

U.S. Persistence Scorecard

Contributors

Craig J. Lazzara, CFA
Managing Director
Index Investment Strategy
craig.lazzara@spglobal.com

Davide Di Gioia
Chief SPIVA Engineer
Index Investment Strategy
davide.di.gioia@spglobal.com

Grace Stoddart
Quantitative Associate
Index Investment Strategy
grace.stoddart@spglobal.com

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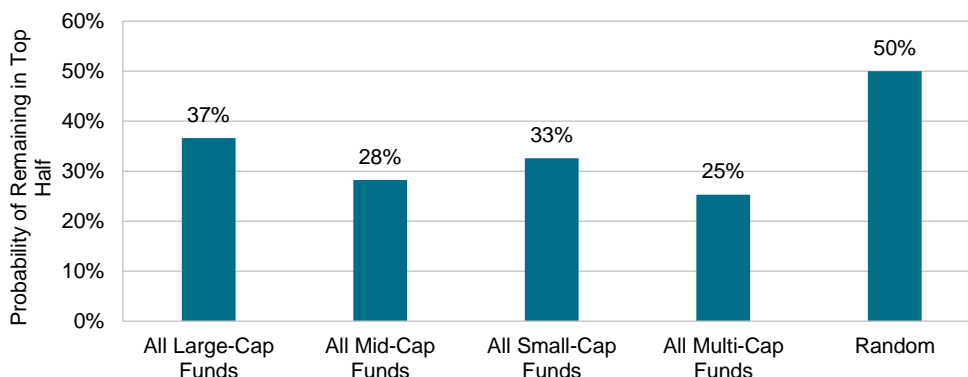
“I don’t know any investors who shouldn’t act as if markets are efficient.”
- Eugene Fama¹

Summary

Strong theoretical arguments and extensive empirical data² support the expectation that most active managers should underperform most of the time. But *most active managers are not all active managers*, and *most of the time is not all of the time*. When we observe active management success, how can we tell whether it is the product of genuine skill or merely the result of good luck? One answer is that **results produced by genuine skill are likely to persist, while those due to luck are likely to prove ephemeral.**³

The Persistence Scorecard is designed to address this question. Our report for year-end 2022 finds little evidence of persistent active management success, despite considering a variety of metrics and lookback periods. Exhibit 1 illustrates the general point, using 10 years of return data for U.S. equity managers.

Exhibit 1: Top-Half Funds in Years 1-5 Did Not Repeat in Years 6-10



Source: S&P Dow Jones Indices LLC, CRSP. Data as of Dec. 31, 2022. Chart is provided for illustrative purposes. Past performance is no guarantee of future results.

¹ Chicago Booth Review, “Are Markets Efficient?,” June 30, 2016.

² See, e.g., <https://www.spglobal.com/spdji/en/research-insights/spiva/>.

³ Lazzara, Craig, “Shooting Hoops with Michael Jordan: An Allegory,” S&P Dow Jones Indices, Sept. 29, 2022.

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Following Report 6, we consider the above-median managers in each fund category for the first five years, and then ask what fraction of the initial set of top managers repeated their above-median performance in the second five years. If performance were completely random, we would expect 50% of the winners in the first five years also to win in the second five years; if substantially more than 50% of the winners repeated in the second interval, that might be evidence of consistent skill. **Results, however, fell well short of this mark.**

Report Highlights

Results of the U.S. Persistence Year-End 2022 Scorecard are broadly consonant with those of prior years, despite 2022's relatively benign environment for active U.S. managers. A declining market, the underperformance of mega-cap stocks, record sectoral spreads and above-average dispersion all militated in favor of active management, and yet 51% of large-cap U.S. equity funds lagged the [S&P 500®](#).⁴ That most active managers underperformed in what might have been a favorable milieu helps explain why consistent value added, while much desired, is seldom observed.

