

Mind the Gap 2026

US stock fund investors made history; crypto mavens stumbled.

Portfolio and Planning Research

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Contents

- 1 Executive Summary
- 5 Introduction
- 6 Key Findings
- 6 Overall
- 7 Investment Style
- 10 Fund Type/Management Style
- 13 Fees/Return Volatility
- 15 Tracking Error/Cash Flow Volatility
- 18 Case Study
- 27 Conclusion
- 28 Appendix
- 28 Study Synopsis
- 30 Methodology

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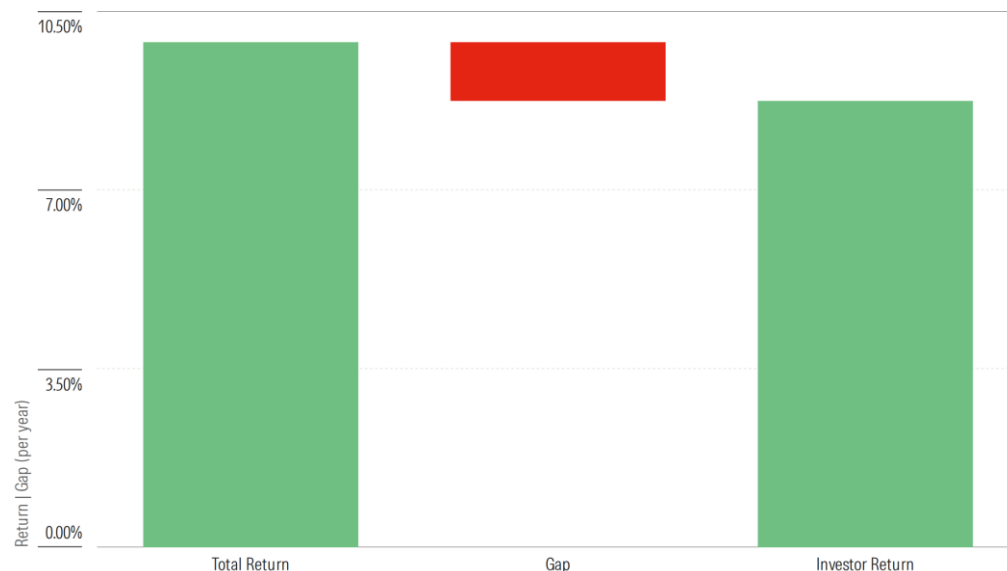
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Executive Summary

We estimate the average dollar invested in US mutual funds and exchange-traded funds earned 8.7% per year over the 10 years ended Dec. 31, 2025 ("investor return"). That's about 1.2 percentage points per year less than these funds' 9.9% aggregate annual total return ("total return") over that span assuming an initial lump-sum purchase. That 1.2-percentage point "investor return gap," which is explained by the timing and magnitude of investors' purchases and sales of fund shares during the 10-year period, is equivalent to around 12% of the funds' aggregate total return.

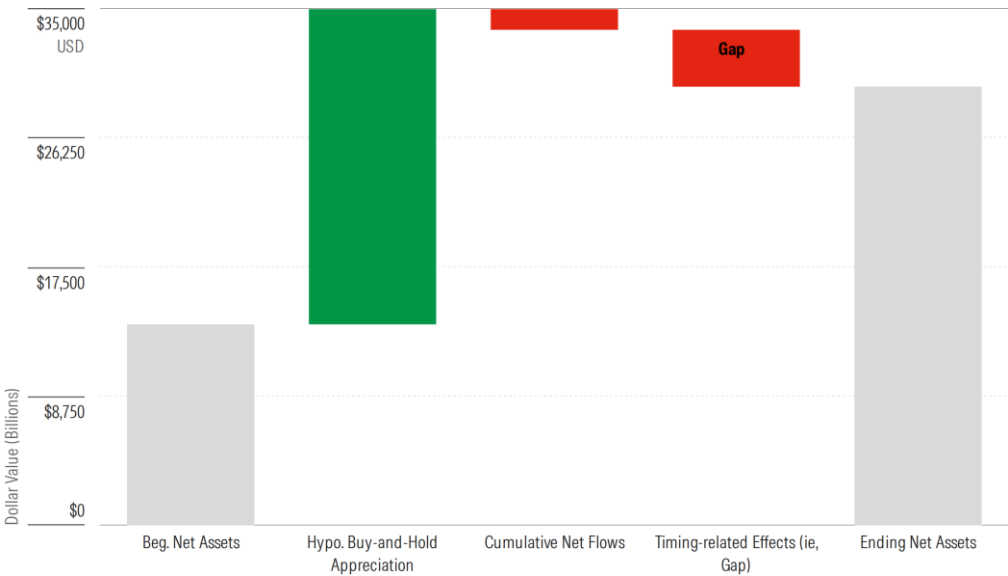
Exhibit 1 Annual Investor Returns and Total Returns of US Open-End Funds and ETFs (10 Years Ended Dec. 31, 2025)



Source: Morningstar, author's calculations. Data as of Dec. 31, 2025. Excludes "commodities" category group and funds of funds.

This gap is substantial in dollar terms. As of Jan. 1, 2016, the open-end funds and ETFs included in the study held around \$13.6 trillion in aggregate net assets. Had those assets hypothetically been left untouched, compounding at 9.9% per year until the end of the period, they'd have been worth nearly \$35 trillion in aggregate. But in reality, these funds held \$29.7 trillion in total as of Dec. 31, 2025, the shortfall largely explained by around \$3.8 trillion in estimated timing-related effects.

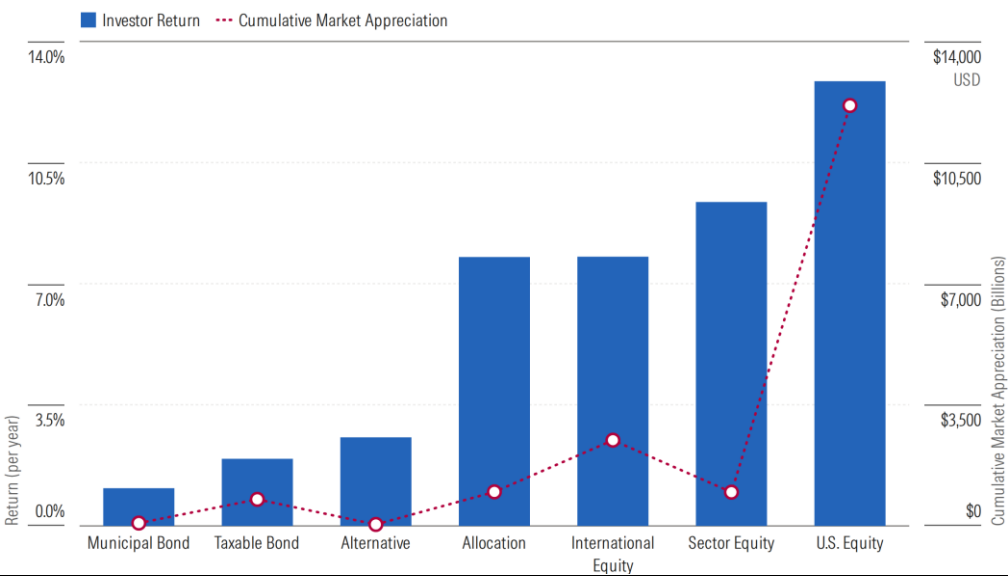
Exhibit 1a Reconciling Beginning and Ending Net Assets of US Open-End Funds and ETFs (as of Dec. 31, 2025)



Source: Morningstar; author's calculations. Data as of Dec. 31, /2025. "Hypo Buy-and-Hold" Appreciation represents the value of the funds' net assets assuming they were left untouched and compounded at the funds' aggregate total return over the 10-year period. Cumulative Net Flows represent the funds' actual aggregate net flows over the decade. "Timing-related Effects" represents the difference between the funds' actual aggregate ending net assets and the sum of their beginning aggregate net assets, hypothetical buy-and-hold return, and cumulative net flows. Excludes "commodities" category group and funds of funds.

On a bright note, we estimate the average dollar invested in US stock funds and ETFs gained 12.8% per year, which fell just shy of the funds' 13.3% aggregate annual return over the 10-year period. Considering US equity funds were the largest group by net assets at the beginning of the study period (\$5.8 trillion as of Dec. 31, 2015), this meant US stock fund investors compounded more than \$12.0 trillion in income and gains in total, making it arguably the largest haul in any decade in fund history.

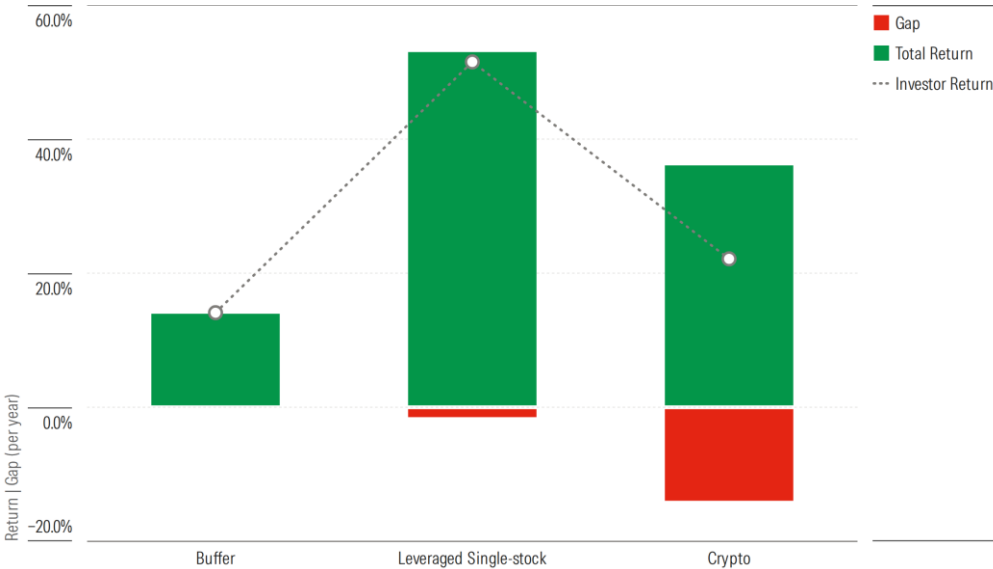
Exhibit 2 Annual Investor Returns and Cumulative Market Appreciation by Category Group (10 Years Ended Dec. 31, 2025)



Source: Morningstar, author's calculations. Data as of Dec. 31, 2025. Excludes "commodities" category group and funds of funds. The "alternative" category group also includes funds assigned to the "nontraditional equity" category group.

