MORNINGSTAR®

Mind the Gap 2023

A report on investor returns in the United States.

Portfolio and Planning Research
31 July 2023

Contents

1 Executive Summary
1 Key Takeaways
2 Introduction
2 Gaps by U.S. Category Group
4 Trends in U.S. Category Groups
7 Results for U.S. Fund Categories
8 Results by Standard Deviation Quintile
10 Results by Expense Ratio Quintile
12 Active Versus Passive
13 Comparing the Results: Dollar-Cost Averaging
13 Conclusion and Lessons from the Study
15 Appendix/Methodology

Jeffrey Ptak, CFA
Chief Ratings Officer
Jeffrey.ptak@morningstar.com

Amy C. Arnott, CFA
Portfolio Strategist
Amy.arnott@morningstar.com

Contributors
Amrutha Alladi
Suvarna Patil
Madison Sargis

Important Disclosure
The conduct of Morningstar's analysts is governed by Code of Ethics/Code of Conduct Policy, Personal Security Trading Policy (or an equivalent of), and Investment Research Policy. For information regarding conflicts of interest, please visit:
http://global.morningstar.com/equitydisclosures

Executive Summary

Our annual study of dollar-weighted returns (also known as investor returns) finds investors earned about 6% per year on the average dollar they invested in mutual funds and exchange-traded funds over the trailing 10 years ended Dec. 31, 2022. This is about 1.7 percentage points less than the total returns their fund investments generated over the same period. This shortfall, or gap, stems from poorly timed purchases and sales of fund shares, which cost investors roughly one fifth the return they would have earned if they had simply bought and held.

The 1.7-percentage-point gap between investor returns and total returns is more or less in line with the gaps we found for the four previous rolling 10-year periods. The persistent gap between the returns investors actually experience and reported total returns makes cash flow timing one of the most significant factors—along with investment costs and tax efficiency—that can influence an investor's end results.

Our research imparts a few lessons on how investors can avoid these gaps and capture more of their fund investments' total returns by emphasizing fewer widely diversified funds, automating tasks like rebalancing, avoiding narrower or highly volatile funds, and favoring simpler approaches they can stick with rather than theoretically optimal strategies they can't.

Key Takeaways

- Fund investors earned a 6% investor return (which reflects the impact of cash inflows and outflows on the returns investors actually earn) over the 10 years ended Dec. 31, 2022, while their fund holdings generated a 7.7% annual total return over the same period. Thus, investors suffered a 1.7 percentage point annual return shortfall, or gap, stemming from mistimed purchases and sales.
- This annual return gap is in line with the gaps we measured over the four previous rolling 10-year periods, which ranged from 1.5 to 1.7 percentage points per year.
- The two largest fund types by net assets, U.S. equity funds and taxable-bond funds, had smaller return gaps than the fund universe as a whole.
- Investors in allocation funds, which combine stocks, bonds, and other asset classes, have continued to fare best, as these funds had the narrowest return gap of any category group.
- On the flip side, investors have struggled to use sector and nontraditional equity funds successfully; these two category groups experienced wider-than-average return gaps.

- Although dollar-cost averaging, which involves investing the same dollar amount on a regular schedule, can help instill discipline, we didn't find evidence that it would have yielded significantly better dollar-weighted returns.
- The more volatile a fund, the more trouble investors tended to have capturing its full return. Funds with higher levels of volatility generally experienced wider return gaps.
- The relationship between return gaps and fees was less clear-cut, with the cheapest funds exhibiting return gaps that approximated the gaps for the category groups as a whole.

Introduction

Most reported total returns are time-weighted, meaning they assume a lump-sum investment made at the beginning of the measurement term that's held throughout the whole period to the end. But investor returns can be a more telling measure because they include the impact of cash inflows and outflows.

Investor returns are essentially an internal rate-of-return calculation that accounts for periods when investors have more dollars invested, which will carry more weight in their overall results. Our annual "Mind the Gap" study compares these dollar-weighted return calculations with time-weighted total returns to see how large the difference has been over time.

Investor returns will almost always differ from reported total returns unless there are no cash flows in or out of the fund during a given period. To use a simple example, let's say an investor puts $1,000 into a specific fund at the beginning of each year. That fund goes on to earn total returns of 10% the first year, 10% the second year, and negative 10% the third year, which works out to an annualized return of 2.9%. But in dollar-weighted terms, the investor's return is actually negative 0.4%, because there was less money in the account during the first two years of positive returns and more money exposed to the loss during the third year.

As mentioned above, bad decisions such as trading too often, buying funds after they've already run up, and selling in a panic after market declines can all chip away at investor returns. But even perfectly reasonable approaches to managing a portfolio—such as investing a portion of every paycheck or shifting more assets toward fixed income as you approach retirement—can open a gap between investor results and reported total returns.

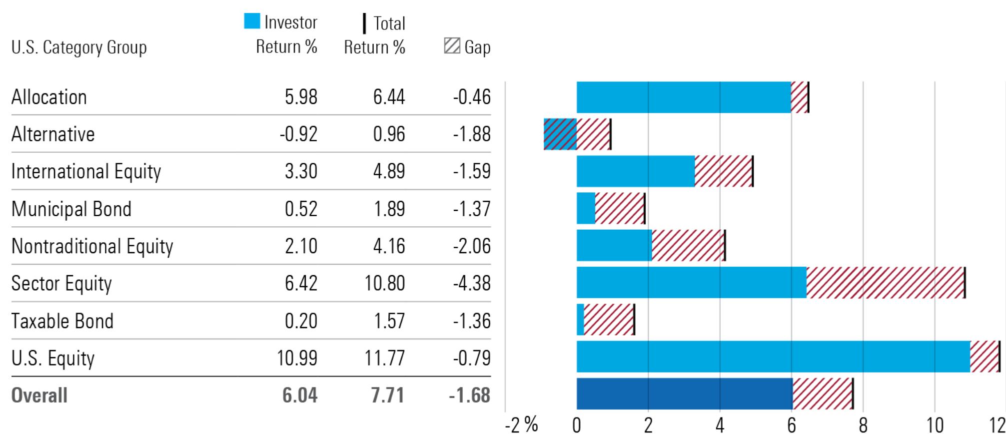
Investor returns will never perfectly match total returns because few investors can simply buy and hold over every time period. But the negative return gaps for the majority of investor dollars suggest there's still room for improvement. Investors can increase their odds of success by taking a more disciplined approach and trying to avoid some of the most common pitfalls, such as buying high and selling low.