- Only 5% of the above-median large-cap active equity funds in calendar year 2020 remained above median in each of the two succeeding years. (If outperformance were purely random, we would expect a 25% repeat rate.) We see similar results for other fund categories (see Report 1).
- Of 2020's top quartile large-cap funds, **none** continued in the top quartile for the next two years (versus 6.25% random expectation). These results were echoed in other fund categories (see Report 1).
- Consistent value added was just as elusive as consistently good peer group rankings. **Outperformance by active managers in 2020 did not predict outperformance in the two subsequent years** (see Report 1b).
- Results for active fixed income managers were somewhat better than for their equity counterparts, although still typically below the level suggested by chance (see Report 7).
- We continue to find evidence of persistence at the unfavorable end of the distribution. For example, 28% of all fourth quartile U.S. equity funds (based on 2012-2017 performance) were merged or liquidated within the next five years. The comparable figure for top quartile funds was only 10%. Results for active fixed income funds were similar (see Reports 5 and 11).

⁴ Edwards, Tim *et al.*, "[SPIVA U.S. Scorecard](#)," S&P Dow Jones Indices, Year-End 2022. Admittedly, this was the best active performance rate for large-cap funds in 13 years, and an especially notable rebound from 2021's 85% underperformance rate.

About the Persistence Scorecard

The phrase “past performance is no guarantee of future results” (or some variation thereof) can be found in the fine print of most mutual fund literature. Yet many investors and advisors consider past performance and related metrics to be important factors in fund selection. So, does past performance really matter?

To answer this question, the semiannual S&P Persistence Scorecard tracks the degree to which historical relative performance is predictive of future relative performance. As in our widely followed SPIVA® Scorecards, the University of Chicago’s Center for Research in Security Prices (CRSP) Survivorship Bias Free Mutual Fund Database serves as the underlying data source. For a more detailed description of the Persistence Scorecard’s allocation of funds to appropriate categories, and how funds are screened and selected for inclusion, please see the corresponding [SPIVA U.S. Year-End 2022 Scorecard](#).

Key features of the S&P Persistence Scorecard include:

- **Historical rankings without survivorship bias:** For anyone making an investment decision, all funds available at the time of that decision are part of the initial opportunity set. Ignoring funds that liquidate or merge during a period of study biases measurements of performance and persistence. Using the CRSP database, the S&P Persistence Scorecard ranks all funds available at each point in time and tracks the top-quartile and top-half performers over time.
- **Clean universe:** The mutual fund universe used in these reports comprises actively managed domestic U.S. equity funds. Index funds, sector funds, and index-based dynamic (bull or bear) funds are excluded from the sample. To avoid double counting of multiple share classes, only the share class with the highest previous period return of each fund is used.
- **Transition matrices:** Transition matrices show the movements across quartiles and halves over non-overlapping three- and five-year periods. They also track the percentage of funds that have merged, liquidated, or changed style.
- **Tracking reports of top performers:** The tracking reports show the percentage of funds that remain in the top-quartile or top-half rankings over consecutive three- and five-year periods.

Reports

Report 1: Performance Persistence of Domestic Equity Funds over Three Consecutive 12-Month Periods

| Fund Category | Fund Count at Start (December 2020) | Percentage Remaining in Top Quartile | |
|---------------------|--|--------------------------------------|---------------|
| | | December 2021 | December 2022 |
| Top Quartile | | | |
| All Domestic Funds | 488 | 4.10 | 0.00 |
| All Large-Cap Funds | 156 | 7.05 | 0.00 |
| All Mid-Cap Funds | 63 | 0.00 | 0.00 |
| All Small-Cap Funds | 123 | 2.44 | 0.81 |
| All Multi-Cap Funds | 121 | 9.09 | 0.00 |
| Fund Category | Fund Count at Start (December 2020) | Percentage Remaining in Top Half | |
| | | December 2021 | December 2022 |
| Top Half | | | |
| All Domestic Funds | 975 | 32.10 | 7.18 |
| All Large-Cap Funds | 318 | 39.31 | 5.03 |
| All Mid-Cap Funds | 128 | 13.28 | 2.34 |
| All Small-Cap Funds | 243 | 21.81 | 9.05 |
| All Multi-Cap Funds | 241 | 39.83 | 9.96 |

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Dec. 31, 2022. Table is provided for illustrative purposes. Past performance is no guarantee of future results.