New to this year’s study is a supplemental case study in which we analyze three newer ETF types that have been popular with investors in recent years--buffer ETFs, leveraged single-stock ETFs, and crypto ETFs. We found mixed results over the periods we assessed. Encouragingly, investors in buffer ETFs, which use derivatives to generate returns within a specified range over a designated outcome period, fared well, with the average dollar gaining more than the ETFs did in aggregate. Leveraged single-stock ETF investors notched lofty dollar-weighted gains but still failed to top the unleveraged returns of the stocks they reference. Lastly, investors in crypto ETFs struggled to time their transactions, with their aggregate dollar-weighted return significantly lagging the ETFs’ aggregate total returns.

Exhibit 2a Buffer, Leveraged Single-Stock, and Crypto ETFs: Annual Investor Return Gaps (as of Dec. 31, 2025)



Source: Morningstar Direct; author’s calculations. Data as of Dec. 31, 2025. Data for buffer and leveraged single-stock ETFs covers the three-year period ended Dec. 31, 2024. Data for crypto ETFs covers the Jan. 11, 2024 to Dec. 31, 2025 period. Gap numbers may not match differences in returns due to rounding.

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 the aggregate dollar-weighted and time-weighted returns of nearly 23,000 individual US open-end funds and ETFs. The difference between them, or "gap," represents the portion of funds' total returns that have been forgone because of the timing and magnitude of transactions investors made during the 10-year study horizon.

To be sure, inopportune purchases and sales—buying high or selling low on impulse, for instance—can hold back investor returns. But even laudable practices like investing a portion of every paycheck or regularly rebalancing can open a gap between investor results and reported total returns. Given that nuance, it's not advisable to view this study's findings as a parable of "dumb money" or definitive proof of individual investors' fallibility.

Also, it is a truism that for the theoretical "total market," there can be no "gap," as for every buyer, there is a seller, meaning one's shortfall is another's surplus. Nor should timing effects be interpreted as literal opportunity costs. For instance, the investor who bought a fund after it had risen sharply, for reasons or circumstances outside their control, hasn't "lost" out on those earlier gains. Rather, their dollars earn whatever comes next, even if that return lags the fund's total return for the full period.

Notwithstanding that, we'd note that the US open-end fund industry, large and significant as it is, is still only a subset of the global market. In addition, as further described in the Methodology section, we limit the study to funds and ETFs that existed as of Jan. 1, 2016, excluding those that came after. Given this, the zero-sum total-market truism won't necessarily hold for it as theory might suggest.

Moreover, while gaps might not evidence bad behavior or constitute actual costs investors incurred, it is still useful to examine the extent to which, and why, investors have succeeded in capturing their funds' returns. While such insights will not necessarily fully close the gap between investor and total returns, they might help investors avoid the types of decisions that can hold back dollar-weighted returns.

With that in mind, this study addresses not just the question of how wide the investor return gap is but also how it can vary based on numerous important factors, including a fund's category group, Morningstar Category, investment type (open-end fund versus ETF), management style (active versus index), fees, return volatility, tracking error (versus its benchmark), and cash flow volatility.

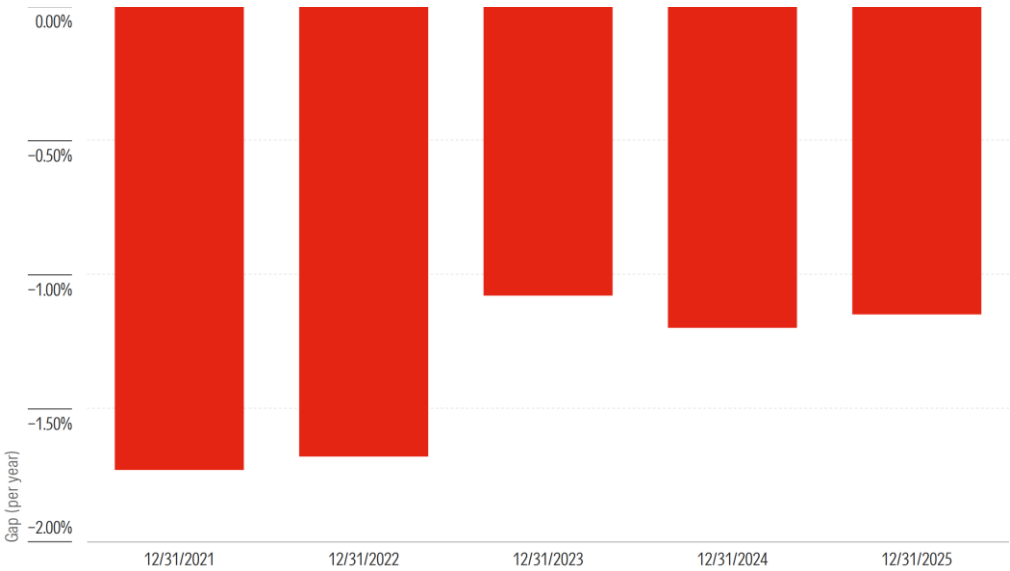
And so, in the pages that follow, this study delves into those factors, the key findings surrounding them, and the takeaways for investors seeking to capture as much of their funds' returns as possible.

Key Findings

Overall

- ▶ The average dollar invested in US stock funds and ETFs earned 8.7% per year over the 10 years ended Dec. 31, 2025, while those funds earned 9.9% per year, with that 1.2-percentage-point annual “gap” stemming from the timing and magnitude of investors' cash flows during the 10-year period.
- ▶ The 1.2-percentage-point per year gap, which is equivalent to around 12% of funds' aggregate total return over this period, is similar to the shortfall we estimated over the 10 years ended Dec. 31, 2023 and 2024, if a bit narrower than the gaps over the decades ended Dec. 31, 2021 and 2022.

Exhibit 3 Rolling 10-Year Annual Investor Return Gaps (10-Year Periods Ended Dec. 31 of Years 2021 to 2025)



Source: Morningstar; author's calculations. Data as of Dec. 31 of 2021-25. Excludes "commodities" category group and funds of funds.

Takeaways for Investors

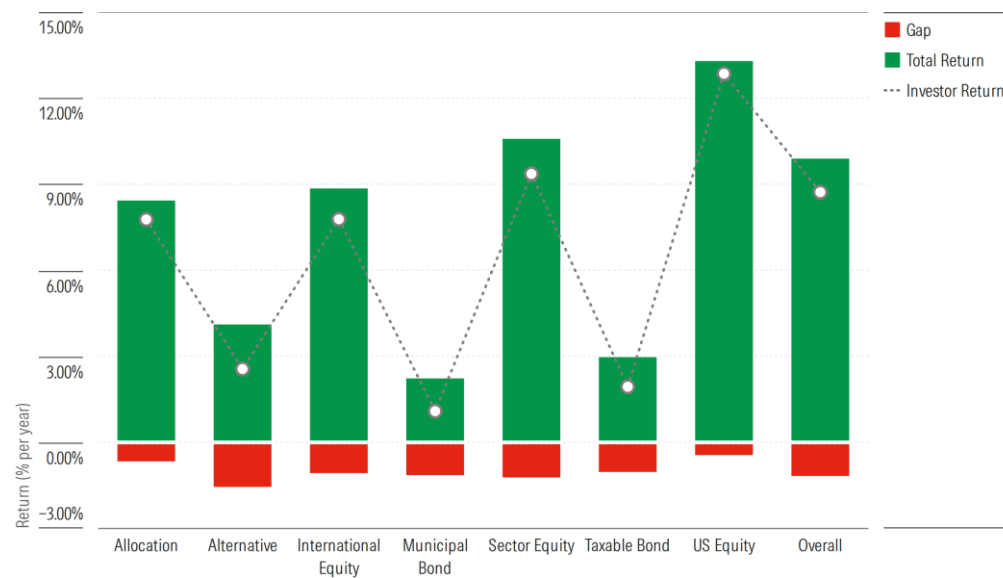
- ▶ We've consistently found the return of the average dollar invested in funds lags the funds' buy-and-hold return, the difference stemming from the timing and magnitude of investors' buys and sells.
- ▶ That gap can reflect suboptimal behavior, such as return chasing, but also contextual factors such as the setting investments are being made in.
- ▶ Investors can narrow this gap by holding the line on transactions, especially discretionary, ad-hoc trading in response to recent events; regimenting transactions using approaches like dollar-cost averaging or a systematic withdrawal plan; holding fewer, more widely diversified funds; and in certain cases, opting for strategies that automate routine tasks like rebalancing.

Investment Style

- US stock funds had the highest dollar-weighted and total returns in absolute terms (12.8% and 13.3% per year, respectively) and municipal-bond funds the lowest (1.1% and 2.2% annually, respectively). The average dollar made money in every category group over the 10-year period.
- From a percentage standpoint, US stock and allocation fund investors earned the largest share of their funds' aggregate total returns (97% and 92%, respectively) while municipal-bond, alternative, and taxable-bond fund investors captured the smallest portion (49%, 62%, and 65%, respectively).

Exhibit 4 Annual Investor Return Gaps by US Category Group (10 Years Ended Dec. 31, 2025)

US Category Group	Investor Return	Total Return	Gap
Allocation	7.8%	8.4%	-0.7%
Alternative	2.6%	4.1%	-1.6%
International Equity	7.8%	8.9%	-1.1%
Municipal Bond	1.1%	2.2%	-1.1%
Sector Equity	9.4%	10.6%	-1.2%
Taxable Bond	1.9%	3.0%	-1.0%
US Equity	12.8%	13.3%	-0.4%
Overall	8.7%	9.9%	-1.2%



Source: Morningstar. Data as of Dec. 31, 2025. Excludes "commodities" category group. The "alternative" category group also includes funds assigned to the "nontraditional equity" category group. The category group figures include funds of funds, but the "overall" figures exclude funds of funds to avoid double-counting. Gap numbers may not match differences in returns because of rounding.

- The trends by category group were more-or-less consistent with what we have observed in the past, with narrower gaps in absolute terms among US stock and allocation funds and wider gaps among alternative and sector equity funds.

