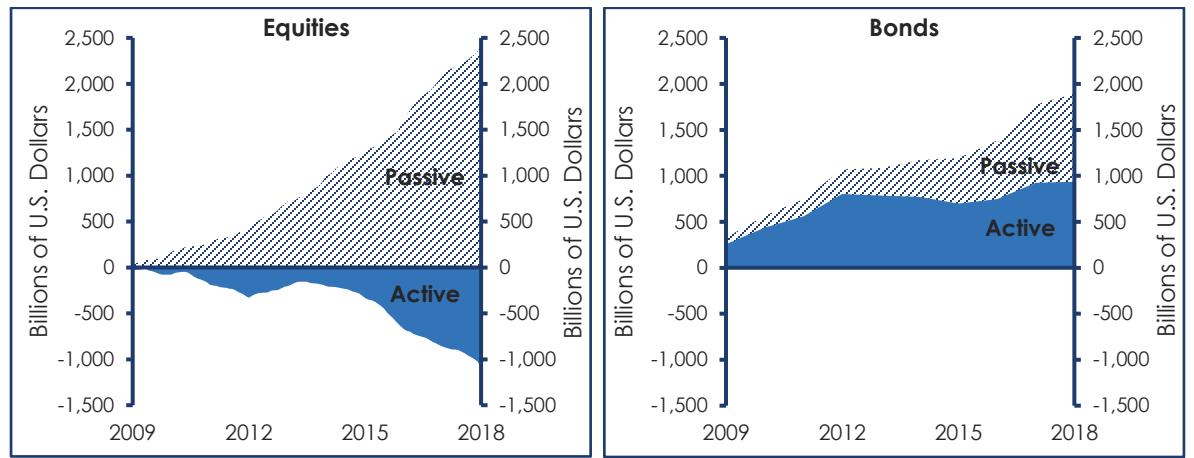
The growth in passive investing continues to be an important topic for investors to consider. Active managers select securities in an effort to generate returns, adjusted for risk, that exceed certain targets. Passive managers create portfolios that mirror indexes or follow specific rules. Examples of rules-based funds include those that attempt to capture premiums from fundamental factors such as size, value, momentum, and volatility. These are commonly called “smart beta” funds. Passive funds can be in the form of traditional index mutual funds or exchange-traded funds (ETFs).¹

The top panel of exhibit 1 shows that active equity funds in the U.S. have suffered \$1.1 trillion in

cumulative outflows in the past ten years, while flows into passive funds have approached \$2.4 trillion.

Active managers in the bond market have not fared as badly. The bottom panel of exhibit 1 reveals that cumulative flows have been positive for both active and passive bond funds. Over the past ten years, flows into active bond funds have been roughly \$935 billion and flows into passive bond funds have been about \$960 billion. The trend has been clearly more favorable for passive managers since 2012.

Exhibit 1: Cumulative Flows from Active to Passive in U.S. Equities and Bonds



Source: Morningstar Direct.

Note: 2009-2018; Monthly data for long-term, open-end mutual funds and ETFs domiciled in the U.S. that invest in U.S. equity, sector equity, or international equity ("Equities") and taxable bonds ("Bonds").

Exhibit 2 provides a simple explanation for the difference in flows. The percentage of actively-managed bond mutual funds that have outperformed their passively-managed peers is much higher than that for equities for holding periods of three or more years through 2018. On the surface it is easy to see why investors have selected active managers for bonds and shunned them for stocks.

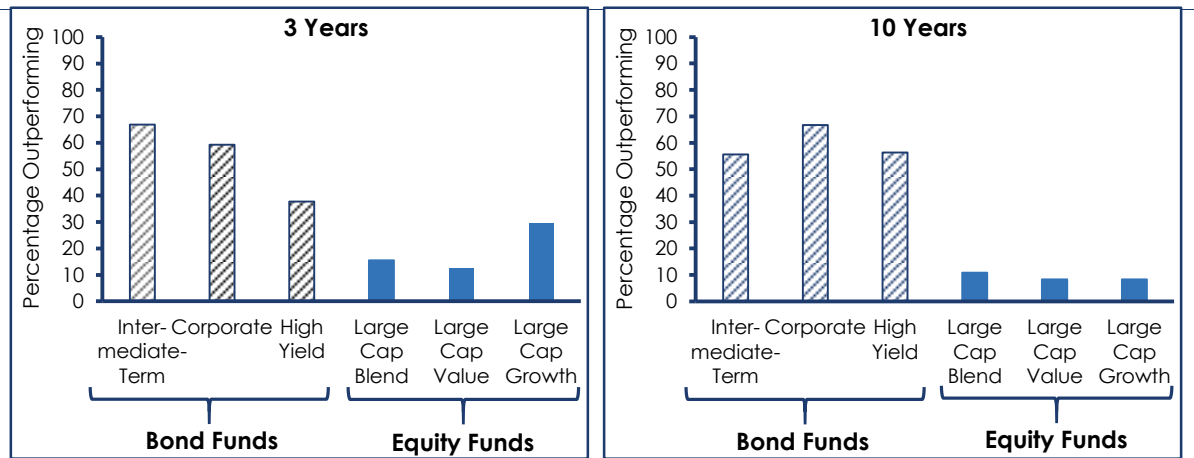
But interpreting this apparent difference in results accurately requires a deeper appreciation of true excess returns and exposure to risk factors. Most of the outperformance relative to passive peers is attributable to traditional risk premiums, including term, corporate credit, and emerging markets risk. Intermediate-term bond managers generally have more credit exposure than their benchmark, and high-yield managers have less

credit exposure than their benchmark, allowing the intermediate-term bond managers to have a higher batting average.

Research by the Vanguard Group, one of the world's largest investment advisers, suggests that an investor can approximate the performance of active managers benchmarked against the Bloomberg Barclays US Aggregate Bond Index with an 80 percent allocation to a total U.S. bond market index fund and a 20 percent allocation to a corporate bond fund with low tracking error and fees.² That said, it is easy to understand why an investor who wants to invest in bonds would select an active rather than a passive fund.

Not all asset classes within the bond universe are created equally. The dispersion of returns for managers of government bonds or mortgage-backed securities funds is small, excluding the

Exhibit 2: Percentage of Active Mutual Funds That Outperformed Passive Peers, 2018



Source: Morningstar.

amplifying effect of leverage, whereas the dispersion in returns for managers of emerging-market or high-yield bonds is large. For instance, the difference between the 75th and 25th percentile managers, measured over three years, is roughly 5 times larger for emerging market debt than for long-term government debt. Equity funds are more volatile but the difference in dispersion between the high- and low-dispersion asset classes is only two times.

Notwithstanding the growth of passive investment in stocks and bonds, it is important to underscore that active management will not disappear

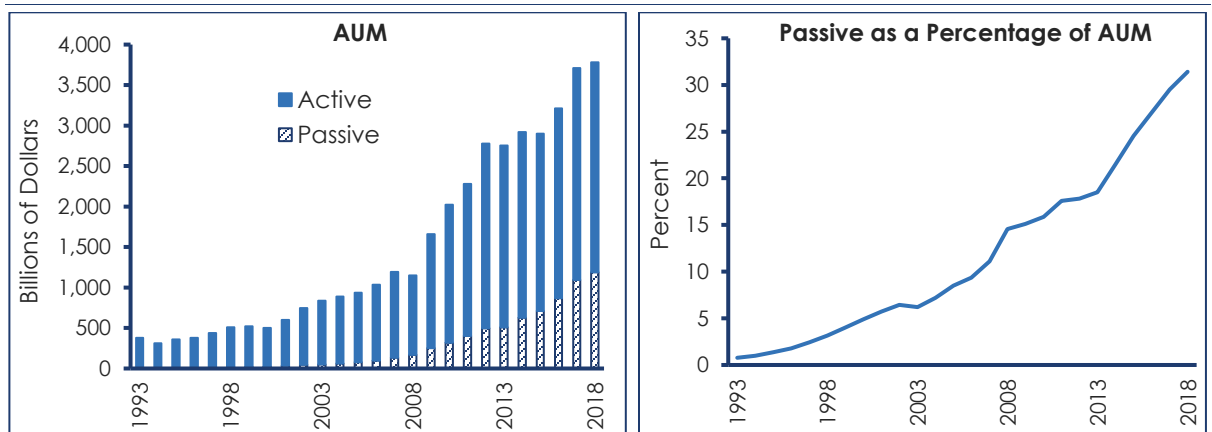
altogether. Active managers generate excess returns by gathering information and reflecting it in the market. In so doing, they promote price discovery and provide liquidity.³ Active managers make money as they drive prices toward efficiency and allow all market participants to get in and out of investments at a relatively low cost. These are good for society and are a positive externality. Traditional index funds and ETFs get a free ride on this externality. The open question is what percentage of the investment management industry needs to be active to accrue these benefits.