Gaps by U.S. Morningstar Category Group

Overall, the difference between investor returns and reported total returns has remained fairly stable in recent years. As a whole (weighted by asset size), the returns investors experienced lagged reported total returns by 167 basis points per year over the trailing 10-year period, which is roughly in line with the average over the past five rolling 10-year periods.

The gap was negative for all the underlying Morningstar Category groups. But, as we have seen in the past, allocation funds fared the best, boasting the narrowest gap of any category group at -0.46% per year over the trailing 10 years ended Dec. 31, 2022.

Exhibit 1 The Gap by U.S. Category Group (10-Year Returns)



U.S. Category Group	Investor Return %	Total Return %	Gap
Allocation	5.98	6.44	-0.46
Alternative	-0.92	0.96	-1.88
International Equity	3.30	4.89	-1.59
Municipal Bond	0.52	1.89	-1.37
Nontraditional Equity	2.10	4.16	-2.06
Sector Equity	6.42	10.80	-4.38
Taxable Bond	0.20	1.57	-1.36
U.S. Equity	10.99	11.77	-0.79
Overall	**6.04**	**7.71**	**-1.68**

Source: Morningstar Direct. Data as of Dec. 31, 2022. Excludes commodities category group. Gap numbers may not match differences in returns because of rounding.

Conversely, investors in nontraditional equity funds, which include strategies like long-short equity and derivative income, saw the return of their average dollar lag the average fund's return by more than 2% per year over the 10 years ended Dec. 31, 2022. Investors in alternative funds fared only slightly better, as their dollar-weighted returns lagged the average fund's returns by 188 basis points annually. However. they didn't have much to show for it, as the average dollar lost nearly a percentage point per year, the lowest investor return of any category group.

Investors have fared the worst in sector equity funds, giving up more than 4 percentage points per year because of poorly timed fund flows. Sector funds are particularly prone to performance-chasing, with investors often piling into popular sectors after a strong showing and then bailing out when they fall out of favor.

Dollar-weighted returns for U.S. equity funds lagged total returns by 79 basis points per year, a narrower gap than we observed in last year’s study. Flows to U.S. stock funds were fairly flat in 2022, with net inflows of only $17 billion, which is very small considering that the category group is home to nearly $11 trillion in assets. (Flows for U.S. stock funds were negative as a whole amid the bear market. However, this study captures the assets and flows of funds that were created at least 10 years ago that managed to gather net inflows.)

International equity funds fared a bit worse, with investor returns lagging reported total returns by about 1.6 percentage points per year over the trailing 10-year period. Investors poured assets into these funds

in 2013, 2017, and 2021, only to see returns deteriorate the following year. The opposite held in 2016, when they yanked $14 billion in net assets from international equity funds only to see performance rebound the following year.

Investor returns for taxable-bond funds lagged total returns by 136 basis points per year, on average, for the trailing 10-year period. Investors shoveled more than $1.2 trillion into taxable bond funds from 2019 through 2021, yet returns trended lower in 2020 and 2021, culminating in a dismal 2022 showing. This weighed heavily on the average dollar's return. The low level of returns for taxable bond funds makes this return gap particularly damaging; taxable-bond investors missed out on about of a third of the returns these funds delivered, which were meager to begin with.

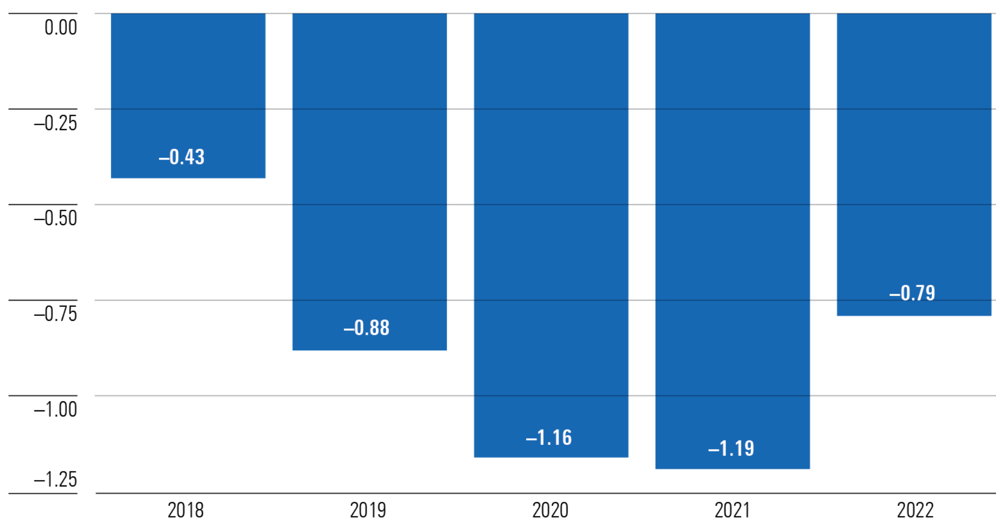
The story was similar for municipal-bond funds, where investor returns lagged total returns by about 1.4 percentage points per year, on average. Municipal-bond fund investors have been prone to bad timing, adding monies just before returns trended lower (2014, 2015, 2017, 2019, 2020, and 2021) or pulling assets before returns trended higher (2013 and 2018)..

In addition to the return gaps within each category group, the results also reflect the adverse impact of fund flows across category groups. For example, investors have pulled about $244 billion in aggregate assets from domestic equity funds included in the study over the past 10 years while funneling about $1.7 trillion into taxable-bond funds over the same period. Investors might have good reasons for making such shifts—such as derisking portfolio allocations as they approach retirement age—but they still incurred significant costs in the form of lower investor returns.