Exhibit 5 Annual Investor Return Gaps by US Category Group (Rolling 10-Year Periods Ended Dec. 31, 2021-25)

US Category Group	2021	2022	2023	2024	2025
Allocation	-0.8%	-0.5%	-0.4%	-0.1%	-0.7%
Alternative	-1.2%	-1.9%	-0.6%	-0.1%	-1.6%
International Equity	-1.8%	-1.6%	-0.7%	-1.1%	-1.1%
Municipal Bond	-1.2%	-1.4%	-1.3%	-1.2%	-1.1%
Nontraditional Equity	-2.9%	-2.1%	-2.3%	N/A	N/A
Sector Equity	-4.3%	-4.4%	-2.6%	-1.5%	-1.2%
Taxable Bond	-1.2%	-1.4%	-1.0%	-1.0%	-1.0%
US Equity	-1.2%	-0.8%	-0.8%	-0.6%	-0.4%
Overall	-1.7%	-1.7%	-1.1%	-1.2%	-1.2%

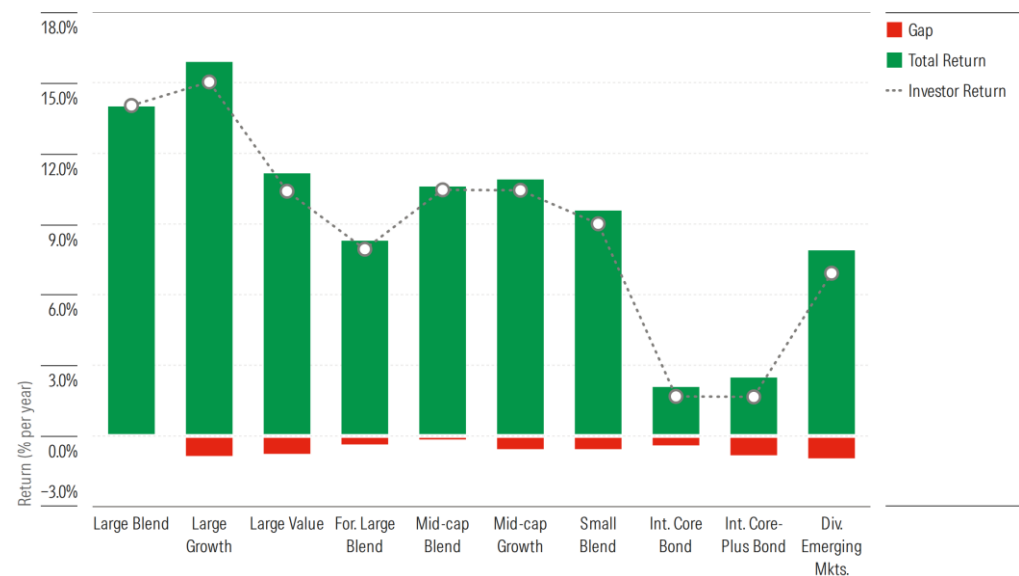
Source: Morningstar. Data as of Dec. 31, 2025. Excludes "commodities" category group. Beginning with the 10-year period ended Dec. 31, 2024, the "alternative" category group also includes funds assigned to the "nontraditional equity" category group. We have displayed the gaps for "nontraditional equity" for the prior rolling 10-year periods for comparability purposes. The category group figures include funds of funds, but the "overall" figures exclude funds of funds to avoid double-counting. Gap numbers may not match differences in returns because of rounding.

- In dollar terms, US stock fund investors had arguably the most profitable decade in fund history, earning more than \$12 trillion in cumulative gains over the 10-year period based on our estimates. This reflects the category group's large size (\$5.7 trillion in net assets at the period's outset), US stock funds' robust aggregate total returns over the decade (13.3% per year), and fairly stable flows, which allowed the asset base to compound to a greater extent.
- Among the largest categories by assets, the large-blend category had the narrowest gap in absolute and percentage terms, with the average dollar earning essentially all the funds' aggregate total return, while the large-growth category claimed the largest dollar-weighted (15.0% per year) and total return (15.9% annually).

- Diversified emerging-markets funds saw the largest shortfall in absolute terms (negative 1.0 percentage point), while investors in intermediate core-plus bond funds captured the smallest share (67%) of the funds' aggregate total returns.

Exhibit 6 Annual Investor Return Gaps for Largest Categories by Assets (10 Years Ended Dec. 31, 2025)

US Category Group	Investor Return	Total Return	Gap
Large Blend	14.0%	14.0%	0.0%
Large Growth	15.0%	15.9%	-0.8%
Large Value	10.4%	11.1%	-0.8%
For Large Blend	7.9%	8.3%	-0.4%
Mid-Cap Blend	10.4%	10.6%	-0.1%
Mid-Cap Growth	10.4%	10.9%	-0.5%
Small Blend	9.0%	9.6%	-0.6%
Int Core Bond	1.7%	2.1%	-0.4%
Int Core-Plus Bond	1.7%	2.5%	-0.8%
Div Emerging Mkts	6.9%	7.9%	-1.0%



Source: Morningstar; author's calculations. Data as of Dec. 31, 2025. Excludes funds of funds from tallies of assets by category, explaining absence of categories from the "allocation" US category group. Gap numbers may not match differences in returns due to rounding

Takeaways for Investors

- This year's study adds to evidence that investors have tended to fare better with relatively simple, stand-alone options like allocation funds or portfolio bulwarks like US stock funds, where we saw narrower timing gaps. This success can hinge on where and how investors are utilizing such funds—for instance, a brokerage account versus a retirement plan menu—but their success in capturing these funds' total returns has been a recurring trend.
- On the other hand, we've seen investors continue to struggle with potentially more complex building-block strategies such as alternatives, which have chronically suffered from larger

timing gaps. It's notable that strategies like these are less likely to be featured on retirement plan menus or be held in target-date funds, contexts associated with greater investor success. Rather, they are more likely to be used on an ad-hoc or standalone basis, which could lead to timing errors.

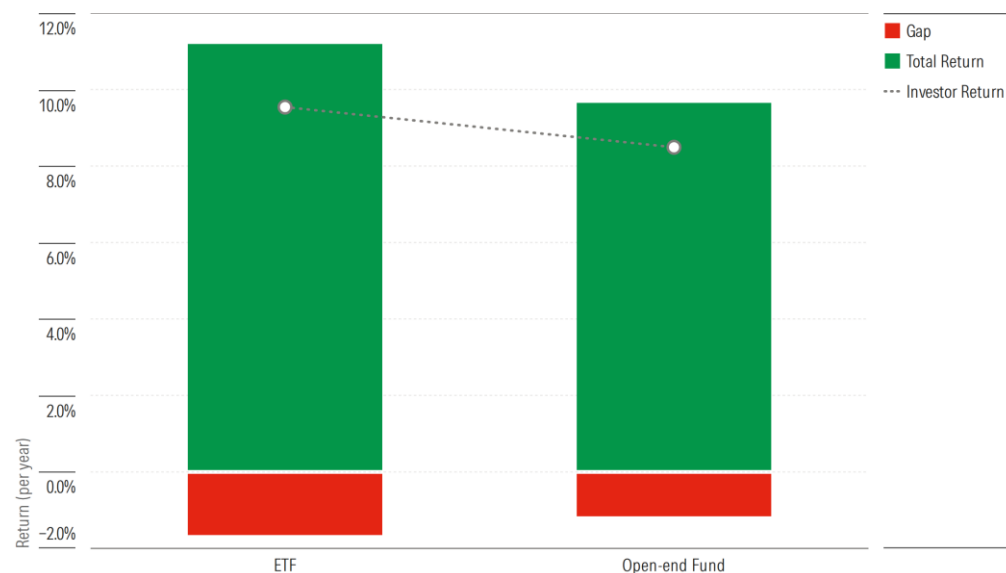
- With respect to the largest categories by assets, the findings largely mirrored the results at the broader category group level, with narrower gaps among popular US equity categories such as large blend, reflecting the central role such strategies often play in asset allocation, as well as other factors, and somewhat wider gaps in certain fixed-income and foreign-stock peer groups.

Fund Type/Management Style

- ETFs earned higher dollar-weighted (9.5% per year) and aggregate total (11.2% annually) returns than open-end funds (8.5% and 9.6% per year, respectively), but the gap was wider for ETFs (negative 1.6 percentage points per year) than for open-end funds (negative 1.2 percentage points annually).
- ETFs exhibited wider timing gaps than open-end funds in all but one category group (municipal bond), with international stock ETFs seeing the widest gap in absolute terms (negative 2.5 percentage points per year) and taxable-bond ETFs the biggest gap in percentage terms (the 1.4-percentage-point gap was equivalent to around half the aggregate return). (This excludes alternative ETFs, which are a tiny cohort.)
- Among open-end funds, US stock funds notched the highest investor (12.7% per year) and aggregate total returns (13.2% per year) while municipal-bond funds suffered the lowest dollar-weighted (1.1% annually) and time-weighted returns (2.2% per year). With respect to ETFs, excluding alternatives, it was largely the same story: U.S. equity ETFs paced the field, with the average dollar earning 13.2% per year compared with a 13.7% aggregate annual total return whereas municipal-bond ETFs earned just a fraction of that (1.1% and 1.9% annual dollar-weighted and total returns, respectively).

Exhibit 7 Annual Investor Return Gaps by US Category Group and Investment Type (10 Years Ended Dec. 31, 2025)

US Category Group	Investment Type	Investor Return	Total Return	Gap
Allocation	ETF	3.7%	5.4%	-1.7%
	Open-End Fund	7.8%	8.4%	-0.7%
Alternative	ETF	-3.9%	4.2%	-8.1%
	Open-End Fund	3.3%	4.1%	-0.9%
International Equity	ETF	7.3%	9.8%	-2.5%
	Open-End Fund	7.9%	8.6%	-0.7%
Municipal Bond	ETF	1.1%	1.9%	-0.8%
	Open-End Fund	1.1%	2.2%	-1.1%
Sector Equity	ETF	9.8%	11.6%	-1.8%
	Open-End Fund	8.8%	9.8%	-1.0%
Taxable Bond	ETF	1.4%	2.7%	-1.4%
	Open-End Fund	2.1%	3.0%	-0.9%
US Equity	ETF	13.2%	13.7%	-0.5%
	Open-End Fund	12.7%	13.2%	-0.5%
Overall	ETF	9.5%	11.2%	-1.6%
	Open-End Fund	8.5%	9.6%	-1.2%



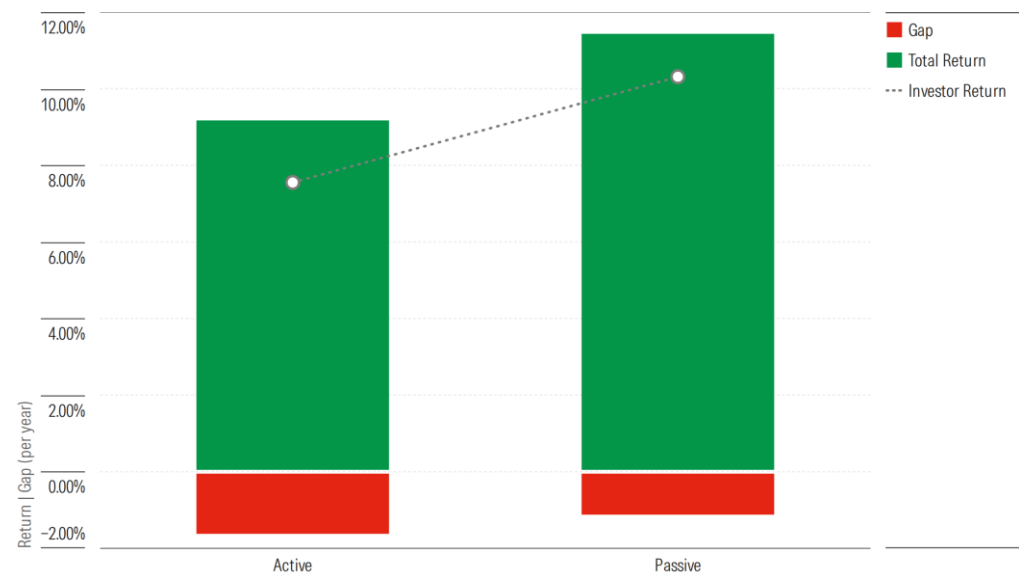
Source: Morningstar; author's calculations. Data as of Dec. 31, 2025. Excludes "commodities" category group. Funds of funds excluded from overall figures to avoid double-counting. Gap numbers may not match differences in returns due to rounding.