Documenting the Shift

The assets under management (AUM) for the U.S. taxable bond mutual fund and ETF universe have gone from about \$380 billion in 1993 to roughly \$3.8 trillion today (left panel of exhibit 3), and passive funds have gone from close to zero to nearly one-third of the AUM (right panel). By way of comparison, passive U.S. equity funds are now about one-half of all AUM for managed funds.⁴

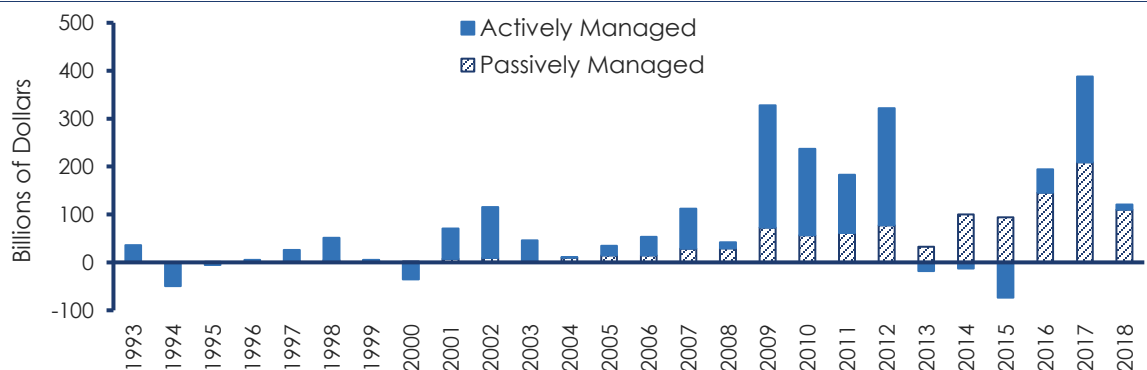
Exhibit 4 shows the flow of money into active and passive taxable bond funds from 1993 through 2018. Flows into active funds were positive for 20 of the 26 years, although 3 of the 6 years of outflows have occurred since 2012. Passive flows have been positive every year.

Exhibit 3: AUM of U.S. Taxable Bond Mutual Funds and ETFs and Market Share of Passive, 1993-2018



Source: Morningstar Direct.

Exhibit 4: Fund Flows into Actively and Passively Managed U.S. Taxable Bond Funds, 1993-2018



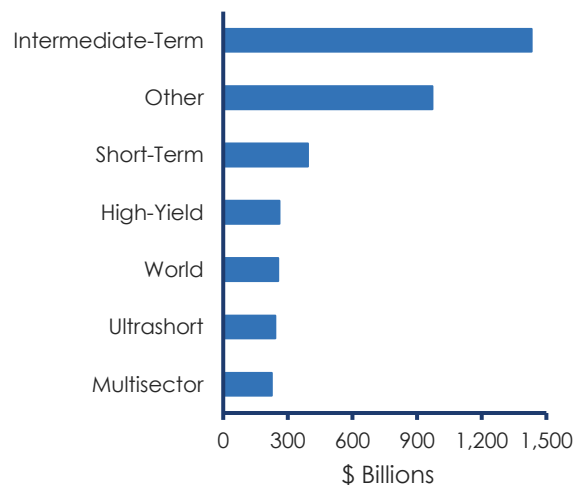
Source: Morningstar Direct.

Exhibit 5 shows how the \$3.8 trillion in mutual funds and ETFs breaks down by asset class within taxable bonds. The largest percentage of the funds, 38 percent, are dedicated to intermediate-term bond funds followed by 10 percent in short-term bond funds and 7 percent in high-yield bond funds.

The first equity ETF was launched in 1993 and the first fixed-income ETF debuted in 2002. There are roughly 400 U.S. taxable bond ETFs today. ETFs trade all day, allow investors to transact through a broker, and can provide better tax efficiency than traditional mutual funds. ETFs represent about one-half of total passive bond AUM. While much smaller than equities in absolute dollars, the proportion of ETF assets to the size of total passively managed assets is similar (see exhibit 6).

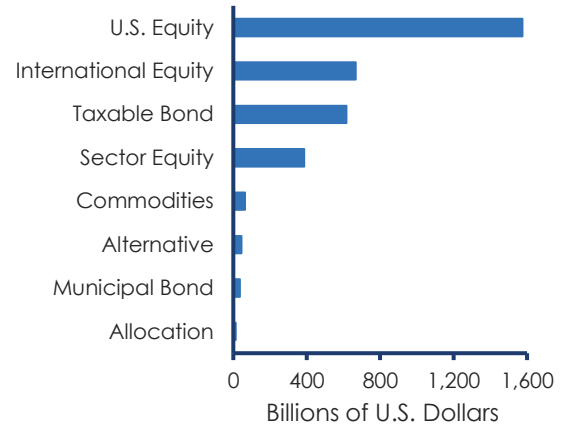
The AUM for ETFs that own taxable bonds have grown rapidly and are roughly ten times higher today than a decade ago (see exhibit 7). Passive ETFs represent the bulk of AUM, but active ETFs have increased in recent years. Active ETFs were 10 percent of AUM in 2018, up from 0 percent ten years ago. Fixed-income ETFs can have larger tracking error than equity ETFs because the underlying bonds tend to be less liquid than the underlying stocks. In general, the less liquid the assets comprising the ETF, the less accurately the ETF will track the asset value.⁵

Exhibit 5: AUM of U.S. Taxable Bond Mutual Funds and ETFs, by Category, 2018



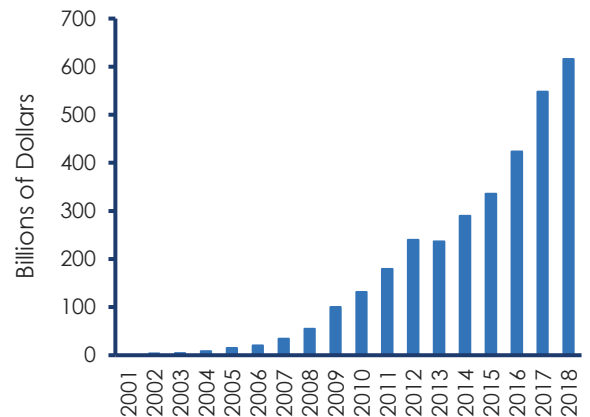
Source: Morningstar Direct.

Exhibit 6: AUM of Exchange-Traded Funds by Asset Class, 2018



Source: Morningstar Direct.

Exhibit 7: AUM of Exchange-Traded Funds, U.S. Taxable Bonds, 2001-2018



Source: Morningstar Direct.

Note: Active and passive ETFs.

Sorting Skill and Luck

Active management is a zero-sum game in the sense that there has to be symmetry between managers who generate positive excess returns and those who generate negative excess returns. Investors face the challenge of identifying and selecting skillful managers.

In fact, there are really two issues. The first is judging which managers are likely to deliver attractive returns and the other is assessing the attractiveness of the opportunity to express skill.

A common way to measure skill is to look at persistence. Results are persistent in activities where outcomes are due predominantly to skill rather than luck. Think of a world-class musician. She will play beautifully night in and night out. The quality of the performance is lasting. Results are more random when luck primarily determines outcomes. Yesterday's lottery winner has no better a chance to win tomorrow.

Consistent with the message from exhibit 2, the persistence in performance for bond mutual fund managers tends to be higher than that for equity mutual fund managers.⁶ This means that bond funds that outperform the benchmark tend to do so with some consistency.

There are a couple ways to explain that result. It may be the case that there is a lot of variety in the skill of bond managers and that the better ones outperform the worse ones. It may also be the case that measuring relative results is trickier than it appears. For example, managers may have exposure to a risk factor that a simple return figure fails to reflect and therefore the outperformance is really compensation for risk.

The variation of skill is a crucial consideration in any competitive domain. One useful concept is the "paradox of skill," which says that in activities where both skill and luck contribute to outcomes, as skill increases, luck can play a bigger role in determining results.⁷ The key to the idea is to recognize that you can measure absolute and relative skill. In nearly all competitive domains, absolute skill has improved. Consider sports measured against a clock, such as running or swimming. Athletes today are faster than their

predecessors as the result of advancements in technique, nutrition, coaching, and training.

At the same time that absolute skill has improved, relative skill has narrowed. That means that in a field of competition, the difference between the best and the average player is smaller today than it was in the past. As the level of skill becomes more uniform, the role of luck rises.