Trends in U.S. Category Groups

Total returns for most category groups fell over the most recent 10-year period owing to widespread losses in 2022. However, investor return gaps for most category groups were generally in line with the gaps estimated for the 10-year period ended Dec. 31, 2021. Let’s drill down to some of the biggest groups to see why.

Exhibit 2 U.S. Equity Funds: 10-Year Return Gaps Over Time

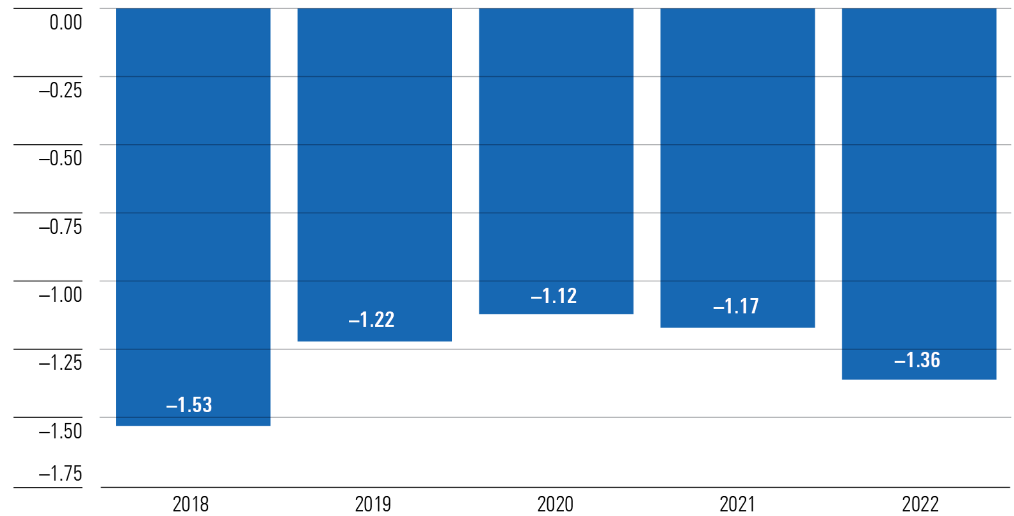


Source: Morningstar Direct. Data as of Dec. 31, 2022.

For U.S. equity funds, the gap between investor returns and total returns narrowed over the most recent 10-year period after remaining more or less flat for the previous 10-year period ended in 2021. In 2013, investors added $116 billion to U.S. stock funds only to see returns sharply slide in 2014 versus the prior year, denting dollar-weighted returns. Similarly, they pulled more than $300 billion in 2020, but returns improved the following year. However, those missteps were partially offset by better-timed moves into (2018) and out of (2017 and 2019) U.S. stock funds. In addition, when 2012 rolled out of the 10-year measurement—investors yanked $84 billion from the funds in 2011, only for returns to perk up in 2012—it removed a drag on dollar-weighted returns.

None of these issues proved especially consequential, though, largely by virtue of the fact that U.S. stock funds had more than $8 trillion in net assets over the 10 years ended Dec. 31, 2021, dwarfing the annual flow tallies.

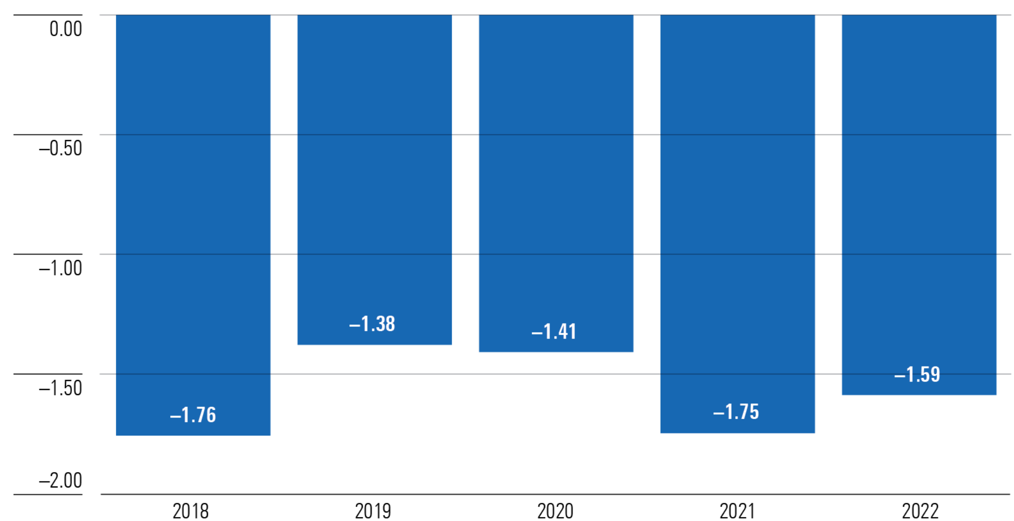
Exhibit 3 Taxable-Bond Funds: 10-Year Return Gaps Over Time



Source: Morningstar Direct. Data as of Dec. 31, 2022.

The investor return gap for taxable-bond funds widened slightly for the most recent 10-year period ended in 2022 after narrowing over the prior 10-year periods. Until 2022, the group enjoyed positive net inflows for much of the decade, which should be beneficial during periods of improving returns. However, returns trended lower from one year to the next in the majority of years, denting investor returns.