- The average dollar invested in active funds gained 7.5% per year, which was around 1.6 percentage points less per year than the 9.2% aggregate annual total return the funds earned over the decade ended Dec. 31, 2025.

- ▶ Index funds earned a higher dollar-weighted return than active funds (10.3% per year), but this still fell shy of the funds' aggregate annual time-weighted return (11.4%), leaving a 1.1-percentage-point per year gap.
- ▶ Active fund investors captured a slightly higher percentage of their funds' aggregate total returns than index fund investors across most category groups, with the notable exception of US equity where the return of the average dollar invested in index funds nearly matched the funds' overall total return.

Exhibit 8 Annual Investor Return Gaps by US Category Group and Management Style (10 Years Ended Dec. 31, 2025)

US Category Group	Mgmt Style	Investor Return	Total Return	Gap
Alternative	Active	3.3%	4.1%	-0.8%
	Index	-5.2%	3.4%	-8.6%
International Equity	Active	7.9%	8.7%	-0.8%
	Index	7.7%	9.3%	-1.6%
Municipal Bond	Active	1.1%	2.2%	-1.1%
	Index	1.1%	1.9%	-0.8%
Sector Equity	Active	8.8%	10.0%	-1.2%
	Index	9.8%	11.2%	-1.5%
Taxable Bond	Active	2.1%	3.2%	-1.0%
	Index	1.6%	2.3%	-0.8%
US Equity	Active	11.8%	12.9%	-1.1%
	Index	13.7%	13.8%	-0.1%
Overall	Active	7.5%	9.2%	-1.6%
	Index	10.3%	11.4%	-1.1%



Source: Morningstar; author's calculations. Data as of Dec. 31, 2025. Excludes "commodities" category group and funds of funds. "Allocation" category group not shown in table because virtually all "allocation" funds are assigned to the "active" management style. Gap numbers may not match differences in returns due to rounding.

Takeaways for Investors

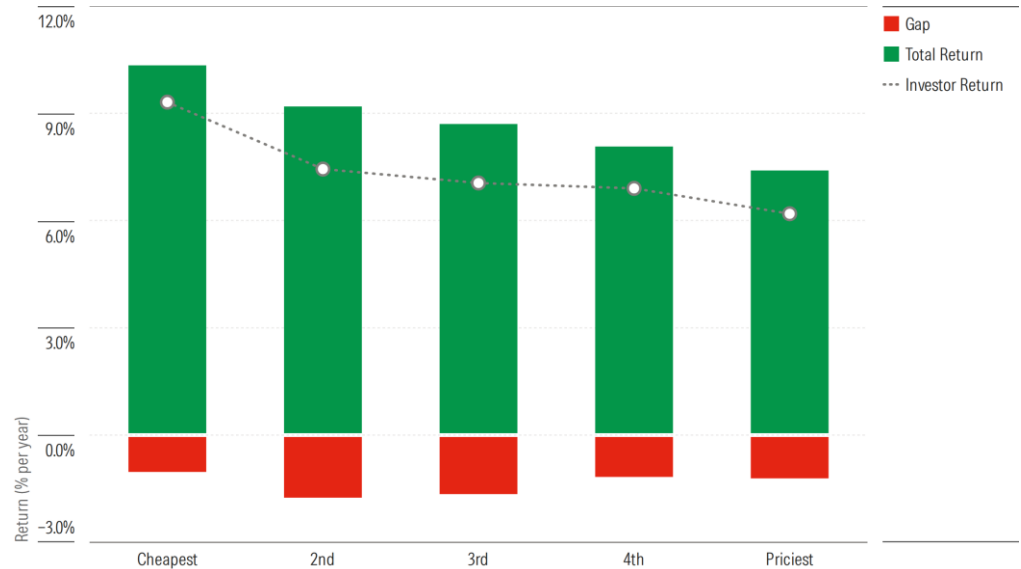
- ▶ Investors should be mindful of the potential trade-offs involved in easily traded ETFs, one of them being larger timing costs. This year's study finds the gaps between the average dollar's return and the buy-and-hold return are often wider among ETFs, notwithstanding those vehicles' other advantages when compared with traditional open-end funds.
- ▶ There's no strong evidence of a link between management style—active or passive—and timing gaps. Rather, it appears that management style subordinates to other factors, such as how and where investors access and utilize a strategy. Put another way, investors might be just as prone to mistime their investments in a very low-cost index fund in a brokerage account as they are to correctly time their buys and sells of a more costly active fund held within a retirement account or that's bought or sold per a systematic purchase or withdrawal plan.

Fees/Return Volatility

- ▶ Over the 10 years ended Dec. 31, 2025, the average dollar invested in the cheapest quintile of funds earned around 9.3% per year. That was about 1.0 percentage point per year less than the funds' 10.3% aggregate annual total return, a narrower margin than the 1.2-percentage-point gap separating the priciest funds' annual dollar-weighted and aggregate total returns.
- ▶ The average dollar invested in the priciest funds captured a smaller percentage of their total returns (84.0%) compared with the cheapest funds (90.0%) and the costliest funds earned significantly lower dollar-weighted (6.2% per year) and aggregate total returns (7.4% annually) than the least-expensive funds.

Exhibit 9 Annual Investor Return Gaps by US Category Group and Fee Quintile (10 Years Ended Dec. 31, 2025)

US Cat Group	Cheapest	2 nd	3 rd	4 th	Priciest
Allocation	-0.6%	-1.2%	-0.9%	-0.7%	-1.5%
Alternative	-0.8%	-2.2%	0.7%	-5.9%	-2.1%
International Equity	-0.8%	-1.7%	-3.5%	-1.0%	-1.2%
Municipal Bond	-1.1%	-1.4%	-1.2%	-1.0%	-0.7%
Sector Equity	-1.1%	-1.6%	-1.4%	-1.1%	-2.3%
Taxable Bond	-1.0%	-1.5%	-0.6%	-0.5%	-0.7%
US Equity	-0.4%	-1.3%	-1.2%	-0.6%	-1.0%
Overall	-1.0%	-1.8%	-1.7%	-1.2%	-1.2%

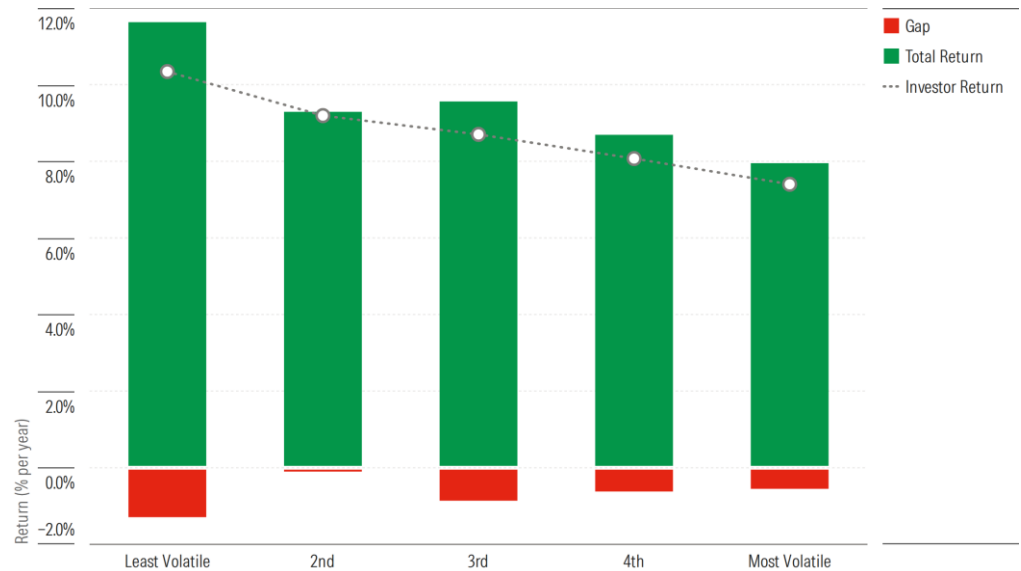


Source: Morningstar, author's calculations. Data as of Dec. 31, 2025. Excludes "commodities" category group. The "alternative" category group also includes funds assigned to the "nontraditional equity" category group. The category group figures include funds of funds, but the "Overall" figures exclude funds of funds to avoid double-counting.

- As in past studies, we found a stronger relationship between funds' volatility and investors' success capturing the funds' total returns: The less volatile the fund, the smaller the gap tended to be (0.4 percentage points per year for the least-volatile quintile) and vice versa for more-volatile funds (more than 2.0 percentage points annually for the most-volatile quintile).
- Over the decade ended Dec. 31, 2025, the most-volatile funds earned substantially lower dollar-weighted (5.8% per year) and aggregate total (8.0% annually) returns than the least-volatile funds (11.2% and 11.6% per year, respectively).
- This relationship held most strongly among alternative funds (where the least volatile funds captured 98% of the funds' aggregate total returns versus negative 159% for the most-volatile funds), international equity funds (94% and 66%, respectively, and municipal-bond funds (64% and 18%, respectively).

Exhibit 10 Annual Investor Return Gaps by US Category Group and Standard Deviation Quintile (10 Years Ended Dec. 31, 2025)

US Cat Group	Least Volatile	2 nd	3 rd	4 th	Most Volatile
Allocation	-0.9%	-0.6%	-0.5%	-0.9%	-0.2%
Alternative	-0.1%	0.7%	-2.0%	-2.9%	-13.2%
International Equity	-0.6%	-0.8%	-0.3%	-1.1%	-3.2%
Municipal Bond	-0.7%	-0.9%	-1.2%	-1.3%	-1.8%
Sector Equity	-0.7%	-0.6%	-1.5%	-1.4%	-1.4%
Taxable Bond	-1.0%	-1.1%	-0.6%	-1.5%	-1.3%
US Equity	-0.1%	-0.4%	-1.4%	-0.6%	-1.3%
Overall	-0.4%	-1.5%	-1.8%	-1.3%	-2.1%



Source: Morningstar, author's calculations. Data as of Dec. 31, 2025. Excludes "commodities" category group. The "alternative" category group also includes funds assigned to the "nontraditional equity" category group. The category group figures include funds of funds, but the "Overall" figures exclude funds of funds to avoid double-counting.