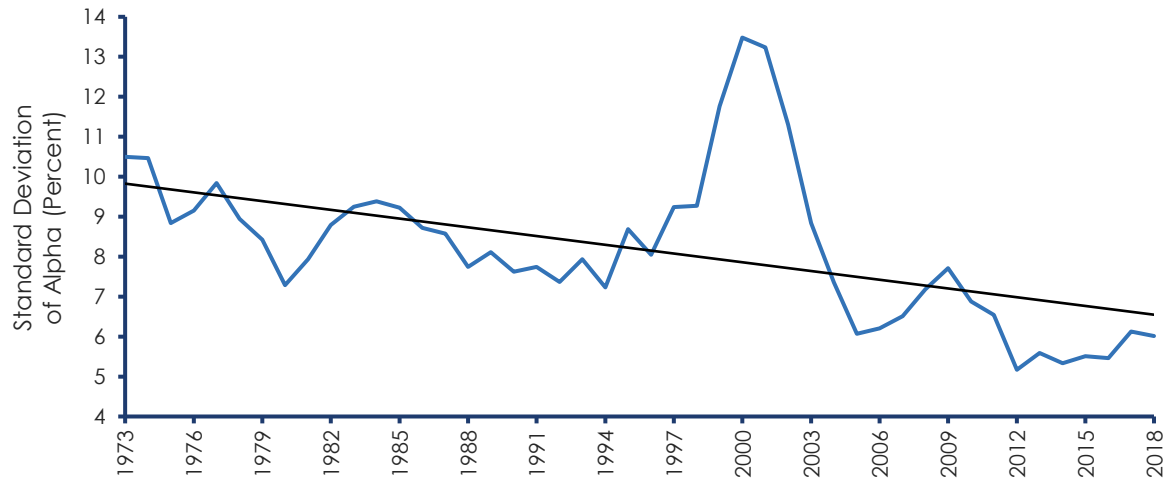
The paradox of skill is a big deal in investing. That manager results appear close to random is not because professional investors don't know what they are doing. It's actually the opposite. Investors today are so good that asset prices do an effective, albeit imperfect, job of reflecting relevant information.⁸

One way to measure the paradox of skill over time is to examine changes in the standard deviation of results. Think of it this way: the results for many activities follow a distribution that looks like a bell. Lots of participants are near the average at the top of the bell. The sides that slope down from the top represent the under- and outperformers. Standard deviation measures the width of the bell. A shrinking standard deviation reveals the paradox of skill, as it documents the gap between the average and the extreme performers.

The investment management industry measures results through excess returns adjusted for risk relative to an appropriate benchmark, or alpha. The distribution of alpha doesn't follow a perfect bell-shaped curve, but reality is close enough to make the point. Skillful active managers want wide distributions so they can earn positive alpha while less skillful investors suffer negative alpha.

Exhibit 8 shows the three-year average standard deviation of single-factor alpha for U.S. large capitalization equity mutual funds from 1973 through 2018. There is a steady decline in standard deviation, save for a brief but explosive expansion during the dot-com bubble. That noted, the standard deviation has rebounded modestly since the financial crisis. In 2018, the standard deviation of alpha was 5.1 percent for more than 2,000 equity mutual funds.

Exhibit 8: Standard Deviation of Alpha for U.S. Large Capitalization Equity Mutual Funds



Source: Morningstar Direct.

Note: Rolling three-year average.

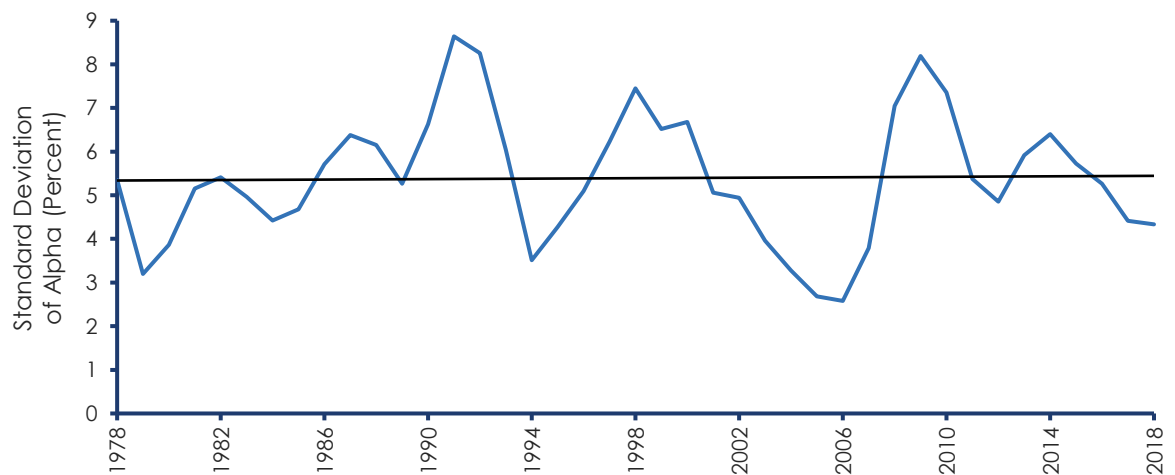
Exhibit 9 shows the three-year average standard deviation of alpha for U.S. taxable bond mutual funds from 1978 through 2018. The standard deviation has bounced around, but unlike the equity chart there is no clear trend. While bond managers have certainly become more skillful over time, the relative skill gap between the best and worst performers has not narrowed as it has for equity managers. In 2018, the standard deviation of alpha was 3.3 percent for nearly 1,300 U.S. taxable bond mutual funds.

All markets are highly competitive, but the persistence and standard deviation of alpha suggest that the opportunity to find managers who may outperform is greater in bonds than in stocks. Investment process and time horizon are

key for both. But bond markets have more securities, are more costly to trade, and experience greater turnover. As a consequence, it comes as little surprise that fewer equity managers than fixed income managers outperform their respective benchmarks. This is consistent with the more rapid transition into passive funds in the equity markets.

Generating positive alpha requires applying skill through a robust process and an ability to find inefficiently-priced assets. Skilled poker players describe the search for easy games, where they can be confident that their skill will prevail over time. The same is true of markets. You know you are playing an easy game when you can clearly identify your source of edge.

Exhibit 9: Standard Deviation of Alpha for U.S. Taxable Bond Mutual Funds



Source: Morningstar Direct.

Note: Rolling three-year average.

Measures of Easy Games

In assessing easy games, you consider the game itself and the nature of the other participants. The game provides some context for gauging how active managers can perform relative to an index fund or ETF that tracks a benchmark. Part of the reason that active bond managers succeed in outperforming a benchmark at a higher rate than equity managers is the nature of the two markets.

The Nature of the Game: Bonds versus Stocks. The Bloomberg Barclays US Aggregate Bond Index is market-value weighted and has more than 10,300 securities. U.S. Treasuries and mortgage-backed securities (MBS) make up about two-thirds of the index, and corporate bonds represent another 25 percent. The maturity and issuance of securities means there is a need

for frequent rebalancing, which can be a challenge because the provision of liquidity has become more expensive since the financial crisis in 2008.⁹ Further, pricing all of the securities accurately in real time is a challenge.¹⁰

The S&P 500 index is market-capitalization weighted and has 505 securities. The information technology, health care, and financials sectors represent about one-half of the index's market capitalization. Turnover is relatively infrequent and has averaged about four percent per year over the last six decades. The main reason for companies to exit the S&P 500 is that they are acquired. Exhibit 10 compares the two leading benchmarks.

Exhibit 10: Comparison of Leading Bond and Equity Indexes

Characteristic	Bloomberg Barclays US Aggregate Bond Index	S&P 500 Index
Asset Class	Investment grade taxable U.S. bonds	Large-capitalization U.S. equities
Weighting	Market-value weighted	Market-capitalization weighted
Number of Securities	10,343	505
Ownership	100%	100%
Institutions	91%	77%
Individuals	9%	23%
Frequency of Rebalancing	Monthly	Quarterly
Annual Security Turnover	18%	5%
Annualized Volatility	5%	17%
Composition	Treasury (39%)	Information Technology (21%)
	MBS (28%)	Health Care (15%)
	Industrial – Corporate (15%)	Financials (13%)
	Financial – Corporate (8%)	Consumer Discretionary (10%)
	Agency (3%)	Communication Services (10%)
	Commercial MBS (2%)	Industrials (9%)
	Utility – Corporate (2%)	Consumer Staples (7%)
	Supranational (1%)	Energy (5%)
	Sovereign (1%)	Utilities (3%)
	Local Authority (1%)	Real Estate (3%)
	Asset-Backed Securities (1%)	Materials (3%)

Source: Bloomberg; S&P Dow Jones Indices; Federal Reserve; Kenneth R. French, "Presidential Address: The Cost of Active Investing," *Journal of Finance*, Vol. 63, No. 4, August 2008, 1537-1573; and BlueMountain estimates.

Note: Number of securities as of 3/31/2019; ownership as of 12/31/2018; turnover is the 5-year average for 2014-2018 and for the Bloomberg Barclays index is measured as the lower of the entering turnover and exiting turnover; annualized volatility for 1989-2018; sector composition as of 3/31/2019.

To show how indexing to these benchmarks differs in practice, we can compare the iShares Core U.S. Aggregate Bond ETF (AGG) and the iShares Core S&P 500 ETF (IVV). AGG had \$57 billion in AUM and IVV had \$149 billion at year-end 2018. We look at three metrics for each: percent of index securities held, active share, and tracking error.

AGG owns 60 percent of the securities in the Bloomberg Barclays US Aggregate Bond Index. The leading ETFs that track the index hold between one-quarter and three-quarters of the securities in the index. Passive bond managers must decide which securities to own. IVV holds 100 percent of its benchmark, as do all large equity index funds.

Active share reflects how much a fund differs from its index.¹¹ Active share is zero percent if a fund exactly matches the index and 100 percent if it is completely different. The calculation assumes no leverage or short sales. (See appendix for more detail.) The active share is 53 percent for AGG and 1 percent for IVV. A passive bond ETF is less similar to its benchmark than a comparable stock ETF.