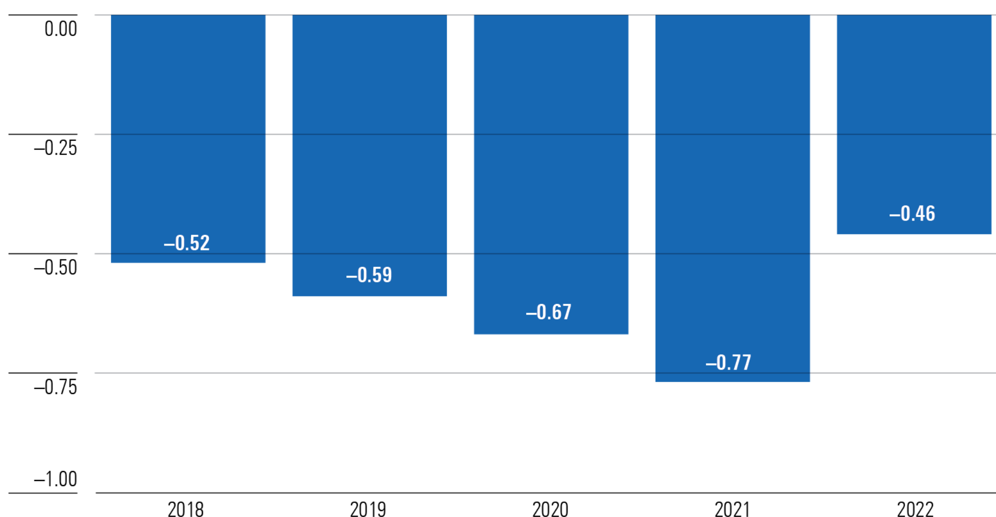
Exhibit 4 International Equity Funds: 10-Year Return Gaps Over Time



Source: Morningstar Direct. Data as of Dec. 31, 2022.

For international equity funds, the investor return gap narrowed by 16 basis points for the most recent 10-year period but remained more or less in the range set by prior 10-year measurements. Investor returns have been buoyed by net redemptions of assets in years like 2019 and 2020, as returns of these funds trended lower in the years that immediately followed. But they've been pressured by ill-timed inflows in 2013, 2014, and 2017, all years that saw deteriorating returns in the following years.

Exhibit 5 Allocation Funds: 10-Year Gaps Over Time



Source: Morningstar Direct. Data as of Dec. 31, 2022.

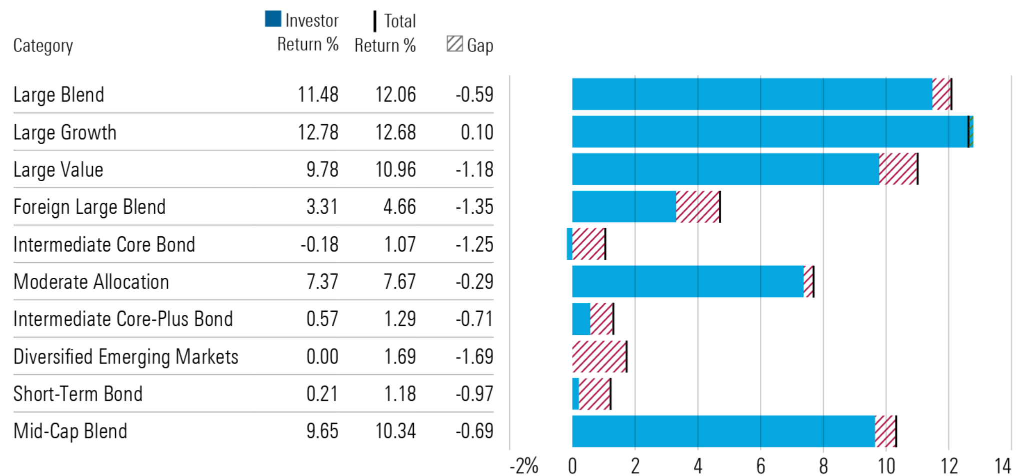
Finally, after widening over the three immediately preceding 10-year periods, the allocation category group saw its investor return gap narrow, with the average dollar lagging the average fund by only 46 basis points per year over the 10 years ended Dec. 31, 2022.

While it might seem tempting to credit investors with making cannily timed purchases and sales, it's worth noting that this group's investor returns include funds of funds, target-date funds in particular. This is noteworthy because some of the largest target-date funds have migrated their investors—typically 401(k) plan participants—to collective investment trusts, with those conversions recorded as outflows of assets from the funds. These monies didn't flow out of the strategies altogether, however—they remained, albeit in a different vehicle type (CITs). When calculating the overall investor return, we remove funds of funds, but not in the category-group-specific estimates.

Results for Largest Fund Categories

The categories that are home to the most investor assets generally had narrower-than-average investor return gaps. On average, investor returns for the 10 largest categories were about 89 basis points lower than their reported total returns.

Exhibit 6 10-Year Return Gaps for Biggest Fund Categories



Category	Investor Return %	Total Return %	Gap
Large Blend	11.48	12.06	-0.59
Large Growth	12.78	12.68	0.10
Large Value	9.78	10.96	-1.18
Foreign Large Blend	3.31	4.66	-1.35
Intermediate Core Bond	-0.18	1.07	-1.25
Moderate Allocation	7.37	7.67	-0.29
Intermediate Core-Plus Bond	0.57	1.29	-0.71
Diversified Emerging Markets	0.00	1.69	-1.69
Short-Term Bond	0.21	1.18	-0.97
Mid-Cap Blend	9.65	10.34	-0.69

Source: Morningstar Direct. Data as of Dec. 31, 2022.

The moderate allocation category boasted the second-smallest gap, once again seeming to underscore the value of combining multiple asset classes into a single package. Doing so lessens the need to maintain positions and, more prosaically, mitigates the risk that an investor will respond impulsively to the performance of any one component.

On the flip side, the average dollar invested in diversified emerging-markets funds gained nothing over the decade ended Dec. 31, 2022, which is about 1.7% less per year than the return of the average fund. While emerging-markets stocks are celebrated in some quarters for offering potential excess returns given their higher risk, investors have struggled to put them to good use.

Not that investors have necessarily shot the lights out with lower-risk strategies, either. For example, investors forsook more than 80% of the already paltry total returns that the average short-term bond fund generated over the trailing 10 years ended Dec. 31, 2022. It was even worse among intermediate core bond funds, where the average dollar lost about 0.2% per year, while the average fund gained 1.1% annually. Mistimed investments cost intermediate core-plus bond fund investors more than half their funds' total returns. Those gaps far exceeded the proportion of total returns that investors cost themselves through mistiming their investments in large-blend, large-growth, and large-value funds.