Takeaways for Investors

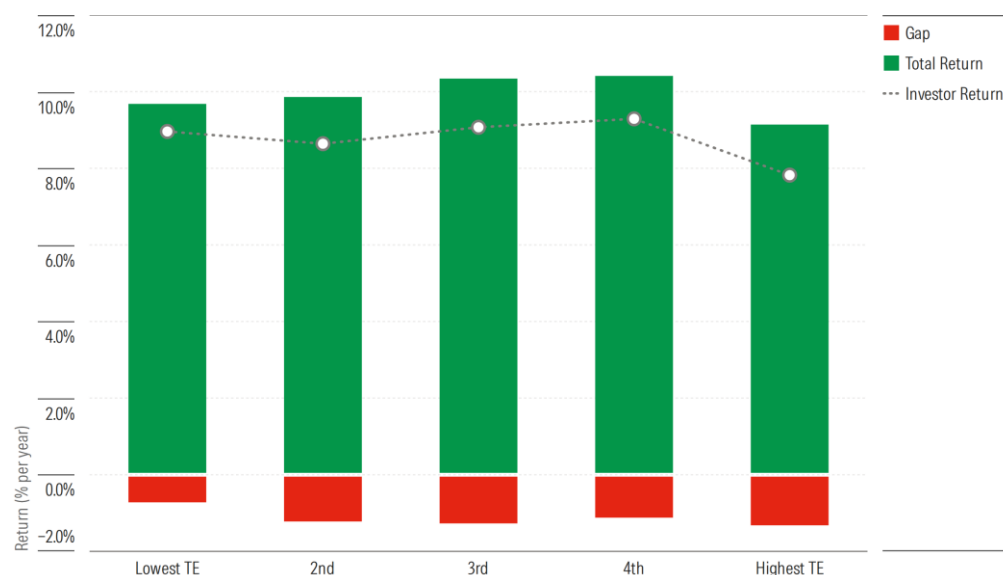
- ▶ Like management style, that is, active versus index, fees appear to play at best an indirect role in explaining the size of timing gaps. While the cheapest funds had a smaller gap and captured more of their funds' total returns than the priciest funds, the differences were modest overall. Investors might be prone to overtransact in cheaper and costlier funds alike, similar to what we observed when examining differences in gaps between traditional open-end funds and ETFs. It's likelier that other factors—such as where and how investors utilize a low-cost or pricey fund—have a stronger bearing on investor success than fees alone.
- ▶ That's in marked contrast to the relationship between volatility and timing gaps. In short, more-volatile funds appear to push investors' buttons, potentially inducing them to trade more often to their detriment, whereas less-volatile funds might be less prone to misuse. This has been one of the more vivid and enduring findings from the study through the years.
- ▶ That doesn't constitute a call to avoid more-volatile funds. Rather, it underscores the importance of being clear-minded and acting with resolve when investing in streakier, somewhat less-predictable funds, knowing that the sheer magnitude of such moves could spark a desire to buy or sell, with all the attendant risks of mistiming those transactions.

Tracking Error/Cash Flow Volatility

- ▶ Funds with higher tracking error (versus their style-specific index) exhibited slightly wider timing gaps than those that hewed closer to their benchmarks.
- ▶ All told, the aggregate total return of funds that deviated the most from their indexes was around 3.7 percentage points per year less than funds with the least tracking error.
- ▶ The average dollar in the highest tracking-error funds earned roughly 4.4 percentage points less annually than the average dollar in the funds that strayed the least.

Exhibit 11 Annual Investor Return Gaps by US Category Group and Tracking Error Quintile (10 Years Ended Dec. 31, 2025)

US Cat Group	Least Volatile	2 nd	3 rd	4 th	Most Volatile
Allocation	0.1%	-0.9%	-1.2%	-1.5%	-0.7%
Alternative	-1.3%	-2.0%	-0.6%	-2.5%	-11.1%
International Equity	-0.7%	-0.9%	-1.2%	-1.2%	-1.3%
Municipal Bond	-0.9%	-1.3%	-1.1%	-1.4%	-1.2%
Sector Equity	-0.8%	-1.1%	-1.0%	-0.5%	-2.0%
Taxable Bond	-0.5%	-0.8%	-1.0%	-1.3%	-1.2%
US Equity	0.1%	-0.4%	-1.2%	-1.4%	-1.1%
Overall	-0.7%	-1.1%	-1.8%	-2.0%	-1.4%

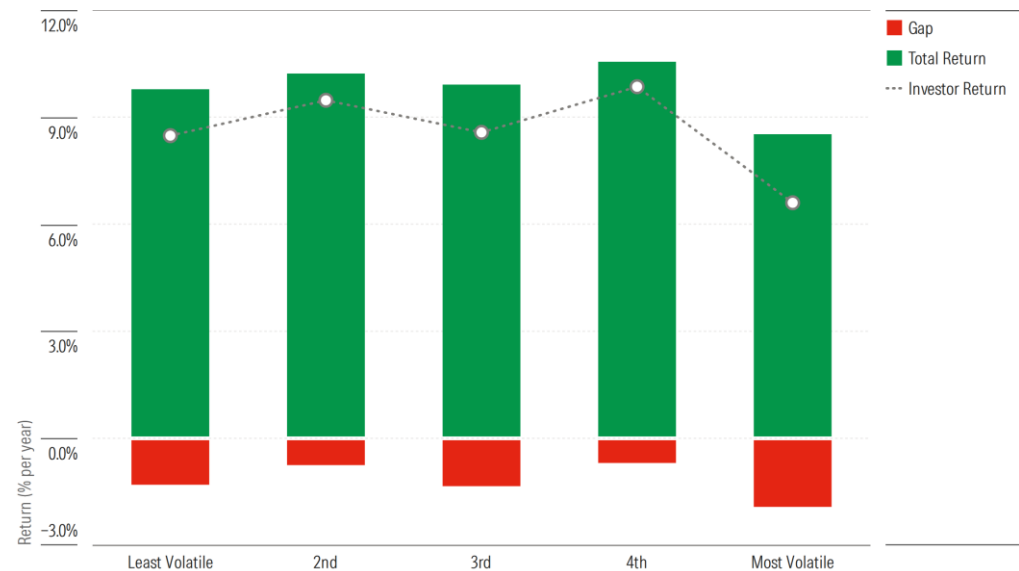


Source: Morningstar, author's calculations. Data as of Dec. 31, 2025. Excludes "commodities" category group. The "alternative" category group also includes funds assigned to the "nontraditional equity" category group. The category group figures include funds of funds, but the "Overall" figures exclude funds of funds to avoid double-counting.

- Funds with more-volatile cash flows (specifically, the volatility of monthly net flows as a percentage of net assets, which proxies for trading activity) tended to earn lower dollar-weighted returns than funds with more-stable cash flows.
- The return of the average dollar invested in funds with the most stable cash flows lagged the funds' aggregate total return by 1.3 percentage points per year, which was 0.6 percentage points narrower than the gap for funds with the most volatile cash flows (negative 1.9 percentage points).
- Funds with more volatile cash flows also tended to earn lower dollar-weighted and total returns in absolute terms: The average dollar invested in the quintile of funds with the most-volatile cash flows earned about 1.9 percentage points per year less (6.6% annually) than funds in the least-volatile quintile (8.5% per year). Correspondingly, the funds with the most-volatile cash flows earned a lower aggregate total return (8.5% annually) than funds with the most-stable cash flows (9.8% per year).

Exhibit 12 Annual Investor Return Gaps by US Category Group and Cash Flow Volatility Quintile (10 Years Ended Dec. 31, 2025)

US Cat Group	Least Volatile	2 nd	3 rd	4 th	Most Volatile
Allocation	-0.69%	-1.30%	-0.74%	-0.92%	-0.96%
Alternative	-0.49%	-2.05%	-0.45%	-1.06%	-1.17%
International Equity	-1.71%	-0.26%	-1.14%	-1.30%	-1.46%
Municipal Bond	-1.21%	-3.66%	-4.15%	-1.16%	-1.10%
Sector Equity	-0.53%	-10.43%	-1.15%	-1.32%	-0.14%
Taxable Bond	-0.69%	-1.30%	-0.74%	-0.92%	-0.96%
US Equity	-0.49%	-2.05%	-0.45%	-1.06%	-1.17%
Overall	-1.3%	-0.8%	-1.3%	-0.7%	-1.9%



Source: Morningstar, author's calculations. Data as of Dec. 31, 2025. Excludes "commodities" category group.

Takeaways for Investors

- There's some evidence of a link between tracking error and timing gaps, though it wasn't overwhelmingly strong, especially when other potentially conflating factors—such as volatility of returns—are taken into consideration. That said, it's advisable to at least consider the degree to which a strategy is likely to stray from its index and peers, as it appears such deviations can induce inopportune purchases and sales that lead to wider timing gaps.
- It was a similar story for cash flow volatility: Investors in funds with less-volatile cash flows tended to capture a larger share of those funds' total returns, if not to a resounding degree. Though cash flow volatility isn't a fund attribute per se—as the manager exerts little or no influence over the timing and magnitude of investors' trades in aggregate—it can serve as a measure of how overtransacting can corrode dollar-weighted returns.

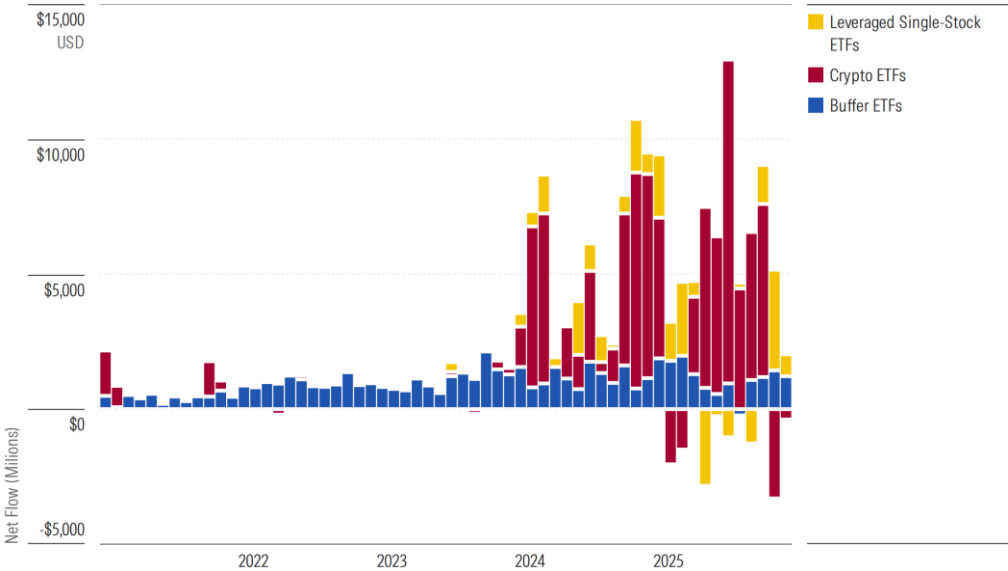
Case Study: Crypto, Leveraged Single-Stock, and Buffer ETFs

That concludes the core Mind the Gap study. In this section, we supplement the core study with this case study in which we analyze the dollar-weighted returns of several emerging ETF types, including:

- Buffer ETFs: Invest in derivative instruments to target returns in a specified range over a designated outcome period
- Leveraged single-stock ETFs: Invest in derivative instruments to deliver some multiple of a reference stock’s return for a single day
- Crypto ETFs: Invest directly in digital currency

These ETFs proved popular with investors, attracting \$165 billion in aggregate net inflows from investors in the five years ended Dec. 31, 2025.