Tracking error, the standard deviation of the difference between the returns of a portfolio and the index, is a measure of how closely a portfolio matches the index. AGG's tracking error is four basis points, while IVV's is one basis point. Further, the annualized volatility for the Bloomberg Barclays US Aggregate Bond Index is lower on average than that for the S&P 500 index, so the tracking error as a percentage of volatility is much higher for AGG than IVV.

Exhibit 11 summarizes the differences between AGG and IVV and clarifies why equity indexing is more straightforward than bond indexing.

Exhibit 11: Tale of the Tape: AGG versus IVV

Metric	AGG	IVV
Percent of index securities held	60%	100%
Active share	53%	1%
Tracking error (basis points)	4	1

Source: Morningstar Direct and ActiveShare.info.
Note: Percent of index securities held is through 3/26/2019; Active share as of 3/26/2019 for AGG and 12/31/2016 for IVV; Tracking error based on monthly returns annualized over three years ended 2/28/2019.

Exhibit 12: Tracking Error for Index Funds and ETFs Benchmarked to Various Indexes

Category	Tracking Error (Basis Points)
S&P 500	2
Short-Term Government	5
Intermediate Government	9
Mortgage-Backed	18
Inflation-Protected	20
Intermediate Investment Grade	21
Emerging Markets	23
High Yield	47

Source: Morningstar Direct.

Note: Monthly returns annualized over three years ended 2/28/2019; Reflects average of 5 largest funds for each category except for mortgage-backed, which includes 3 funds based on data availability.

We selected AGG because it is large and can be reasonably compared to the Bloomberg Barclays US Aggregate Bond Index. Exhibit 12 shows that the average tracking error for passive bond funds ranges from 5 basis points for short-term government funds to 47 basis points for high yield funds. In each case, the tracking error is calculated using the benchmark noted in the fund prospectus.

We have seen that it is difficult to build a fund that closely tracks the Bloomberg Barclays US Aggregate Bond Index. This difficulty creates opportunity. Refinancing, maturities, and issuance present ways for active managers to beat the benchmark. This ability is inherently more limited for active equity managers.

For example, the issuance of new securities is far more active in the bond market than in the stock market, creating a potential source of alpha for bond managers. There are more new bond issues because bonds mature whereas equities are perpetual. Institutional bond investors purchase new issues from bank underwriters, often at a discount to similar secondary transactions.

This new-issue yield premium compensates investors in corporate debt for bearing the uncertainty of what the eventual market price will be, as well as other risks. New issues equaled 17 percent of total debt outstanding for the corporate debt market in the decade ended 2018. But research suggests bond investors earn returns, or alpha, that these risks do not fully explain. One argument is that banks underprice new issues to benefit institutional investors. This effectively transfers wealth from issuers to investors.¹²

The Nature of the Participants. Another aspect to assessing how hard it is to outperform a benchmark is a consideration of the other participants. Nicolae Gârleanu and Lasse Pedersen, professors of finance, created a model to reflect the reality that for there to be winners, there must be losers (see exhibit 13).¹³ The core idea is that some investors can gather information that is relevant for discerning value, buy and sell accordingly, and profit from mispricing. These are the informed asset managers.

For some managers to outperform, others must underperform. These are the noise traders and noise allocators, who include retail investors and some issuers. Passive investors neither win nor lose. To the extent that noise traders transition to be passive investors, active management can get even more difficult because the weak players have left the game.

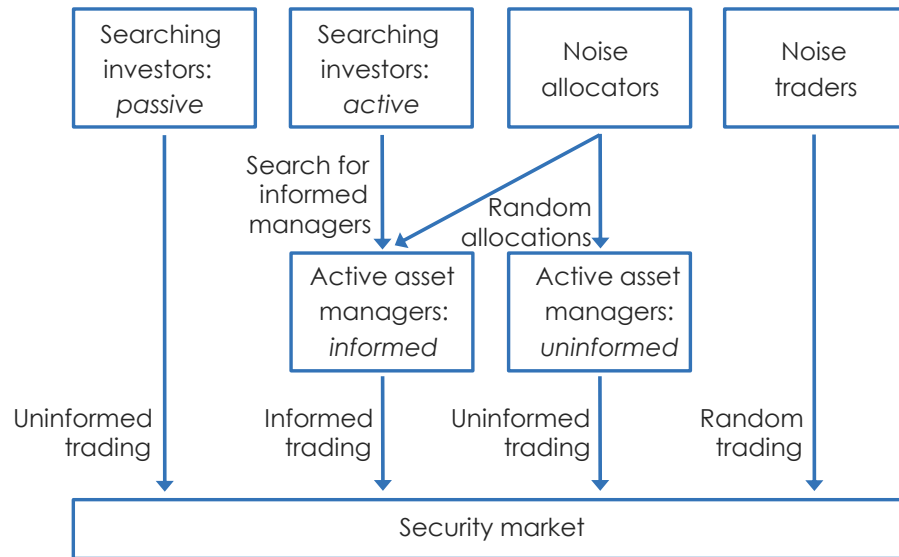
The model shows why it makes sense for unsophisticated investors to participate in most markets via index funds or ETFs. Gârleanu and Pedersen also find that institutional investors tend

to do better than individuals, reflecting greater sophistication and the ability to pay lower costs.

The model also reiterates why “searching investors” can earn higher returns in markets that are less efficient. A recent survey of returns to active management found “that the value of active management depends on the efficiency of the underlying market and the sophistication of the investor.”¹⁴ Returns to active managers depend on the composition of the market in which they compete, and the bond and stock markets are very different.

Both the poker metaphor and the Gârleanu and Pedersen model illustrate that part of finding an easy game is understanding the other participants. Expressing skill is easier when other investors are less sophisticated or have motivations to trade that are not based solely on fundamentals. Exhibit 14 shows the composition of ownership for U.S. Treasury securities, agency- and government-sponsored enterprise (GSE)-backed securities, and corporate bonds since 1973, the year that what is now the Bloomberg Barclays US Aggregate Bond Index was created.

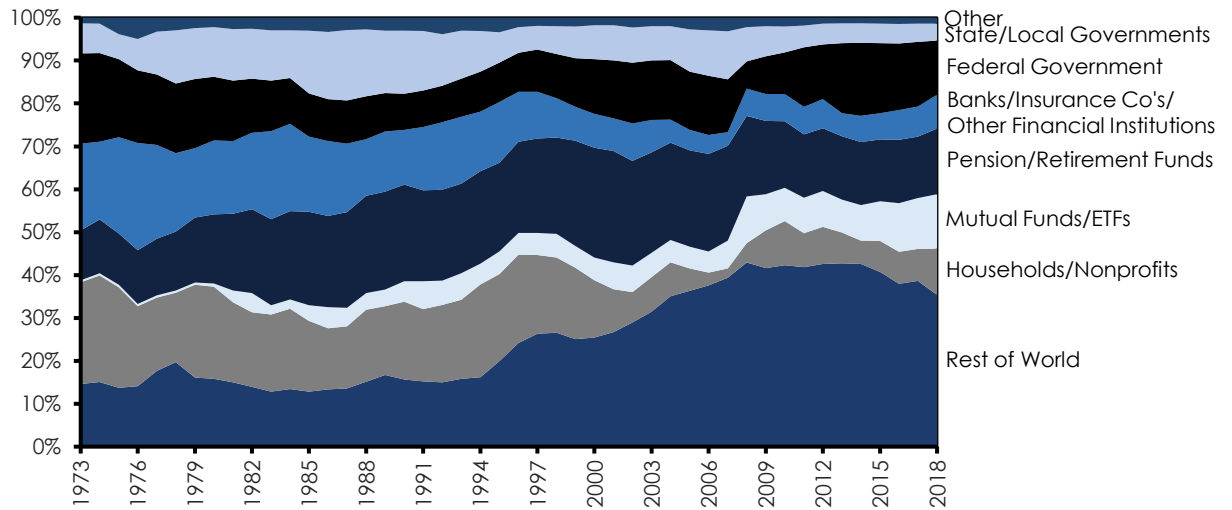
Exhibit 13: A Model of Efficiently Inefficient Markets



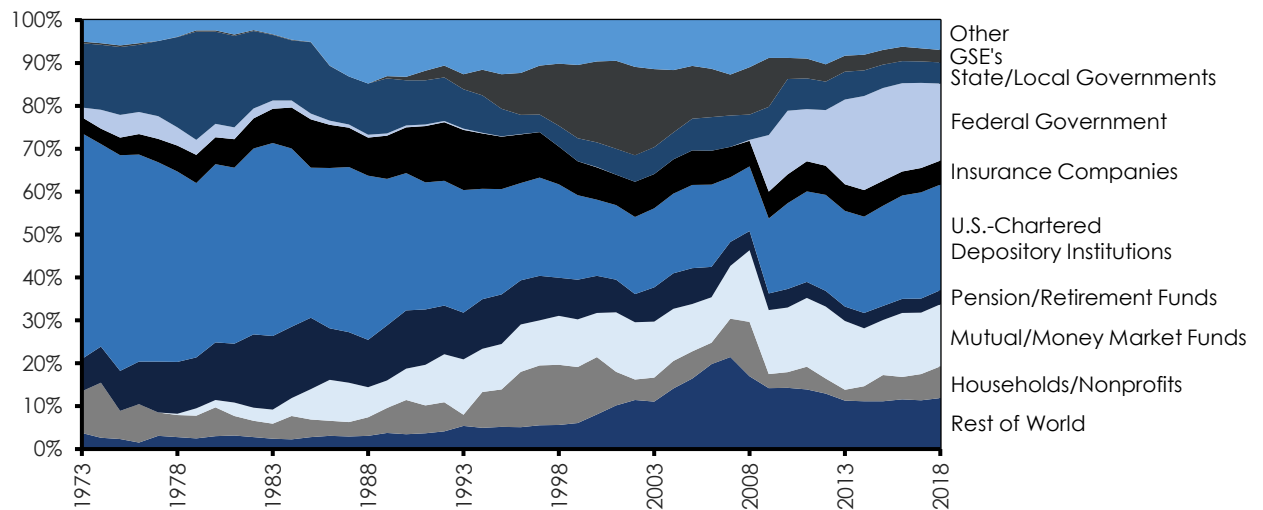
Source: Nicolae Gârleanu and Lasse Heje Pedersen, “Efficiently Inefficient Markets for Assets and Asset Management,” *Journal of Finance*, Vol. 73, No. 4, August 2018, 1663-1712.