Results by Standard Deviation Quintile

In six of the eight category groups included in the study, funds with lower volatility (as measured by standard deviation) had narrower investor return gaps, though still mostly negative, than funds with higher volatility. The general trend makes intuitive sense, as funds that expose investors to less volatility should be easier to own and less prone to erratic cash flows, thus leading to better investor results.

Exhibit 7 Less Volatility Means Better Results

		Average Annual Return %		
U.S. Category Group	Standard Deviation Quintile	Investor	Total	Gap
Allocation	1	3.77	4.20	**-0.43**
	2	5.70	6.19	**-0.49**
	3	6.53	6.81	**-0.28**
	4	6.84	7.04	**-0.20**
	5	7.38	7.65	**-0.27**
Alternative	1	1.59	1.46	**0.14**
	2	2.27	3.47	**-1.19**
	3	0.77	2.18	**-1.41**
	4	-5.54	-3.04	**-2.50**
	5	-6.50	-22.31	**15.81**
International Equity	1	6.10	7.23	**-1.13**
	2	5.36	5.83	**-0.47**
	3	3.19	4.68	**-1.48**
	4	3.19	4.40	**-1.21**
	5	0.23	2.75	**-2.51**
Municipal Bond	1	0.42	1.13	**-0.71**
	2	0.80	1.88	**-1.08**
	3	0.91	2.02	**-1.11**
	4	-0.03	1.92	**-1.95**
	5	0.62	2.56	**-1.94**
Nontraditional Equity	1	2.87	3.97	**-1.10**
	2	0.70	3.44	**-2.75**
	3	0.17	3.80	**-3.64**
	4	7.25	10.43	**-3.18**
	5	8.08	9.48	**-1.40**
Sector Equity	1	9.10	12.17	**-3.07**
	2	7.21	10.19	**-2.98**
	3	8.92	11.85	**-2.93**
	4	6.91	11.37	**-4.46**
	5	0.28	7.76	**-7.47**
Taxable Bond	1	0.15	1.01	**-0.85**
	2	0.05	1.15	**-1.10**
	3	0.53	1.34	**-0.81**
	4	0.53	2.19	**-1.66**
	5	0.07	2.15	**-2.08**
U.S. Equity	1	11.17	11.95	**-0.78**
	2	11.75	11.72	**0.02**
	3	11.40	12.06	**-0.65**
	4	10.97	11.42	**-0.45**
	5	9.19	10.09	**-0.90**

Source: Morningstar Direct. Data as of Dec. 31, 2022. We grouped funds by their trailing three-year standard deviation within each category group and then tracked their results over the following 10-year periods. We show the least-volatile quintile first, down to the most-volatile quintile.

Excluding a massive 22-percentage-point positive gap among the most volatile quintile of nontraditional equity funds (which reflects the impact of flows on a fairly small pool of assets), we found that the least-volatile quintile had a 0.94% per year gap, on average, while the most-volatile quintile had a 1.94% annual gap—a 100 basis points difference.

Results by Expense Ratio Quintile

The results for expense ratios were less conclusive. To a certain extent this is arithmetic, as assets have increasingly flocked to the very cheapest funds, and thus the cheapest quintile by cost is home to the bulk of assets in many cases. So, it makes sense that the gap for the cheapest quintile will come to approximate that of the category group as a whole. For example, the lowest-cost U.S. equity funds had a 99-basis-point per year return gap over the 10 years ended Dec. 31, 2022, which is just a tad higher than the 89-basis-point annual gap for the overall category group, and so forth for the other category groups.

The corollary to that is the gaps for the more expensive quintiles are much smaller by assets and therefore sensitive to the inputs, such as flows that constitute a larger share of the asset base than would be possible in the cheaper quintiles by virtue of their large size.

Exhibit 8 Lower Fees (Usually) Mean Better Results

		Average Annual Return %		
U.S. Category Group	Fee Quintile	Investor	Total	Gap
Allocation	1	6.04	6.49	**-0.45**
	2	6.42	6.95	**-0.54**
	3	5.65	6.15	**-0.50**
	4	5.26	5.62	**-0.36**
	5	5.18	5.31	**-0.13**
Alternative	1	-0.61	0.54	**-1.15**
	2	0.86	2.43	**-1.57**
	3	-0.71	1.39	**-2.10**
	4	-18.16	-19.15	**0.99**
	5	1.76	2.43	**-0.68**
International Equity	1	3.25	4.93	**-1.68**
	2	3.89	4.74	**-0.85**
	3	3.95	4.72	**-0.78**
	4	4.55	5.01	**-0.47**
	5	3.71	4.10	**-0.39**
Municipal Bond	1	0.56	1.99	**-1.43**
	2	0.42	1.83	**-1.41**
	3	0.52	1.82	**-1.30**
	4	0.68	1.56	**-0.88**
	5	0.48	1.00	**-0.52**
Nontraditional Equity	1	2.99	5.19	**-2.20**
	2	1.90	3.95	**-2.05**
	3	2.66	2.88	**-0.22**
	4	0.97	4.13	**-3.17**
	5	0.84	3.42	**-2.58**
Sector Equity	1	6.40	11.21	**-4.81**
	2	7.26	10.80	**-3.54**
	3	6.50	9.47	**-2.97**
	4	5.25	8.70	**-3.46**
	5	2.31	6.03	**-3.72**
Taxable Bond	1	0.01	1.59	**-1.58**
	2	0.48	1.50	**-1.02**
	3	0.97	1.71	**-0.73**
	4	0.55	1.22	**-0.67**
	5	0.57	1.08	**-0.51**
U.S. Equity	1	11.09	12.09	**-0.99**
	2	10.89	11.22	**-0.33**
	3	10.52	10.79	**-0.27**
	4	10.62	10.34	**0.28**
	5	10.03	9.37	**0.67**

Source: Morningstar Direct. Data as of Dec. 31, 2022. We grouped funds by their expense ratios within each category and then tracked their results over the following 10-year period. We show the least-expensive quintile first, down to the most-expensive quintile.