Report 1b: Alpha Persistence of Domestic Equity Funds over Three Consecutive 12-Month Periods

| Fund Category | Benchmark | Total Fund Count | Funds Outperforming the Benchmark (December 2020) | | Percentage Continuing to Outperform the Benchmark (%) | |
|---------------------|--------------------|------------------|---|----------------|---|---------------|
| | | | Count | Percentage (%) | December 2021 | December 2022 |
| All Domestic Funds | S&P Composite 1500 | 2061 | 891 | 43.23 | 10.66 | 2.47 |
| All Large-Cap Funds | S&P 500 | 724 | 288 | 39.78 | 12.50 | 2.08 |
| All Mid-Cap Funds | S&P MidCap 400 | 295 | 145 | 49.15 | 8.97 | 0.00 |
| All Small-Cap Funds | S&P SmallCap 600 | 520 | 284 | 54.62 | 11.27 | 4.93 |
| All Multi-Cap Funds | S&P Composite 1500 | 532 | 238 | 44.74 | 10.92 | 1.68 |

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Dec. 31, 2022. Table is provided for illustrative purposes. Past performance is no guarantee of future results.

Report 2: Performance Persistence of Domestic Equity Funds over Five Consecutive 12-Month Periods

| Fund Category | Fund Count at Start (December 2018) | Percentage Remaining in Top Quartile | | | |
|---------------------|--|--------------------------------------|------------------|------------------|------------------|
| | | December 2019 | December 2020 | December 2021 | December 2022 |
| Top Quartile | | | | | |
| All Domestic Funds | 527 | 48.58 | 33.21 | 1.71 | 0.00 |
| All Large-Cap Funds | 178 | 48.88 | 42.13 | 3.93 | 0.00 |
| All Mid-Cap Funds | 67 | 52.24 | 31.34 | 1.49 | 0.00 |
| All Small-Cap Funds | 132 | 51.52 | 40.91 | 0.00 | 0.00 |
| All Multi-Cap Funds | 118 | 46.61 | 27.97 | 1.69 | 0.00 |
| Fund Category | Fund Count at Start (December 2018) | Percentage Remaining in Top Half | | | |
| | | December 2019 | December 2020 | December 2021 | December 2022 |
| Top Half | | | | | |
| All Domestic Funds | 1053 | 64.20 | 54.89 | 16.81 | 2.66 |
| All Large-Cap Funds | 366 | 63.39 | 55.19 | 16.94 | 1.37 |
| All Mid-Cap Funds | 136 | 70.59 | 60.29 | 5.15 | 0.74 |
| All Small-Cap Funds | 263 | 63.50 | 52.85 | 6.08 | 2.66 |
| All Multi-Cap Funds | 229 | 59.39 | 51.97 | 20.09 | 5.24 |

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Dec. 31, 2022. Table is provided for illustrative purposes. Past performance is no guarantee of future results.

Report 3: Three-Year Transition Matrix – Performance of Domestic Equity Funds over Two Non-Overlapping Three-Year Periods (Based on Quartile)