Exhibit 14: Ownership of U.S. Treasuries, Agency and GSE-Backed Securities, and Corporate Bonds, 1973-2018

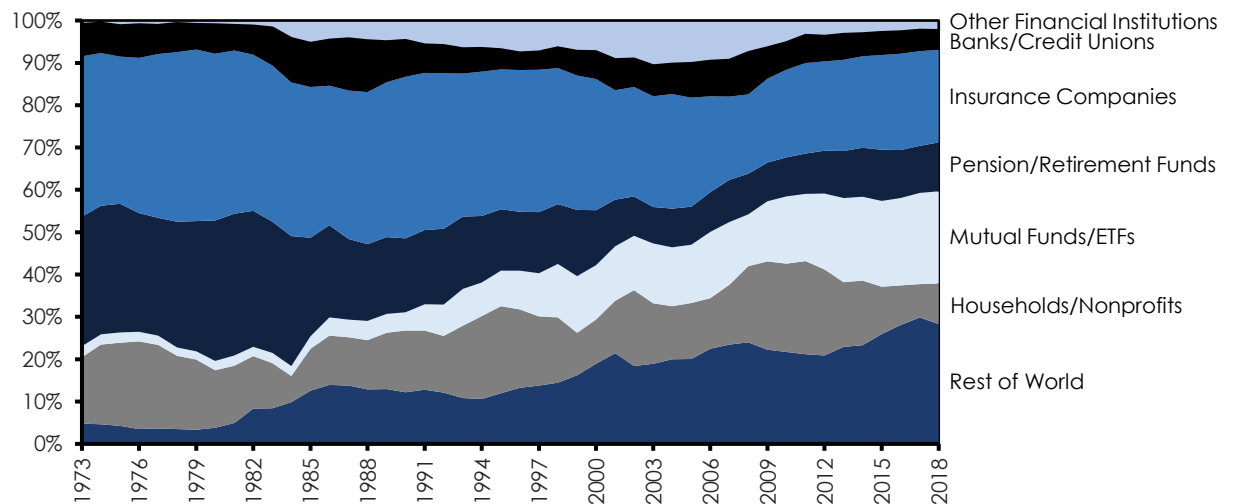
Treasury Securities



Agency- and GSE-Backed Securities



Corporate Bonds



Source: Federal Reserve.

Note: GSE: government-sponsored enterprises.

There are a couple of observations that are relevant for a consideration of passive and active bond management:

- Some large holders of U.S. Treasury and agency- and GSE-backed securities may have incentives unrelated to the value of the bonds solely. For instance, the Federal Reserve buys bonds to achieve quantitative easing and non-U.S. central banks buy bonds to stabilize exchange rates.¹⁵ This is important because foreign ownership of U.S. Treasury and agency- and GSE-backed securities has increased substantially in recent decades.

Further, banks are required to hold high-quality liquid assets to ensure liquidity. Because the Bloomberg Barclays US Aggregate Bond Index largely comprises U.S. Treasuries and agency- and GSE-backed securities, these non-economic owners can influence the price of the securities and hence the index's returns.

- Rules or regulations constrain the bond holdings of certain institutions.¹⁶ For example, an insurance company that owns an investment grade bond may need to sell it if it is downgraded to high yield. This leads to a lower price on the security than the fundamentals justify. In both cases, active managers can position themselves to sidestep these challenges or take advantage of them. This makes it easier to beat the benchmark.

- The pattern of fund flows is different in equities versus bonds, as we saw in exhibit 1. Active U.S. equity managers have realized outflows of \$1.1 trillion in the past ten years, whereas active U.S. taxable bond managers have seen inflows of \$935 billion. While flows into passive bond funds have exceeded flows into active bond funds, the story is not as one-sided as in equities.¹⁷ Flows are important in investing because they create a tailwind for funds doing well and a headwind for those performing poorly. Investors generally chase past performance by investing in funds that have done well.

Portfolio managers who receive inflows commonly purchase more of the securities they already own, boosting the performance of the portfolio.¹⁸ Underperforming managers who suffer outflows must sell what they hold, compounding performance woes. Flows are a short-term predictor of results.¹⁹

These elements clarify the nature of the game active bond managers play as they seek to deliver returns in excess of a benchmark. First, the Bloomberg Barclays US Aggregate Bond Index is markedly different than the S&P 500 in terms of the number of securities, liquidity, pricing, and pace of rebalancing. Active managers can more readily distinguish themselves from the benchmark in a way that improves their relative performance. Exhibit 15 summarizes some sources of alpha for active bond managers.

Exhibit 15: Sources of Alpha for Active Bond Managers

Source of Alpha	Mechanism
Nature of market	Bond markets have more securities and turnover and are more costly to trade.
Taking other side of non-economic trades	Taking other side of forced sales or exploiting constraints of other parties: <ul style="list-style-type: none"> * Central banks: pursue quantitative easing and stabilization of exchange rates; * Banks: required to hold high-quality liquid assets; * Insurance companies: potential forced selling of downgraded bonds.
Liquidity provider	Active managers compensated for providing liquidity to index changes.
Negotiation	Trading over-the-counter versus on exchanges allows for negotiation.
Dispersion in spreads	Dispersion in spreads over Treasuries can present an opportunity as bonds with the same credit rating may offer different yields.
New issue premium/wealth transfer	Active managers can take advantage of underpricing at issuance.
Relative value opportunities	There can be hundreds of bonds for a single issuer versus usually only one stock. This variety may present attractive relative value opportunities within the capital structure.

Source: BlueMountain Capital Management.

What It Means for Asset Managers

Economies of scale are important for passive managers because the fees on passive funds are a fraction of those on active funds. Exhibit 16 shows the fifteen firms with the highest share of passive AUM for U.S. taxable bond funds. Vanguard dominates the industry, with a market share of roughly 55 percent, followed by BlackRock (iShares), Fidelity, and State Street. The same four investment managers have the largest share in traditional index funds and ETFs for equities, albeit in a different order.

Expense ratios have been trending down in the investment management industry, reflecting the cost-saving impact of technology and the shift from active to passive AUM.²⁰

Exhibit 17 shows the trend in asset-weighted expense ratios in the U.S. taxable bond market for active mutual funds, index funds, and index ETFs, as well as the weighted average for all mutual funds. The expense ratio on index ETFs is about 10 basis points higher than that for traditional index funds. Active expense ratios remain roughly 40 basis points higher than passive ones.

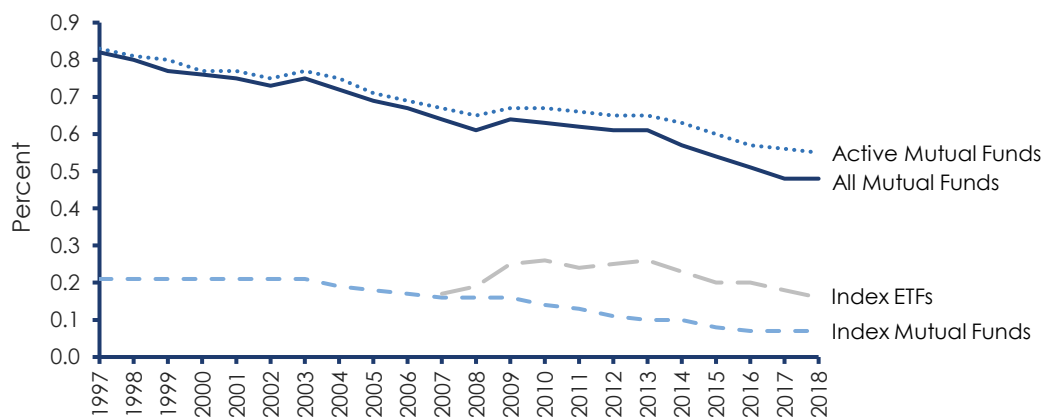
Passive investors can pay lower expenses because they benefit from the positive externalities active managers create, including price discovery and liquidity. Expense ratios on all funds have declined roughly 35 basis points in the past two decades.