Exhibit 13 Buffer, Leveraged Single-Stock, and Crypto ETFs: Monthly Net Flows (Jan. 1, 2021 to Dec. 31, 2025)



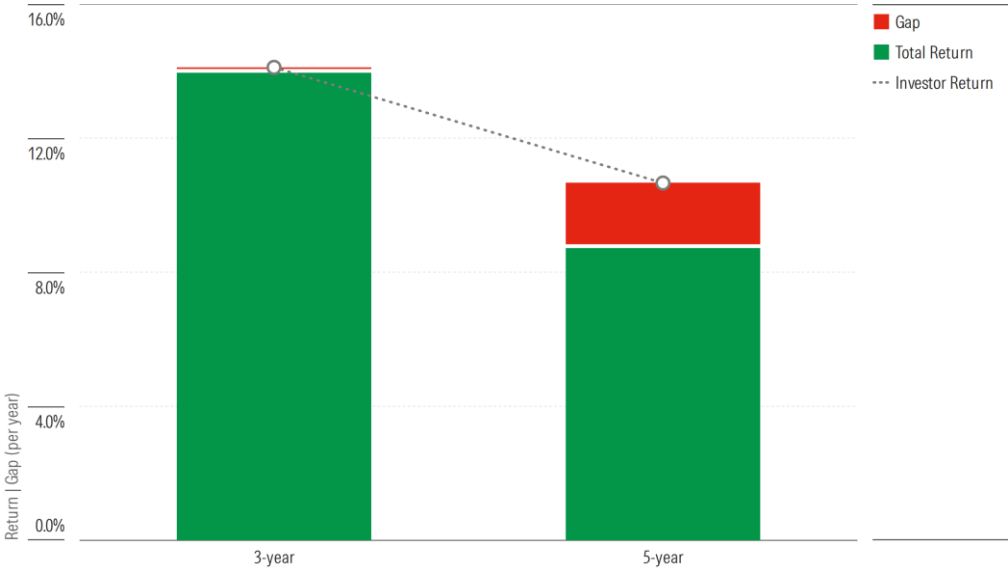
Source: Morningstar Direct. Data as of Dec. 31, 2025. Includes all ETFs in Morningstar’s defined outcome, trading-leveraged equity (limited to single-stock ETFs only), and digital assets categories over the period.

The question is how investors in these ETFs fared in dollar terms. To address that, we compiled net asset, flow, and return data for the three-year period ended Dec. 31, 2025 (leveraged single-stock ETFs and buffer ETFs) and the five-year period ended Dec. 31, 2025 (buffer ETFs only), as well as for the Jan. 10, 2024 to Dec. 31, 2025 period (crypto ETFs only). Using this data, we estimated each ETF type’s aggregate dollar-weighted and total returns.

Buffer ETFs

Encouragingly, we found buffer ETFs’ dollar-weighted returns exceeded their aggregate total returns over the three- and five-year periods ended Dec. 31, 2025.

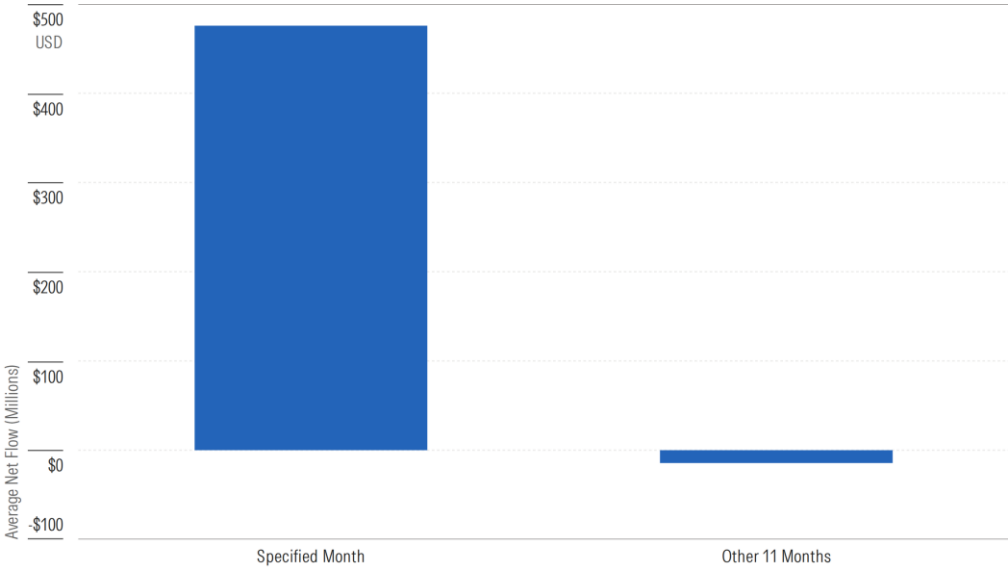
Exhibit 14 Buffer ETFs: Annual Investor Return Gaps (Three and Five Years Ended Dec. 31, 2025)



Source: Morningstar Direct; author's calculations. Data as of Dec. 31, 2025. Limited to "defined outcome" ETFs that existed as of Jan. 1, 2023 (three-year period) or Jan. 1, 2021 (five-year period). Gap numbers may not match differences in returns due to rounding.

These ETFs' strong dollar-weighted returns appear to owe to two main factors. First, flows clustered around the month in which the outcome period starts and ends. This made the pattern of demand more akin to buy and hold than other investment types where flows might be more irregular or episodic.

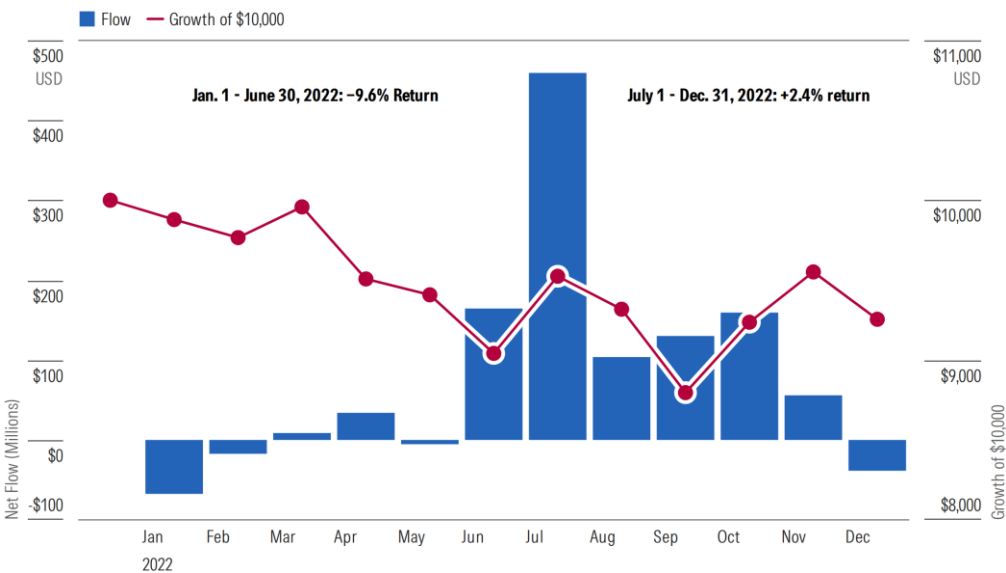
Exhibit 15 Buffer ETFs: Average Net Flow in Outcome Month Versus All Other Months (5 Years Ended Dec. 31, 2025)



Source: Morningstar Direct; author's calculations. Data as of Dec. 31, 2025. "Specified Month" is the month corresponding to the month mentioned in each buffer ETF's name; average monthly flow derived as sum of all flows in specified months divided by 60; calculation is same for other 11 months but with 660 as the divisor.

Second, it appears investors in these ETFs benefited from fortuitous timing, especially in 2022. Stocks and bonds took a drubbing that year, but the losses were largely confined to the January to June period. This portended well for investors in the “July” buffer ETFs, for instance, who concentrated their purchases in that month and shortly thereafter, just as performance began to stabilize.

Exhibit 16 “July” Buffer ETFs: Monthly Flows Versus Growth of \$10,000 (Year Ended Dec. 31, 2022)

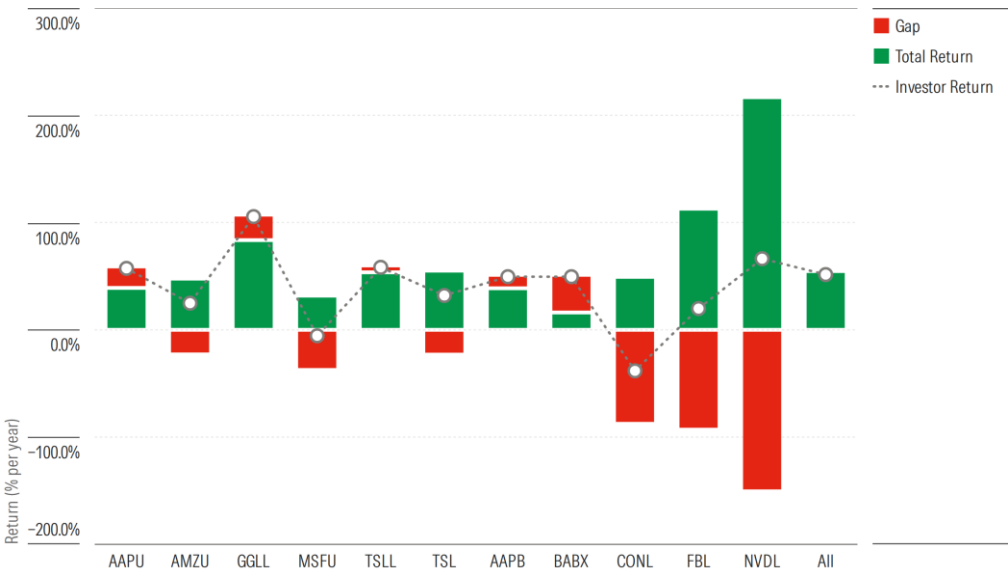


Source: Morningstar Direct; author’s calculations. Data as of Dec. 31, 2022. “July” buffer ETFs defined as “defined outcome” ETFs with “July” in the name; growth of \$10,000 represents cumulative growth of July buffer ETFs’ monthly returns in 2022, with ETFs weighted by their net assets as of Dec. 31, 2021.