That said, in some cases, the gaps do seem to evidence investors' missteps. For instance, the average dollar invested in the cheapest quintile of taxable bond funds earned nothing over the decade ended Dec. 31, 2022, while the average fund in that cohort gained 1.6% per year. As mentioned previously, investors poured money into cheap bond funds such as index trackers, only to see returns trend gradually lower.

Active Versus Passive

The results for actively managed versus passively managed offerings are surprising: Index funds had lower investor returns in six of the seven category groups and wider gaps in all cases. (We excluded allocation funds from this analysis because the overwhelming majority of allocation funds are actively managed in the sense that they deliberately set an asset mix rather than simply matching market averages).

Exhibit 9 Investor Return Gaps: Active Funds Versus Passive Funds

		Average Annual Return %		
U.S. Category Group	Management Style	Investor	Total	Gap
Alternative	Active	0.50	1.58	-1.07
	Passive	-17.84	-15.71	-2.13
International Equity	Active	4.70	5.32	-0.61
	Passive	1.03	3.91	-2.88
Municipal Bond	Active	0.61	1.89	-1.28
	Passive	-1.53	1.67	-3.21
Nontraditional Equity	Active	1.99	3.98	-1.99
	Passive	5.62	8.91	-3.30
Sector Equity	Active	7.22	9.83	-2.62
	Passive	5.70	11.44	-5.74
Taxable Bond	Active	0.71	1.68	-0.97
	Passive	-1.05	1.32	-2.37
U.S. Equity	Active	11.24	11.47	-0.24
	Passive	10.68	12.11	-1.43

Source: Morningstar Direct. Data as of Dec. 31, 2022. Excludes allocation category group.

Strikingly, the average dollar invested in actively managed U.S. stock funds earned a higher return than the average dollar invested in passive funds over the decade ended Dec. 31, 2022. Passive U.S. equity funds actually earned a higher total return than active funds over that span, but the 143-basis-point per year shortfall between the funds' investor returns and time-weighted returns was far wider than the 0.24% gap active funds saw, explaining how active funds pulled ahead.

What might explain this? It's less likely a function of investors making ill-timed trades in and out of index funds or deftly timing their purchases and sales of active funds. Rather, it reflects the enveloping trend that has seen assets move en masse from active to passive, with those shifts proving costly and beneficial, respectively, for passive and active investors given the pattern of returns we've seen over the past 10 years.

One way to think of this is in terms of how "new" the assets are in active and passive funds. Given steady inflows to passives, a meaningful portion of that group's asset base wasn't around to participate in the returns of the full 10-year period, missing some of the more-profitable stretches but catching last year's bear market.

Comparing the Results: Dollar-Cost Averaging

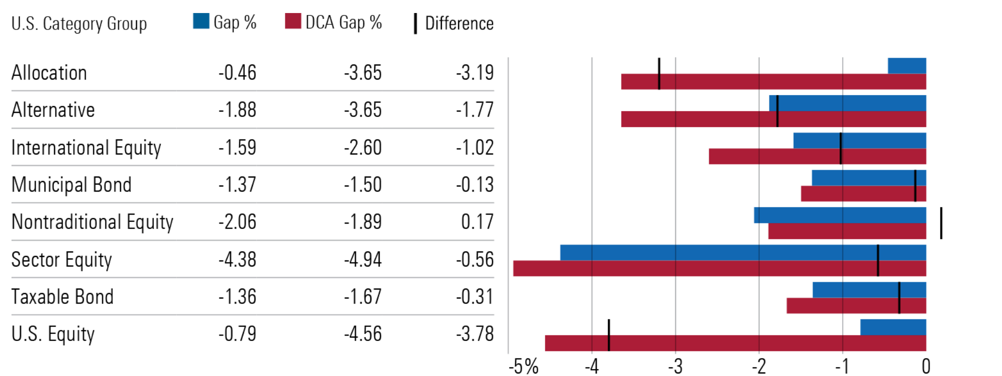
We also examined how investor returns would look in a hypothetical scenario in which an investor contributed equal monthly investments (dollar-cost averaging) to funds in each broad category group. By comparing investor returns with what they would have been, assuming steady monthly investments, we can zero in on the impact of cash flow timing on investor returns.

Dollar-cost averaging doesn't usually lead to better results compared with a buy-and-hold approach. In fact, because market returns are positive more often than not, dollar-cost averaging often leads to lower returns. As shown in the table below, investor return gaps assuming dollar-cost averaging were negative across every category group. What's more, the gaps were wider than investors' actual results in every case except nontraditional equity, where the gap would have slightly narrowed had an investor hypothetically invested equal sums.

This reflects the underlying math of total returns: If returns are generally positive, investors are typically better off making a lump-sum investment and holding it for the entire period. Investors who buy and hold can take full advantage of performance trends when total returns are positive, but investors who contribute smaller amounts over time often have fewer dollars invested during periods with strong returns.

Of course, this can work in reverse when markets head lower, as in 2022. But over longer stretches, buy-and-hold tends to win out, explaining the negative gaps for all category groups shown below.

Exhibit 10 Another View of the Data: Investor Return Gaps Versus Dollar-Cost Averaging Gaps



U.S. Category Group	Gap %	DCA Gap %	Difference
Allocation	-0.46	-3.65	-3.19
Alternative	-1.88	-3.65	-1.77
International Equity	-1.59	-2.60	-1.02
Municipal Bond	-1.37	-1.50	-0.13
Nontraditional Equity	-2.06	-1.89	0.17
Sector Equity	-4.38	-4.94	-0.56
Taxable Bond	-1.36	-1.67	-0.31
U.S. Equity	-0.79	-4.56	-3.78

Source: Morningstar Direct. Data as of Dec. 31, 2022. We estimate the results for dollar-cost-averaging by assuming equal monthly investments made within each category and then calculating an internal rate of return.