| Quartile | Fund Count at Start (December 2016- December 2019) | Three-Year Percentages at End (December 2019-December 2022) | | | | | |
|----------------------------|--|---|------------------------|------------------------|------------------------|------------------------------|-------------------------|
| | | 1st Quartile (%) | 2nd Quartile (%) | 3rd Quartile (%) | 4th Quartile (%) | Merged/ Liquidated (%) | Style Changed (%) |
| All Domestic Funds | | | | | | | |
| 1st Quartile | 487 | 8.21 | 12.32 | 24.02 | 31.42 | 4.52 | 19.51 |
| 2nd Quartile | 486 | 19.96 | 19.14 | 16.05 | 13.17 | 9.88 | 21.81 |
| 3rd Quartile | 486 | 18.52 | 17.08 | 12.96 | 11.32 | 13.37 | 26.75 |
| 4th Quartile | 487 | 13.76 | 14.37 | 18.28 | 12.53 | 18.69 | 22.38 |
| All Large-Cap Funds | | | | | | | |
| 1st Quartile | 173 | 6.94 | 8.09 | 21.97 | 49.71 | 4.05 | 9.25 |
| 2nd Quartile | 172 | 20.93 | 25.00 | 19.77 | 9.30 | 5.23 | 19.77 |
| 3rd Quartile | 172 | 22.67 | 19.77 | 16.86 | 5.23 | 9.30 | 26.16 |
| 4th Quartile | 173 | 12.14 | 15.61 | 14.45 | 12.72 | 12.72 | 32.37 |
| All Mid-Cap Funds | | | | | | | |
| 1st Quartile | 70 | 4.29 | 14.29 | 28.57 | 25.71 | 4.29 | 22.86 |
| 2nd Quartile | 70 | 8.57 | 11.43 | 14.29 | 21.43 | 18.57 | 25.71 |
| 3rd Quartile | 70 | 18.57 | 15.71 | 11.43 | 10.00 | 8.57 | 35.71 |
| 4th Quartile | 70 | 18.57 | 11.43 | 17.14 | 4.29 | 22.86 | 25.71 |
| All Small-Cap Funds | | | | | | | |
| 1st Quartile | 122 | 8.20 | 6.56 | 27.87 | 43.44 | 7.38 | 6.56 |
| 2nd Quartile | 121 | 17.36 | 19.01 | 19.83 | 18.18 | 10.74 | 14.88 |
| 3rd Quartile | 121 | 15.70 | 29.75 | 19.83 | 8.26 | 14.05 | 12.40 |
| 4th Quartile | 122 | 23.77 | 16.39 | 10.66 | 6.56 | 22.13 | 20.49 |
| All Multi-Cap Funds | | | | | | | |
| 1st Quartile | 125 | 6.40 | 12.00 | 13.60 | 23.20 | 5.60 | 39.20 |
| 2nd Quartile | 125 | 16.80 | 20.80 | 16.80 | 9.60 | 9.60 | 26.40 |
| 3rd Quartile | 125 | 18.40 | 12.00 | 15.20 | 12.80 | 18.40 | 23.20 |
| 4th Quartile | 125 | 16.80 | 10.40 | 12.00 | 10.40 | 22.40 | 28.00 |

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Dec. 31, 2022. Table is provided for illustrative purposes. Past performance is no guarantee of future results.

Report 4: Three-Year Transition Matrix – Performance of Domestic Equity Funds over Two Non-Overlapping Three-Year Periods (Based on Halves)

| Half | Fund Count at Start (December 2016- December 2019) | Three-Year Percentages at End (December 2019-December 2022) | | | |
|----------------------------|--|---|-----------------|-----------------------|-------------------|
| | | Top Half (%) | Bottom Half (%) | Merged/Liquidated (%) | Style Changed (%) |
| All Domestic Funds | | | | | |
| Top Half | 973 | 29.80 | 42.34 | 7.19 | 20.66 |
| Bottom Half | 973 | 31.86 | 27.54 | 16.03 | 24.56 |
| All Large-Cap Funds | | | | | |
| Top Half | 345 | 30.43 | 50.43 | 4.64 | 14.49 |
| Bottom Half | 345 | 35.07 | 24.64 | 11.01 | 29.28 |
| All Mid-Cap Funds | | | | | |
| Top Half | 140 | 19.29 | 45.00 | 11.43 | 24.29 |
| Bottom Half | 140 | 32.14 | 21.43 | 15.71 | 30.71 |
| All Small-Cap Funds | | | | | |
| Top Half | 243 | 25.51 | 54.73 | 9.05 | 10.70 |
| Bottom Half | 243 | 42.80 | 22.63 | 18.11 | 16.46 |
| All Multi-Cap Funds | | | | | |
| Top Half | 250 | 28.00 | 31.60 | 7.60 | 32.80 |
| Bottom Half | 250 | 28.80 | 25.20 | 20.40 | 25.60 |

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Dec. 31, 2022. Table is provided for illustrative purposes. Past performance is no guarantee of future results.

Report 5: Five-Year Transition Matrix – Performance of Domestic Equity Funds over Two Non-Overlapping Five-Year Periods (Based on Quartile)