Leveraged Single-Stock ETFs

Unfortunately, it was a different story for investors in leveraged single-stock ETFs. To be sure, over the three-year period ended Dec. 31, 2025, these ETFs produced lofty dollar-weighted returns that nearly matched the ETFs' aggregate total return. But the results varied dramatically at the individual ETF level, reflecting the idiosyncratic nature of demand for these strategies.

Exhibit 17 Leveraged Single-Stock ETFs: Annual Investor Return Gaps (3 Years Ended Dec. 31, 2025)

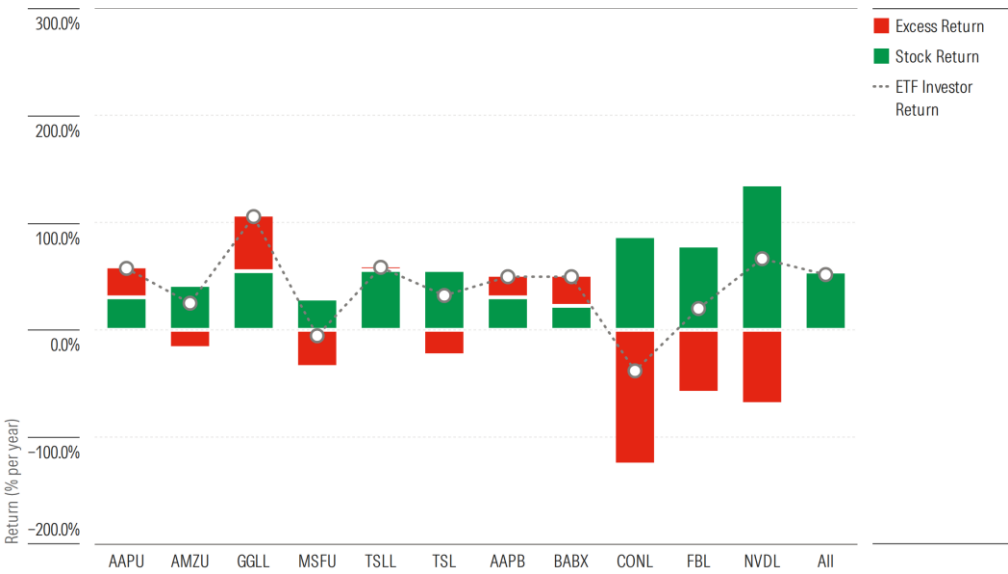


Source: Morningstar Direct; author's calculations. Data as of Dec. 31, 2025. Direxion Daily AAPL Bull 2X Shares (AAPU); Direxion Daily AMZN Bull 2X Shares (AMZU); Direxion Daily GOOGL Bull 2X Shares (GGLL); Direxion Daily MSFT Bull 2X Shares (MSFU); Direxion Daily TSLA Bull 2X Shares (TSLI); GraniteShares 1.25x Long Tsla Daily (TSL); GraniteShares 2x Long AAPL Daily (AAPB); GraniteShares 2x Long COIN Daily (CONL); GraniteShares 2x Long META Daily (FBL); GraniteShares 2x Long NVDA Daily (NVDL). Gap numbers may not match differences in returns due to rounding.

For instance, we estimate that Direxion Daily GOOGL Bull 2x Shares earned a 105.6% annual dollar-weighted return, which exceeded the ETF's total return by nearly 24 percentage points per year. Conversely, the average dollar invested in GraniteShares 2x Long COIN Daily ETF lost more than 38.0% per year, based on our estimates, despite the fact the ETF earned a 47.6% annual return over this span.

Also, while these ETFs aren’t meant to be held longer than a day, it’s still noteworthy that the return of the average dollar invested in these ETFs often failed to exceed the unlevered return of the reference stocks themselves over the three-year period. All told, these ETFs’ aggregate dollar-weighted return lagged the composite stocks’ return by 1 percentage point per year.

Exhibit 18 Leveraged Single-Stock ETFs: Annual Investor Returns Versus Stock Returns (3 Years Ended Dec. 31, 2025)

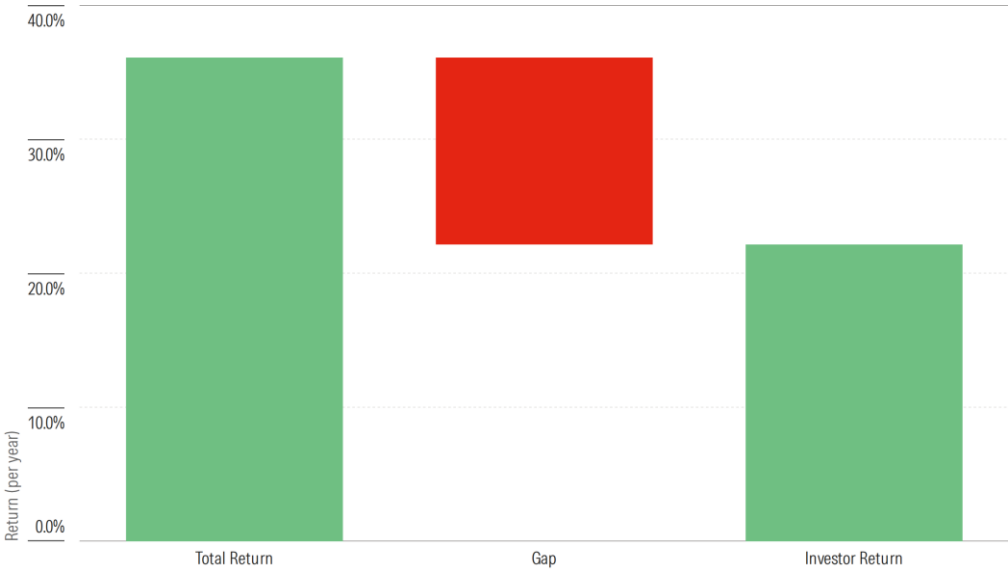


Source: Morningstar Direct; author’s calculations. Data as of Dec. 31, 2025. Direxion Daily AAPL Bull 2X Shares (AAPU); Direxion Daily AMZN Bull 2X Shares (AMZU); Direxion Daily GOOGL Bull 2X Shares (GGLL); Direxion Daily MSFT Bull 2X Shares (MSFU); Direxion Daily TSLA Bull 2X Shares (TSLI); GraniteShares 1.25x Long Tsla Daily (TSL); GraniteShares 2x Long AAPL Daily (AAPB); GraniteShares 2x Long COIN Daily (CONL); GraniteShares 2x Long META Daily (FBL); GraniteShares 2x Long NVDA Daily (NVDL). Gap numbers may not match differences in returns due to rounding.

Crypto ETFs

Lastly, we estimated the dollar-weighted returns of the first batch of bitcoin ETFs from January 2024, when they listed, through Dec. 31, 2025, finding the average dollar gained about 22% annually, or nearly 14 percentage points less per year than the ETFs earned in aggregate.

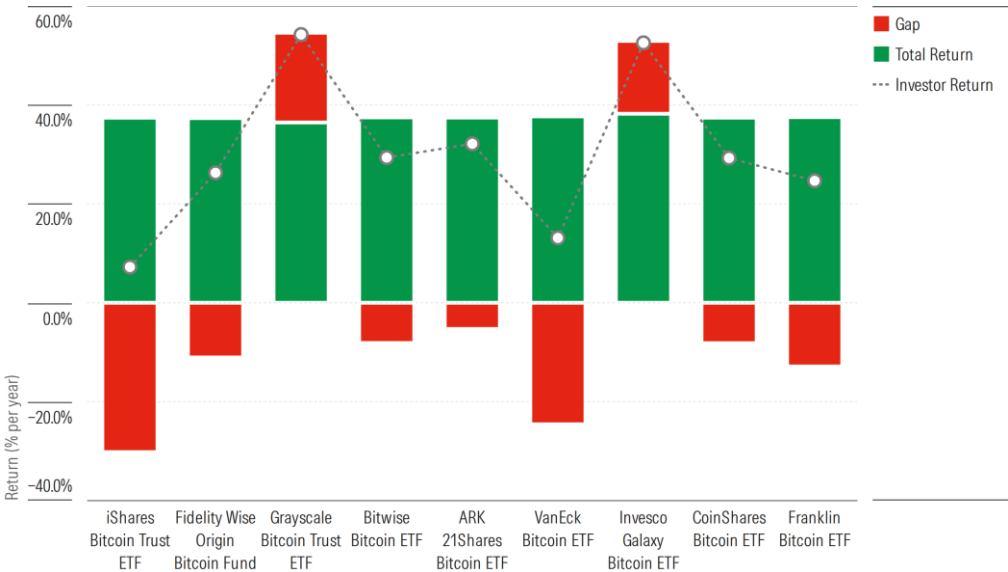
Exhibit 19 Crypto ETFs: Annual Investor Returns and Total Returns (Jan. 11, 2024 to Dec. 31, 2025)



Source: Morningstar Direct; author's calculations. Data as of Dec. 31, 2025. Limited to spot bitcoin ETFs in the digital assets category that existed as of Jan. 11, 2024. Gap numbers may not match differences in returns due to rounding.

Though the results varied by individual ETF, the large aggregate shortfall appears to be attributable to investors piling into one ETF, iShares Bitcoin Trust ETF, after bitcoin had already rallied substantially. This more than offset the Grayscale Bitcoin Trust ETF's positive timing gap, which seems to have arisen for the opposite reason--investors withdrawing capital soon after the ETF launched in January 2024, before bitcoin began to falter, with at least some of those proceeds likely having been reinvested in the other eight crypto ETFs that launched that month.

Exhibit 20 Crypto ETFs: Annual Investor Return Gaps (Jan. 11, 2024 to Dec. 31, 2025)



Source: Morningstar Direct; author's calculations. Data as of Dec. 31, 2025. Limited to spot bitcoin ETFs in the digital assets category that existed as of Jan. 11, 2024. Gap numbers may not match differences in returns due to rounding.

Morningstar recently furnished updated data to the *Wall Street Journal* for a story on these crypto ETFs' dollar-weighted returns through June 30, 2026. ("The Mind Games that Investors Can't Stop Playing" by Jason Zweig; July 10, 2026.) As of that date, we estimate that the average dollar invested in these ETFs had lost around 5.8% per year since Jan. 2024, which was more than 14 percentage points less than the ETFs' 8.5% per year aggregate total return over that span.