Conclusion and Lessons from the Study

While investors have made strides in many ways, our research finds that there's still room for improvement when it comes to timing their investments. According to our estimates, the average dollar underperformed the average fund by a hefty 1.67% per year over the decade ended Dec. 31, 2022. In

other words, inopportunely timed purchases and sales cost investors about 22% of the return they otherwise could have earned had they bought and held.

What can investors do to earn more of their fund investments' total returns? Here are a few lessons to be drawn from our findings:

Hold fewer, more widely diversified funds and automate. Time and again, we have found that investors in allocation funds capture a greater share of the funds' total returns. Why? They are designed to be all-in-one holdings given they span multiple asset classes and rebalance on a regular basis, sparing investors from having to do much maintenance.

Allocation funds also help mitigate the risk of mental-accounting mistakes that investors are prone to, such as buying more of a high-performing stand-alone strategy and selling a lagging one when they ought to do the opposite. Allocation funds combine these separate strategies to form a cohesive whole, and thus the performance divergences that otherwise might push investors' buttons are largely unseen.

Avoid narrow or highly volatile funds. Another clear finding from the study is that investors have struggled to successfully use narrowly focused or highly volatile funds. These types of funds—whether they were nontraditional equity offerings or those that were among the most volatile in their category group—saw some of the heftiest return gaps that we measured. Most investors would likely be better off keeping it simple in ways that emphasize wide diversification and low costs, which means steering clear of strategies like these.

Keep it simple. The evidence suggests that investors enjoyed greater success when they didn't make the perfect the enemy of the good, instead favoring simpler solutions like allocation funds. Interestingly, we found larger gaps in areas and styles for which there is robust academic support, like tilting to value, smaller-company stocks, or emerging markets, suggesting that the added volatility these strategies entail cost investors any excess return they might have earned and then some. The same held for more-exotic strategies that on paper might push a portfolio closer to the efficient frontier but in real life confound investors into costly mistakes.

Don't assume that penny-pinching or indexing will necessarily translate to superior dollar-weighted returns. While it's laudable to keep costs to a minimum and invest passively through diversified index funds or ETFs, we didn't find that these practices necessarily prevented wide gaps from forming between these funds' dollar-weighted and total returns. This suggests that timing issues plagued even those who'd emphasized low costs and a passive approach. Some of this owes to circumstance—that is, investors allocating capital to low-cost passive funds in a recurring way as part of a long-term strategy, only to see returns deteriorate. But it's likely that some owes to other preventable factors, such as investors' propensity to chase returns. M

Appendix

Methodology

Morningstar's annual "Mind the Gap" study is designed to compare dollar-weighted internal rate-of-return calculations with time-weighted total returns to see how large the gap, or difference, has been over time.

We use a portfolio-based methodology for combining fund flows to an aggregate level. This method combines all of the monthly inflows, outflows, and assets from a given category or category group into one portfolio to better capture investors' asset-weighted returns. In contrast to total returns, investor returns account for all cash flows into and out of the fund to measure how the average investor performed over time.

We include funds that were merged or liquidated during each time period by building a category-level portfolio of net flows and returns, including extinct funds, up until their final partial month. In other words, the methodology is designed to make sure the averages don't exclude results for poorly performing funds that later disappeared. We treat the final net assets before the fund is liquidated or merged as a sale. If those dollars went into another fund, we treat those incoming assets as a buy. Because fund mergers almost always occur within the same category group, those figures should be a wash on an asset-class basis.

While the study attempts to correct for survivorship bias as much possible, it does not correct for creation bias. The data set only captures net assets, cash flows, and returns for funds that were created at least 10 years ago.

Once all of the monthly cash flows are available for the period in question, we calculate investor returns. The calculation is similar to an internal rate of return, or IRR, and measures the compound growth rate of the value of all dollars invested in the fund over the evaluation period. As with an IRR calculation, investor return is the constant monthly rate of return that makes the beginning assets equal to the ending assets with all monthly cash flows accounted for. We derive investor returns by using an iterative process, running a program that attempts to solve for the constant rate of return and adjusting the estimate up and down until it converges on a solution. After calculating investor returns for each month, we link them together to calculate an annualized return for the 10-year period.

We use time-weighted total returns, weighted by asset size, as a benchmark for comparison with investor returns. (The asset-weighted return average weights each fund's return based on its asset size at the end of the month.) We refer to the difference between investor returns and total returns as the gap or investor return gap.

The study includes investor returns and total returns for both mutual funds and exchange-traded funds. Our ETF data doesn't capture all day-to-day activity in ETFs, though. ETFs are often used as trading vehicles, but our data uses monthly asset data rather than daily data. We used the month-end asset data compared with the underlying total return to estimate a net inflow or outflow for the month. Investor returns for ETFs would likely be lower if we captured all the intramonth trades as well as newly created funds.

Because investor returns over shorter periods aren't as meaningful, we focus the study on long-term results. The aggregate numbers shown in the study are based on the 10-year period ended Dec. 31, 2022, but we also show results for each of the most recent five 10-year periods. This historical data allows investors to see trends in investor return gaps over time.

We run the data based on category groups instead of broad asset classes, which allows for a more detailed view of investor return patterns across different types of funds. We exclude the commodities category group because that area's extremely volatile cash flows make it difficult to measure investor returns.

Finally, we include data to see how investor returns would look if an investor contributed equal monthly investments (dollar-cost averaging). Within each category group, we assume a constant monthly investment and divided that amount among all the funds that were active during the month. If a fund became obsolete, we took the balance and divided it among the remaining funds. We then calculate total balances for each fund as well as the deposits made to calculate an internal rate of return for the category group.