| Quartile | Fund Count at Start (December 2012- December 2017) | Five-Year Percentages at End (December 2017-December 2022) | | | | | |
|----------------------------|--|--|------------------------|------------------------|------------------------|------------------------------|-------------------------|
| | | 1st Quartile (%) | 2nd Quartile (%) | 3rd Quartile (%) | 4th Quartile (%) | Merged/ Liquidated (%) | Style Changed (%) |
| All Domestic Funds | | | | | | | |
| 1st Quartile | 473 | 20.08 | 18.18 | 11.21 | 11.63 | 10.36 | 28.54 |
| 2nd Quartile | 473 | 13.74 | 13.53 | 10.99 | 13.53 | 14.38 | 33.83 |
| 3rd Quartile | 473 | 10.57 | 14.38 | 13.53 | 13.11 | 17.12 | 31.29 |
| 4th Quartile | 473 | 6.98 | 8.25 | 12.90 | 12.90 | 28.12 | 30.87 |
| All Large-Cap Funds | | | | | | | |
| 1st Quartile | 178 | 25.84 | 16.85 | 14.61 | 12.92 | 9.55 | 20.22 |
| 2nd Quartile | 177 | 14.12 | 16.38 | 15.82 | 6.21 | 15.25 | 32.20 |
| 3rd Quartile | 178 | 14.61 | 13.48 | 14.04 | 11.80 | 10.67 | 35.39 |
| 4th Quartile | 178 | 10.11 | 8.99 | 13.48 | 18.54 | 24.16 | 24.72 |
| All Mid-Cap Funds | | | | | | | |
| 1st Quartile | 66 | 16.67 | 15.15 | 9.09 | 15.15 | 7.58 | 36.36 |
| 2nd Quartile | 65 | 12.31 | 12.31 | 10.77 | 12.31 | 23.08 | 29.23 |
| 3rd Quartile | 65 | 12.31 | 13.85 | 18.46 | 4.62 | 16.92 | 33.85 |
| 4th Quartile | 66 | 9.09 | 12.12 | 9.09 | 6.06 | 31.82 | 31.82 |
| All Small-Cap Funds | | | | | | | |
| 1st Quartile | 115 | 19.13 | 16.52 | 17.39 | 16.52 | 7.83 | 22.61 |
| 2nd Quartile | 115 | 15.65 | 13.91 | 28.70 | 18.26 | 11.30 | 12.17 |
| 3rd Quartile | 115 | 8.70 | 13.04 | 13.04 | 16.52 | 20.87 | 27.83 |
| 4th Quartile | 115 | 13.04 | 9.57 | 9.57 | 7.83 | 34.78 | 25.22 |
| All Multi-Cap Funds | | | | | | | |
| 1st Quartile | 117 | 14.53 | 13.68 | 8.55 | 8.55 | 11.11 | 43.59 |
| 2nd Quartile | 116 | 8.62 | 13.79 | 7.76 | 4.31 | 21.55 | 43.97 |
| 3rd Quartile | 117 | 5.98 | 11.97 | 13.68 | 8.55 | 17.09 | 42.74 |
| 4th Quartile | 117 | 3.42 | 4.27 | 6.84 | 14.53 | 26.50 | 44.44 |

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Dec. 31, 2022. Table is provided for illustrative purposes. Past performance is no guarantee of future results.

Report 6: Five-Year Transition Matrix – Performance of Domestic Equity Funds over Two Non-Overlapping Five-Year Periods (Based on Halves)

| Half | Fund Count at Start (December 2012- December 2017) | Five-Year Percentages at End (December 2017-December 2022) | | | |
|----------------------------|--|--|-----------------|-----------------------|-------------------|
| | | Top Half (%) | Bottom Half (%) | Merged/Liquidated (%) | Style Changed (%) |
| All Domestic Funds | | | | | |
| Top Half | 946 | 32.77 | 23.68 | 12.37 | 31.18 |
| Bottom Half | 946 | 20.08 | 26.22 | 22.62 | 31.08 |
| All Large-Cap Funds | | | | | |
| Top Half | 355 | 36.62 | 24.79 | 12.39 | 26.20 |
| Bottom Half | 356 | 23.60 | 28.93 | 17.42 | 30.06 |
| All Mid-Cap Funds | | | | | |
| Top Half | 131 | 28.24 | 23.66 | 15.27 | 32.82 |
| Bottom Half | 131 | 23.66 | 19.08 | 24.43 | 32.82 |
| All Small-Cap Funds | | | | | |
| Top Half | 230 | 32.61 | 40.43 | 9.57 | 17.39 |
| Bottom Half | 230 | 22.17 | 23.48 | 27.83 | 26.52 |
| All Multi-Cap Funds | | | | | |
| Top Half | 233 | 25.32 | 14.59 | 16.31 | 43.78 |
| Bottom Half | 234 | 12.82 | 21.79 | 21.79 | 43.59 |

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Dec. 31, 2022. Table is provided for illustrative purposes. Past performance is no guarantee of future results.