Exhibit 16: Largest Passive U.S. Taxable Bond Fund Managers, 2018

Asset Manager	Passive AUM	Total AUM	Passive Fraction of AUM
Vanguard	666	892	75%
iShares	291	297	98%
Fidelity Investments	71	250	28%
SPDR State Street Global Advisors	43	49	89%
Invesco	29	44	65%
Schwab ETFs	19	19	100%
AXA Equitable	16	22	73%
TIAA Investments	11	33	34%
VanEck	7	7	100%
Schwab Funds	4	4	95%
Goldman Sachs	3	22	16%
Voya	3	20	17%
Northern Funds	3	15	20%
PIMCO	3	306	1%
Flexshares Trust	2	3	89%

Source: Morningstar Direct.
Note: Mutual Funds and ETFs.

Exhibit 17: Expense Ratios on U.S. Taxable Bond Mutual Funds and ETFs, 1997-2018



Source: James Duvall, "Trends in the Expenses and Fees of Funds, 2018," ICI Research Perspective, Vol. 25, No. 1, March 2019.

Winning the Easy Game (Value Added by Active Managers)

Markets cannot be perfectly efficient, where price and value are the same, because there is a cost to gather information and reflect it in prices. To compensate investors for assuming this cost, there must be a profit opportunity in the form of excess return. In a competitive market, it would be reasonable to assume that cost and benefit are in rough parity.

The trick is to quantify cost and benefit. The amount of fees that investors pay to active managers is one approach to quantifying cost, and available positive alpha captures benefit. While much of the investment industry reports results using percentage returns versus a benchmark, the crucial underlying question is how many dollars in excess returns a fund creates.

Jonathan Berk and Richard Green, professors of economics, created a framework to consider excess returns that captures both cost and benefit.²¹ They assume that investors seek to give their money to funds that will generate excess returns but that the more money a skillful manager runs, the lower is his or her expected alpha. Their setup suggests that skillful managers end up with more money and expected alpha moves toward zero as a fund grows.

The Berk and Green framework is similar to economic profit, or a company's economic return after considering the opportunity cost of capital.²² Economic profit equals a firm's return on invested capital (ROIC) minus its weighted average cost of capital (WACC) times its invested capital. For example, a firm with a 13 percent ROIC, an 8 percent WACC, and \$1,000,000 in invested capital has an economic profit of \$50,000 $[(0.13 - 0.08) \times \$1,000,000]$.

The same analysis applies to investment funds. A fund's gross economic profit equals its beta-adjusted gross return minus the benchmark return, multiplied by AUM. We call gross economic profit "gross profit" for short. For instance, a bond fund with average risk that has a gross return of 9 percent, a benchmark return of 4 percent, and \$100,000,000 of AUM would produce a gross profit of \$5,000,000 $[(0.09 - 0.04) \times \$100,000,000]$. Five million dollars is the value the investment manager extracts from the market. Berk and Green find that gross profit is a better reflection of skill than simple measures of return.

Here's an example. Peter Lynch, who managed the Magellan Fund at Fidelity Investments from May 1977 to May 1990, generated an average annual return of more than 29 percent per annum. Alpha was large but the AUM was small in his first five years running the fund. Lynch's average monthly gross profit was \$2.1 million in 2018 U.S. dollars.

Positive alpha was small but the AUM was large in the last five years he ran the fund. Average monthly gross profit was roughly \$38 million. Even though Lynch's alpha was vastly larger in the early years than in the late years, he extracted nearly 20 times more value in his last 5 years as a result of the large increase in AUM.²³

Results for Bill Gross, the famous bond investor who spent the bulk of his career running the Total Return Fund at PIMCO, provide a noteworthy comparison. The average monthly spread between the fund's risk-adjusted gross return and the benchmark return, gross alpha, was 0.10 percent over Gross's first five years running the fund. His skill allowed him to extract about \$1.9 million per month in 2018 U.S. dollars from the market.

In his last five years ended in September 2014, the average monthly spread was 0.18 percent, and the average fund AUM was \$271 billion. Gross's monthly value extraction was roughly \$500 million.

The magnitude of his alpha in the later years was roughly double what it was in the early years, leading to value extraction that was roughly 270 times larger because of the substantial increase in AUM.

We calculate gross profit before fees to accurately measure an investment manager's skill.²⁴ Fees finance the manager's ability to express skill by unearthing information and pricing it in securities. But fees also eat into investor returns. How best to split the fruits of skill between managers and investors is a topic of debate.

We use the Berk and Green calculation to analyze active mutual funds in the Morningstar Direct database that invest in U.S. taxable bonds from 1978 through 2018. Over the full period the data capture roughly 23,400 fund years and \$35 trillion of AUM. The database is free of survivorship bias. We show all figures in 2018 U.S. dollars to reflect inflation.

The number of funds included in the analysis increased from about 25 in 1978 to nearly 1,200 today. The average fund size was roughly \$300 million in the late 1970s, peaked at \$2.23 billion in 2013, and is currently \$2.17 billion. See exhibit 18.

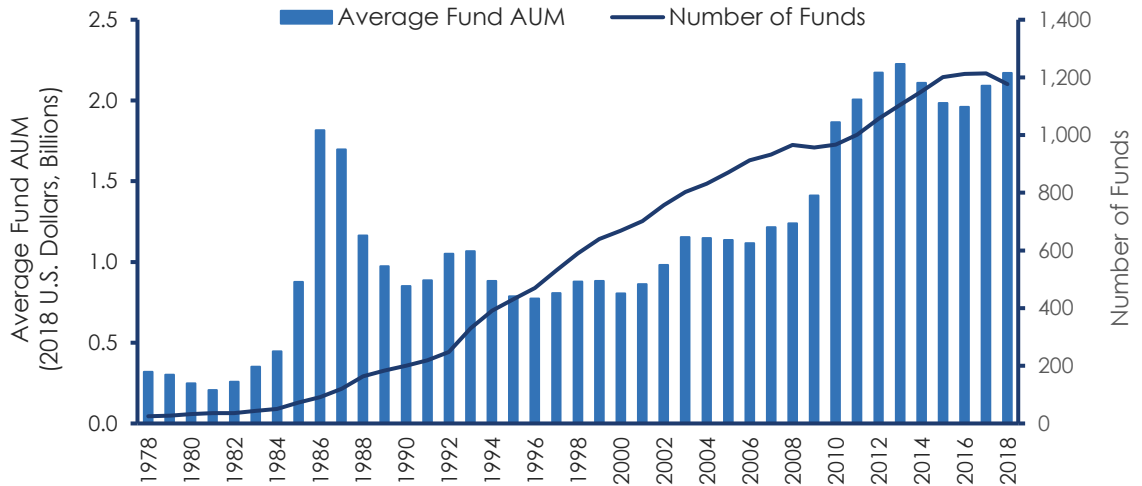
We calculate gross profit using alpha that is based on the capital asset pricing model. Research suggests the use of single-factor alpha is reasonable given how investors behave.²⁵ The risk of the funds is measured relative to the benchmark the funds specify in their prospectus.

The average fund's gross profit was \$1.4 million per month and \$16.6 million per year over the period we measure. The mean is misleading because the distribution of AUM in the mutual

fund industry has large skewness. To illustrate, the top 20 percent of bond funds manage just under 85 percent of total AUM and the top 50 percent control 97 percent of AUM.

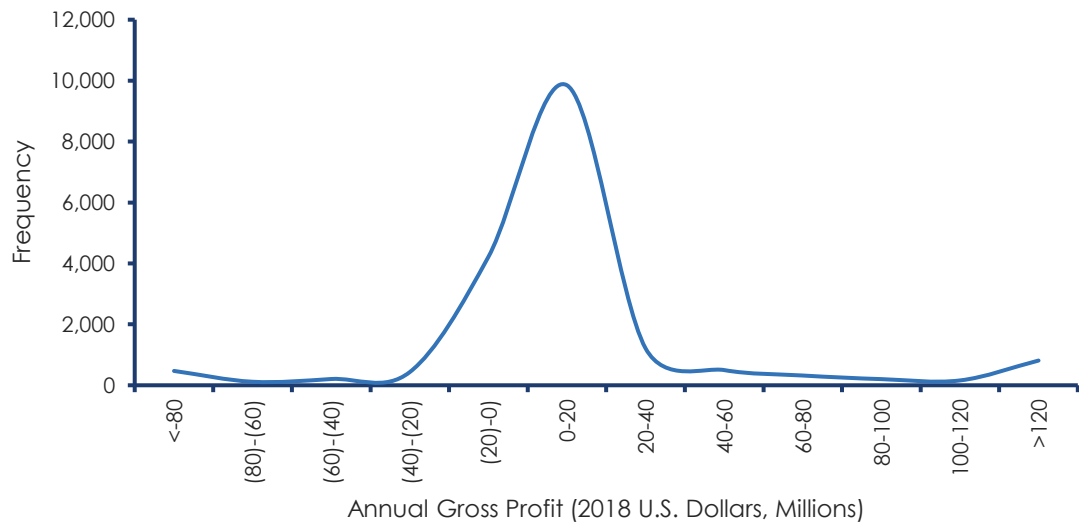
The gross profit for the middle of the distribution of all funds, or the median, was \$103,000 per month and \$1.2 million per year. The median measures the central tendency of a distribution with skewness better than the average does. That the average and the median gross profit are positive reveals mutual fund managers generated returns in excess of the market, after accounting for risk but before fees. Exhibit 19 shows the frequency distribution of gross profit for roughly 23,400 fund years from 1978-2018.