Exhibit 11 Summary Data: Annual Organic Growth Rates, Total Returns, and Assets by Category Group

Annual Organic Growth Rates (%)	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Allocation	0.6	3.5	5.7	4.3	6.4	7.0	4.2	-1.1	-2.0	-1.1	-3.2	-1.0	-4.0	-2.4	-2.0
Alternative	-4.6	55.1	34.7	17.5	15.9	27.4	5.2	2.2	-0.4	-3.2	-7.1	0.0	-1.6	25.8	16.7
International Equity	-3.8	5.1	4.7	0.5	3.2	10.7	5.7	8.0	-0.6	8.1	1.7	-0.6	-4.5	5.0	-1.0
Municipal Bond	2.2	21.5	2.7	-2.1	10.8	-9.8	6.0	3.0	5.4	3.8	-1.5	14.8	5.9	11.4	-11.2
Nontraditional Equity	26.4	33.8	23.7	1.3	9.2	79.6	4.4	-14.8	-19.9	0.8	-14.0	-19.9	-14.0	65.6	60.2
Sector Equity	5.2	13.2	6.5	6.0	6.8	15.0	12.7	2.4	-0.4	2.4	-3.6	-4.2	6.7	8.1	-3.4
Taxable Bond	2.8	26.7	14.1	8.0	13.3	-1.2	3.2	-0.1	6.4	10.9	2.0	10.7	8.9	8.6	-3.4
U.S. Equity	-1.1	-2.4	-1.7	-2.3	-2.5	3.0	1.8	-2.7	-1.2	-0.5	0.4	-0.8	-3.3	1.2	0.1

>= 8.2
4.3 to 8.1
0.9 to 4.2
–2.0 to 0.8
<= –2.1

Annual Total Returns (%)	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Allocation	-28.1	25.3	12.3	0.4	12.8	16.0	5.7	-1.6	8.1	14.9	-5.5	20.0	12.5	13.8	-14.3
Alternative	-4.2	4.8	-0.9	-0.4	0.0	0.6	1.2	-1.4	-2.5	2.5	-2.5	3.1	9.2	4.6	-10.1
International Equity	-43.7	41.6	13.4	-13.3	18.9	16.3	-2.1	-3.4	4.6	28.1	-13.8	23.4	16.1	8.4	-18.1
Municipal Bond	-8.8	16.0	2.1	9.1	7.3	-3.0	8.4	2.8	0.4	4.8	1.4	7.1	4.3	2.4	-8.5
Nontraditional Equity	-20.1	13.7	6.1	-1.0	3.1	16.5	-1.7	-3.3	5.2	10.7	-8.6	13.6	4.4	15.0	-7.0
Sector Equity	-35.7	40.2	22.0	-1.1	13.9	18.6	15.3	-0.6	10.6	16.5	-5.4	29.7	19.1	23.9	-14.1
Taxable Bond	-4.4	16.5	8.5	5.1	8.5	-0.3	3.9	-0.7	4.9	4.4	-0.3	8.6	7.0	0.1	-10.6
U.S. Equity	-38.5	32.1	17.3	-1.2	16.1	34.1	10.7	0.3	11.9	21.3	-5.5	29.9	21.2	24.6	-18.9

>= 10.9
5.3 to 10.8
1.3 to 5.2
–2.0 to 1.2
<= –2.0

Average Assets (USD Tril)	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Allocation	1.0	1.0	1.2	1.3	1.5	1.9	2.2	2.3	2.3	2.4	2.5	2.6	3.0	3.3	3.1
Alternative	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2
International Equity	1.3	1.1	1.5	1.5	1.5	1.9	2.2	2.2	2.3	2.8	3.0	3.2	3.6	4.0	3.8
Municipal Bond	0.4	0.4	0.5	0.5	0.6	0.6	0.5	0.6	0.6	0.7	0.7	0.8	0.9	1.0	1.0
Nontraditional Equity	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Sector Equity	0.3	0.3	0.3	0.4	0.4	0.5	0.7	0.7	0.7	0.8	0.8	0.9	1.1	1.3	1.3
Taxable Bond	1.1	1.4	1.8	2.1	2.5	2.7	2.8	2.9	3.0	3.4	3.7	4.0	4.7	5.3	5.1
U.S. Equity	3.2	2.7	3.3	3.5	3.6	4.6	5.6	5.9	6.1	7.1	7.5	8.2	10.0	12.1	12.1

>= 3.1
2.2 to 3.0
0.9 to 2.1
0.2 to 0.8
<= 0.1

Source: Morningstar Direct. Data as of Dec. 31, 2022. Includes assets, fund flows, and total returns for funds created before Jan. 1, 2012. Total returns are asset-weighted. Excludes commodities category group. Annual organic growth rates are based on estimated net flows for each category group divided by total assets as of Dec. 31 of the previous year. Average assets are based on the year-end values for the current year and the previous year.

About Morningstar Portfolio and Planning Research

Morningstar Portfolio and Planning Research provides independent, fundamental analysis on topics like portfolio construction, retirement planning, personal finance, and investment strategy. The analysis seeks to frame the critical choices that investors face in designing and implementing a financial plan and offers practical solutions covering areas like setting goals, allocating assets, selecting investments, and withdrawing retirement income. The research takes various forms, including articles on Morningstar's flagship research platforms as well as in-depth studies of topics that are particularly relevant to investors seeking to build cohesive portfolios or achieve other financial goals like retirement security.

22 West Washington Street
Chicago, IL 60602 USA

©2023 Morningstar. All Rights Reserved. Unless otherwise provided in a separate agreement, you may use this report only in the country in which its original distributor is based. The information, data, analyses, and opinions presented herein do not constitute investment advice; are provided solely for informational purposes and therefore are not an offer to buy or sell a security; and are not warranted to be correct, complete, or accurate. The opinions expressed are as of the date written and are subject to change without notice. Except as otherwise required by law, Morningstar shall not be responsible for any trading decisions, damages, or other losses resulting from, or related to, the information, data, analyses, or opinions or their use. The information contained herein is the proprietary property of Morningstar and may not be reproduced, in whole or in part, or used in any manner, without the prior written consent of Morningstar. To license the research, call +1 312 696-6869.