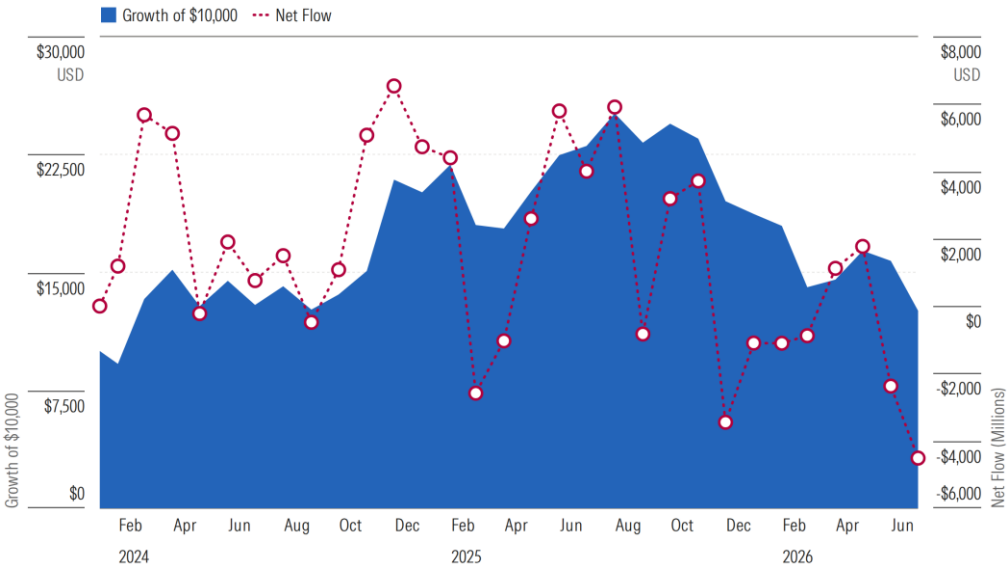
Exhibit 21 Crypto ETFs: Annual Investor Returns and Total Returns (Jan. 11, 2024 to June 30, 2026)



Source: Morningstar Direct; author's calculations. Data as of June 30, 2026. Limited to spot bitcoin ETFs in the digital assets category that existed as of Jan. 11, 2024.

This poor result appears to stem from ill-timed purchases and sales, with the biggest inflows coming after bitcoin had already streaked higher (in the 2024's first quarter and again in the first half of 2025), followed by redemptions in more-recent periods amid a downturn in the cryptocurrency's price, effectively locking-in losses.

Exhibit 22 Crypto ETFs: Growth of \$10,000 Versus Monthly Net Flows (Jan. 11, 2024 to June 30, 2026)



Source: Morningstar Direct; author's calculations. Data as of June 30, 2026. Limited to spot bitcoin ETFs in the digital assets category that existed as of Jan. 11, 2024.

Conclusion

We find that investors captured most, but not all, of their funds' aggregate total returns over the decade ended Dec. 31, 2025. The average dollar earned 8.7% per year over that span, or about 1.2 percentage points per year less than the funds' 9.9% aggregate annual total return. This finding is consistent with the results of prior studies, which also found gaps over the rolling 10-year periods ended Dec. 31, 2021, 2022, 2023, and 2024.

Here is a summary of our key findings and takeaways by major factor we assessed as part of the study:

Factor	Key Finding	Key Takeaway
Investment Style	Stand-alone and core options, such as allocation and US equity funds, saw narrower gaps than more specialized strategies like alternatives.	Favor fewer, more widely diversified funds, including those that automate routine tasks like rebalancing, and hold the line on transacting, mechanizing trades to the extent possible.
Fund Type and Management Style	ETFs are exhibiting wider gaps than open-end funds, but there wasn't a clear link between management style—active or passive—and gaps.	When it comes to ETFs, avoid the temptation to transact, despite the advantage such vehicles boast as trading vehicles.
Fees and Volatility of Returns	Fees weren't closely associated with wider gaps, but funds with high standard deviations sported larger gaps than funds that were less volatile.	There's nothing wrong with volatile funds, per se, but investors should be clear-eyed upfront about the patience and resolve they require, as well as the cost others have incurred from mistiming their investments.
Tracking Error and Cash Flow Volatility	While it appears there was a relationship between tracking error, cash flow volatility, and timing gaps, it wasn't especially strong.	Try to hold the line on discretionary, ad hoc trading of the sort we see in funds that exhibit the most-volatile cash flows and be clear-eyed about the slightly higher potential to inopportunistly buy or sell high-tracking error funds when they break from the pack.

Appendix

Study Synopsis

Exhibit 23 Breakdown of Number of Funds Included in Study by Category Group, Management Style, and Type
(Excludes Funds of Funds)

US Category Group	Active	Passive	Open-End	ETF	Total
Allocation	1,429	11	1,425	15	1,440
Alternative	1,195	47	1,196	46	1,242
International Equity	3,730	538	3,857	411	4,268
Municipal Bond	1,764	32	1,756	40	1,796
Sector Equity	1,387	358	1,425	320	1,745
Taxable Bond	4,506	300	4,577	229	4,806
US Equity	6,658	813	7,147	329	7,471
Unassigned	25	66	80	11	
Total	20,694	2,165	21,458	1,401	22,859

Exhibit 24 Breakdown of Beginning Net Assets of Funds Included in Study by Category Group, Management Style, and Type (USD Billions; Excludes Funds of Funds)

US Category Group	Active	Passive	Open-End	ETF	Total
Allocation	1,138	2	1,137	2	1,139
Alternative	158	7	157	7	164
International Equity	1,603	732	1,901	434	2,235
Municipal Bond	595	19	588	26	614
Sector Equity	390	337	430	298	728
Taxable Bond	2,180	674	2,532	322	2,854
US Equity	3,460	2,305	4,824	941	5,765
Total	9,523	4,076	11,570	2,030	13,999

Exhibit 25 Breakdown of Ending Net Assets of Funds Included in Study by Category Group, Management Style, and Type (USD Billions; Excludes Funds of Funds)

US Category Group	Active	Passive	Open-End	ETF	Total
Allocation	1,453	1	1,453	1	1,454
Alternative	173	17	167	22	190
International Equity	1,895	2,390	2,752	1,533	4,285
Municipal Bond	677	126	666	137	803
Sector Equity	425	1,085	500	1,010	1,511
Taxable Bond	2,835	2,237	3,570	1,502	5,072
US Equity	5,179	11,182	9,882	6,479	16,361
Total	12,637	17,038	18,991	10,684	29,675

Exhibit 26 Breakdown of Cumulative Net Flows of Funds Included in Study by Category Group, Management Style, and Type (USD Billions; Excludes Funds of Funds)

US Category Group	Active	Passive	Open-End	ETF	Total
Allocation	(667)	(1)	(667)	(2)	(668)
Alternative	(34)	18	(38)	22	(16)
International Equity	(1,078)	549	(988)	460	(528)
Municipal Bond	8	101	6	103	109
Sector Equity	(313)	121	(331)	139	(192)
Taxable Bond	110	1,340	389	1,061	1,450
US Equity	(3,133)	1,582	(3,500)	1,949	(1,552)
Total	(5,107)	3,710	(5,129)	3,732	(1,398)

Exhibit 27 Breakdown of Cumulative Market Appreciation of Funds Included in Study by Category Group, Management Style, and Type (USD Billions; Excludes Funds of Funds)

US Category Group	Active	Passive	Open-End	ETF	Total
Allocation	983	0	982	1	983
Alternative	50	(7)	48	(6)	42
International Equity	1,369	1,109	1,839	639	2,478
Municipal Bond	74	7	72	8	81
Sector Equity	348	627	401	574	975
Taxable Bond	545	223	649	119	768
US Equity	4,853	7,295	8,558	3,589	12,147
Total	8,221	9,253	12,551	4,923	17,147

Source: Morningstar. Data as of Dec. 31, 2025. Excludes "commodities" category group. The "alternative" category group also includes funds assigned to the "nontraditional equity" category group. The figures exclude funds of funds to avoid double-counting. Numbers may not sum exactly across columns due to rounding.

Methodology

Morningstar's annual "Mind the Gap" study compares funds' dollar-weighted returns with their time-weighted returns to see how large the gap, or difference, has been over time.

We use a portfolio-based methodology to pool funds' net assets and monthly flows to an aggregate level. We then estimate the pool's dollar-weighted returns using an internal-rate-of-return calculation that represents the constant monthly rate of return that makes the pool's beginning net assets equal its ending assets with all monthly cash flows accounted for. This estimate approximates the return of the average dollar in the pool over the study period.

It is important to note that this estimate is not a proxy for the average investor's dollar-weighted return, as this will depend on the particular magnitude and timing of an individual investor's purchases and sales, which is beyond the scope of this study.

Each pool consists of all share classes of all eligible funds and ETFs that existed at the beginning of the study period, in this case, as of Jan. 1, 2016. This includes funds that were merged or liquidated during the study period. We incorporate obsolete funds by aggregating their beginning assets and monthly flows through their final partial month of existence. In the case of liquidated funds, we carry the fund's terminal net assets forward to the end of the study, which is akin to assuming these assets were held in cash. With respect to merged funds, we treat the final net assets before the fund is merged as a transfer to the acquiring fund.

While we attempt to correct for survivorship bias, we do not correct for creation bias, as the study captures net assets, cash flows, and returns only for funds that existed at the start of the study period. In other words, we exclude funds that launched after Dec. 31, 2015, from the study.

The study also excludes funds in the "commodities" and "miscellaneous" category groups, as well as any fund lacking complete net assets, monthly net flows, or monthly net return data through the end of the study period or, if an obsolete fund, its final month of existence. For brevity, we've folded funds in the "nontraditional equity" category group into the "alternatives" category group.

We include funds of funds in the category group pools, and thus, their dollar-weighted and total returns are reflected in the aggregate category group investor return and total returns shown. (The vast majority of funds of funds belong to the "allocation" category group.) However, to avoid double-counting, we exclude funds of funds from the overall investor return and total return calculations.

To derive each pool's aggregate total return, we compound each constituent fund's beginning net assets by its monthly net returns to the end of the study period. We sum these values to arrive at the pool's aggregate ending net assets, which we compare with its beginning net assets to arrive at the total return for the study period.

For purposes of aggregating the total returns of obsolete funds, we incorporate the monthly returns of liquidated funds through the terminal month and assume the returns are zero thereafter. With respect to merged funds, we incorporate the monthly net returns of the acquired fund through the month before it merges and then assume it inherits the monthly net returns of the acquiring fund thereafter.

The study includes investor returns and total returns for both mutual funds and ETFs. ETFs can be used as trading vehicles, but our data uses monthly asset data rather than daily data. Given that ETFs do not report changes in net assets attributable to dividend reinvestments, we adjust reported flows by an assumed reinvestment rate that's tailored to each category group. (We make the same adjustment for open-end funds if the fund doesn't separately report reinvestments.)

(For more detailed information on Morningstar's approach to estimating funds' monthly net flows, please see Morningstar's ["Estimated Net Cash Flow Methodology"](#) dated Aug. 31, 2018.)

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, 2025, 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. ■■■

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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.



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