Exhibit 18: Total Number of Funds and Average Fund Assets Under Management



Source: Morningstar Direct.

Exhibit 19: Frequency Distribution of Annual Gross Profit, 1978-2018



Source: Morningstar Direct.

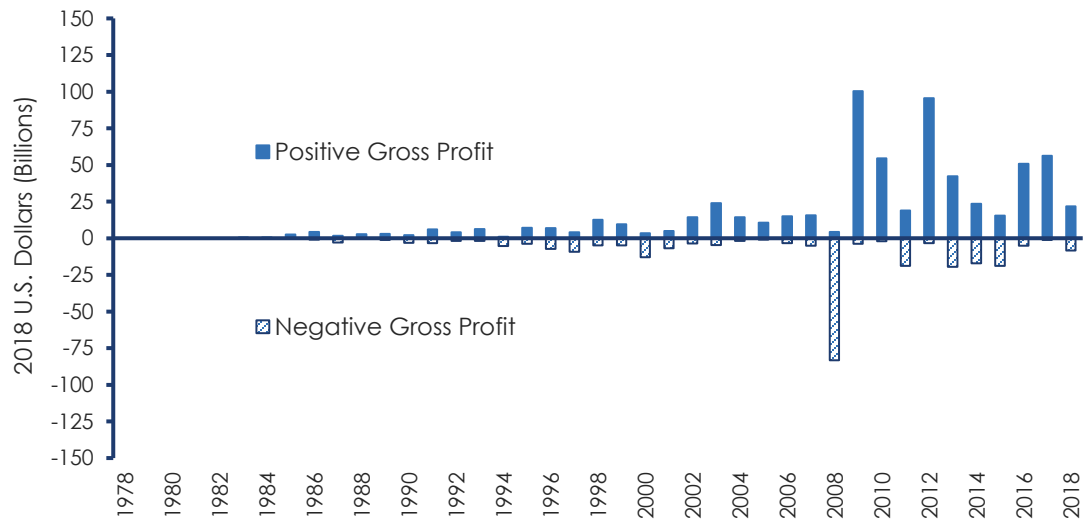
Exhibit 20 documents the positive and negative gross profits by year from 1978 through 2018. Over the 41 years, the aggregate positive gross profit was about \$660 billion and the aggregate negative gross profit was roughly \$270 billion, netting to total gross profit of roughly \$390 billion. This is the amount of value that bond mutual fund managers wrested from the market before fees.

Exhibit 21 smooths the short-term noise by showing the trailing five-year positive and negative gross profit. Investors with skill prefer periods with large quantities of positive and negative gross profit. This dispersion means there are big winners and losers, which provides an opportunity for the skillful to thrive at the expense

of the less skillful. The financial crisis of 2008 marked the beginning of an era of larger positive and negative gross profit figures.

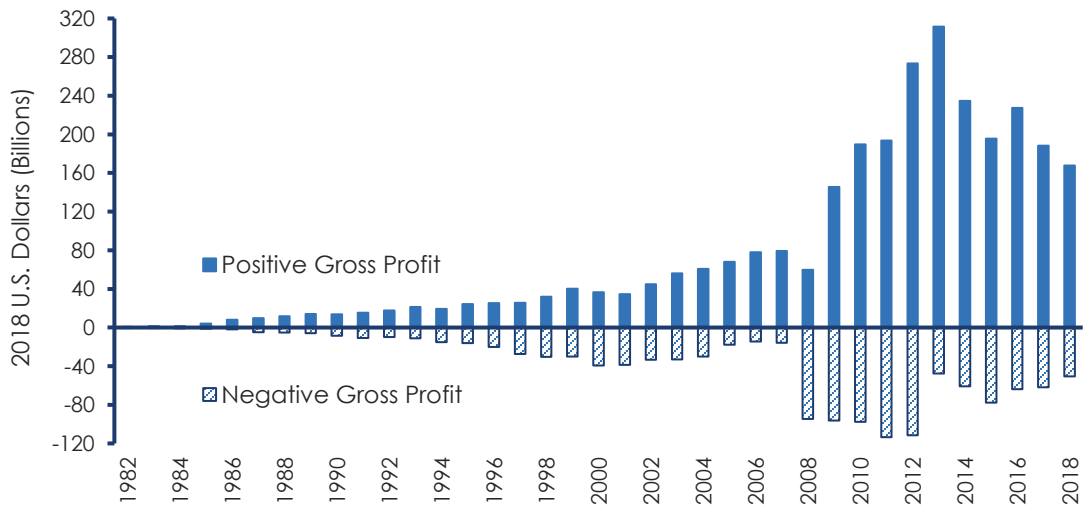
Looking at the dollars of gross profit is informative, but the critical concept is opportunity compared to the AUM. Over the full 41 years, the \$390 billion in gross profit was extracted from \$35 trillion in AUM. Thus the average gross profit was 1.1 percent of AUM. This exceeds the fees the funds charged during that period, reinforcing the notion that active bond funds offer an attractive alternative to index funds or ETFs. For equity mutual funds over the same period, the gross profits roughly equaled the fees.

Exhibit 20: Total Gross Profit (Annual), 1978-2018



Source: Morningstar Direct.

Exhibit 21: Total Gross Profit (Sum of Trailing 5 Years), 1982-2018



Source: Morningstar Direct.

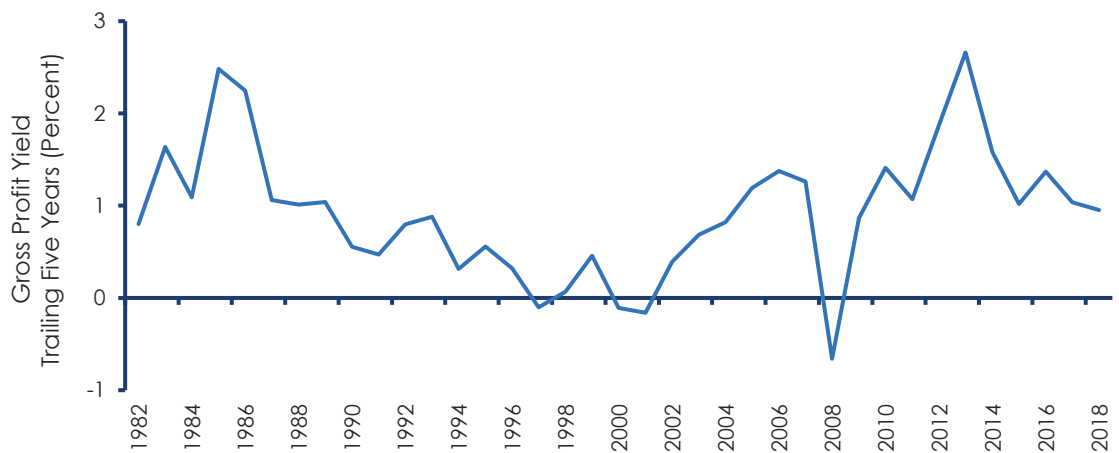
Exhibit 22 traces the trailing 5-year gross profit yield, defined as gross profit divided by AUM, from 1982-2018. The yield bounces around, with upturns in the early 1980s, early 2000s, and the 5 years after the financial crisis. The series declined from the mid-1980s through the mid-1990s, and in the past five years after peaking in 2013.

Because the Berk and Green calculation is weighted for AUM, it captures a nuance of performance assessment that is often absent in the headlines about fund results. Exhibit 23 shows the relationship between fund size, gross alpha, and gross profit. For each year from 2000 through 2018, we break the active U.S. taxable bond mutual fund industry into deciles based on AUM

and calculate the gross alpha and gross profit for each. We then take the average of each of the deciles over the 19 years. Most of the action is on the right side of the exhibit, as the largest five deciles control the vast majority of the AUM.

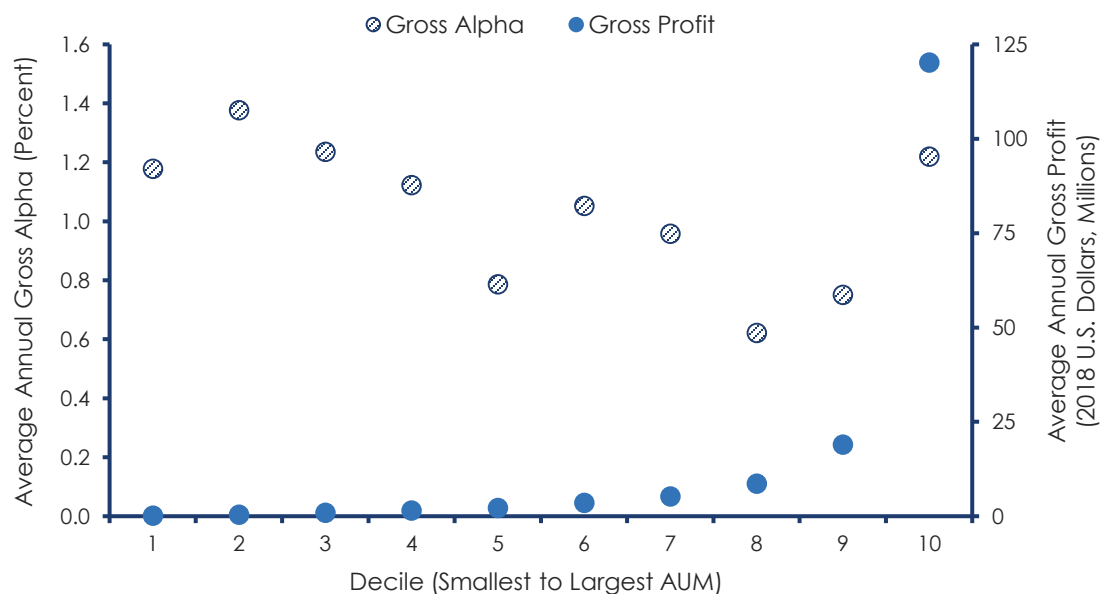
A pair of patterns are visible. The first is a decline in annual gross alpha as you go from the first to the eighth decile. Gross alpha then rises again for the largest funds. In general, the opportunity set shrinks as funds get larger because of ownership and liquidity constraints.²⁶ But the reversal in the trend for large funds suggests some sources of edge. These include superior allocations to new issues, better access to information, and more flexible mandates.

Exhibit 22: Gross Profit Yield (Trailing Five Years), 1982-2018



Source: Morningstar Direct.

Exhibit 23: Mutual Fund Size, Gross Alpha, and Gross Profit, 2000-2018



Source: Morningstar Direct.

The second pattern is a rise in annual gross profits as fund size increases. The jump is particularly large from the ninth to the tenth decile. The average annual gross profit for the largest 10 percent of funds is roughly \$120 million per year. The next largest 10 percent, which today have 15 percent of the assets, is approximately \$20 million per year. The smaller funds do well but play for lesser stakes. The larger funds have more modest gross alpha but play for higher stakes and hence extract more alpha from the market. This is especially true for the largest funds.

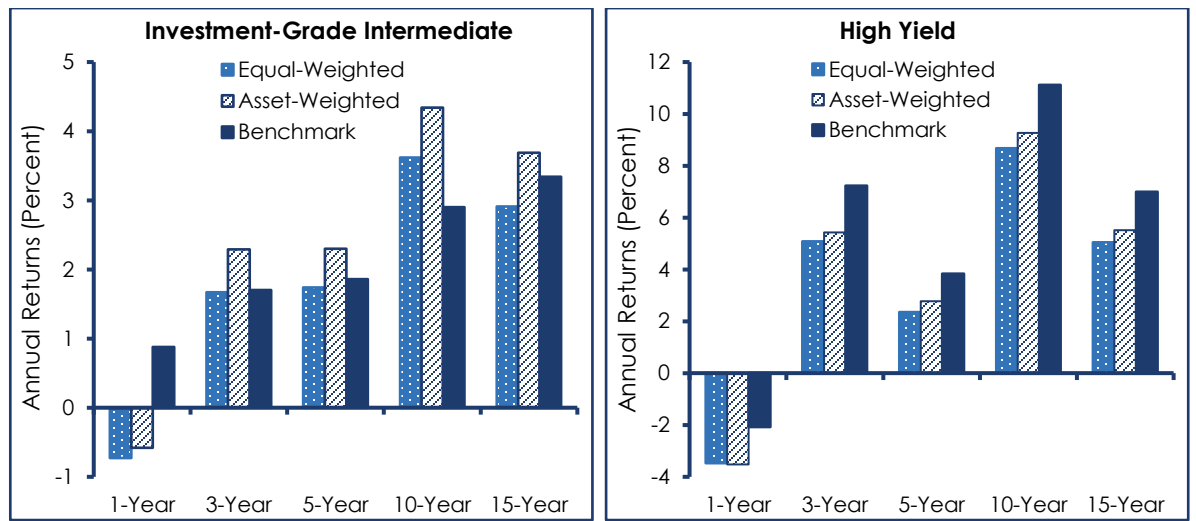
More often than not, headlines broadcasting the poor record of active managers rely on results where each fund has an equal weight. But if the Berk and Green framework is correct and more skillful investors manage more money than less

skillful investors, returns weighted by AUM will provide a clearer picture of economic results.

Exhibit 24 reveals that asset-weighted returns are consistently higher than equal-weighted returns for investment-grade and high-yield bond mutual funds. For example, for the 10 years ended December 31, 2018, the asset-weighted returns for all investment-grade intermediate bond funds was 4.3 percent, roughly 70 basis points higher than equal-weighted returns.

Fees are generally lower for larger funds than for smaller ones, which is part of the reason that larger funds outperform smaller ones. But it is likely that differential skill also contributes to the gap between asset-weighted and equal-weighted returns.

Exhibit 24: Equal-Weighted versus Asset-Weighted Returns



Source: Aye M. Soe, Berlinga Liu, and Hamish Preston, "SPIVA® U.S. Scorecard: Year-End 2018," S&P Dow Jones Indices Research, March 11, 2019.

Conclusion

This report explored the shift from active to passive investments in the bond market. Active investors have fared much better in bonds than in equities, in part because they have outperformed passive alternatives at a much higher rate than equity managers have. While a large part of that outperformance can be explained by exposure to traditional risk premiums, the fact remains that fund investors have realized higher returns owning active funds than they would have owning passive funds.

While there has been a large move into passive funds, active managers continue to contribute to price discovery and liquidity, which are vital. But active managers charge higher fees than do passive vehicles, including traditional index funds and ETFs. Passive managers charge lower fees because they rely on active managers to make markets efficient.

Mimicking indexes in bonds is not as straightforward as it is in stocks. One reason is that

the most popular bond index, the Bloomberg Barclays US Aggregate Bond Index, includes more than 10,000 securities versus roughly 500 for the S&P 500 index. As a result, it is very difficult to create a passive fund that tracks the index with negligible tracking error.

One crucial question in investing is how much opportunity there is for active managers to capture alpha. We describe a framework, based on the work of professors Jonathan Berk and Richard Green, to gauge the value that active managers generate. We find that over the past four decades, cumulative gross profit and fees are roughly equal in equities but that gross profit exceeds fees in bonds. This suggests investors in bond funds have extracted more value from the market than equity fund investors have.

Gross profit allows us to get away from the misleading results of equal-weighted mutual fund returns and provides figures for both the cost and opportunity for active investment management.

Appendix: Notes on Methodology

Active Share. Active share reflects how much a fund differs from its index. Active share is zero percent if a fund exactly matches the index and 100 percent if it is completely different. This assumes no leverage or short sales. We calculate active share as 100 percent less the sum of the overlapping weights between the holdings of the fund and the index.

Here is a simple example for an equity fund (see exhibit 25). The fund holds four stocks (A, B, C, and D), and the index holds four stocks (A, B, C, and E). We see that A, B, and C are overlapping positions and D and E are not.

Exhibit 25: Active Share Example

Holdings in Either Fund or Index	Fund	Index	Overlapping Weights
Stock A	50%	50%	50%
Stock B	20%	25%	20%
Stock C	15%	10%	10%
Stock D	15%	0%	0%
Stock E	0%	15%	0%
Sum	100%	100%	80%
Active Share = 100% Minus Overlap = 20%			

Source: *ActiveShare.info*; Martijn Cremers, "Active Share and the Three Pillars of Active Management: Skill, Conviction, and Opportunity," *Financial Analysts Journal*, Vol. 73, No. 2, Second Quarter 2017, 61-79.

For overlapping positions (A, B, and C), the overlapping weight is the lower of the two weights between the fund and the index. For non-overlapping positions (D and E), there is 0 percent overlapping weight. We sum the overlapping weights (80 percent) and subtract that sum from 100 percent to arrive at active share (20 percent). Therefore the more the holdings overlap, the lower is the active share.

Gross Profit. To calculate a fund's gross profit, we use the alpha of the oldest share class and an aggregated size based on all share classes. The annual gross profit sums only include funds that have a gross alpha figure for a full calendar year.

Based on data availability, our gross profit calculations for Peter Lynch and Bill Gross do not perfectly align with the months in which their tenures began.

- Lynch tenure: May 1977-May 1990; Analysis: June 1977-May 1990;
- Gross tenure: May 1987-September 2014; Analysis: October 1987-September 2014.

Endnotes

- ¹ An exchange-traded fund (ETF) is an investment fund that trades on an exchange just as a stock does.
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- ¹² Robert S. Goldberg and Ehud I. Ronn, "Quantifying and Explaining the New-Issue Premium in the Post-Glass-Steagall Corporate Bond Market," *Journal of Fixed Income*, Summer 2013, 43-55.
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