Report 7: Performance Persistence of Domestic Fixed Income Funds over Three Consecutive 12-Month Periods

| Fund Category | Fund Count at Start (December 2020) | Percentage Remaining in Top Quartile | |
|---|--|--------------------------------------|---------------|
| | | December 2021 | December 2022 |
| Top Quartile | | | |
| Investment-Grade Intermediate Funds | 34 | 23.53 | 2.94 |
| Investment-Grade Short & Intermediate Funds | 34 | 11.76 | 0.00 |
| High Yield Funds | 38 | 31.58 | 2.63 |
| Global Income Funds | 23 | 8.70 | 8.70 |
| Fund Category | Fund Count at Start (December 2020) | Percentage Remaining in Top Half | |
| | | December 2021 | December 2022 |
| Top Half | | | |
| Investment-Grade Intermediate Funds | 68 | 55.88 | 17.65 |
| Investment-Grade Short & Intermediate Funds | 67 | 37.31 | 16.42 |
| High Yield Funds | 74 | 51.35 | 25.68 |
| Global Income Funds | 45 | 24.44 | 13.33 |

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Dec. 31, 2022. Table is provided for illustrative purposes. Past performance is no guarantee of future results.

Report 7b: Alpha Persistence of Domestic Fixed Income Funds over Three Consecutive 12-Month Periods

| Fund Category | Benchmark | Total Fund Count | Funds Outperforming the Benchmark (December 2020) | | Percentage Continuing to Outperform the Benchmark (%) | |
|---|----------------------------|------------------|---|----------------|---|---------------|
| | | | Count | Percentage (%) | December 2021 | December 2022 |
| Investment-Grade Intermediate Funds | Bloomberg U.S. Aggregate | 141 | 94 | 66.67 | 69.15 | 9.57 |
| Investment-Grade Short & Intermediate Funds | iBoxx \$ Overall 1-5Y | 142 | 36 | 25.35 | 55.56 | 16.67 |
| High Yield Funds | iBoxx \$ Liquid High Yield | 156 | 107 | 68.59 | 61.68 | 27.10 |
| Global Income Funds | Bloomberg Global Aggregate | 98 | 30 | 30.61 | 26.67 | 20.00 |

Source: S&P Dow Jones Indices LLC, CRSP, Bloomberg LLC. Data as of Dec. 31, 2022. Table is provided for illustrative purposes. Past performance is no guarantee of future results.

Report 8: Performance Persistence of Domestic Fixed Income Funds over Five Consecutive 12-Month Periods

| Fund Category | Fund Count at Start (December 2018) | Percentage Remaining in Top Quartile | | | |
|--|--|--------------------------------------|------------------|------------------|------------------|
| | | December 2019 | December 2020 | December 2021 | December 2022 |
| Top Quartile | | | | | |
| Investment-Grade Intermediate Funds | 36 | 11.11 | 2.78 | 0.00 | 0.00 |
| Investment-Grade Short & Intermediate Funds | 35 | 5.71 | 2.86 | 2.86 | 0.00 |
| High Yield Funds | 49 | 12.24 | 10.20 | 4.08 | 0.00 |
| Global Income Funds | 26 | 7.69 | 0.00 | 0.00 | 0.00 |
| Fund Category | Fund Count at Start (December 2018) | Percentage Remaining in Top Half | | | |
| | | December 2019 | December 2020 | December 2021 | December 2022 |
| Top Half | | | | | |
| Investment-Grade Intermediate Funds | 71 | 29.58 | 21.13 | 14.08 | 4.23 |
| Investment-Grade Short & Intermediate Funds | 71 | 28.17 | 14.08 | 7.04 | 2.82 |
| High Yield Funds | 98 | 30.61 | 22.45 | 15.31 | 8.16 |
| Global Income Funds | 51 | 45.10 | 25.49 | 15.69 | 9.80 |

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Dec. 31, 2022. Table is provided for illustrative purposes. Past performance is no guarantee of future results.

Report 9: Three-Year Transition Matrix – Performance of Domestic Fixed Income Funds over Two Non-Overlapping Three-Year Periods (Based on Quartile)

| Quartile | Fund Count at Start (December 2016- December 2019) | Three-Year Percentages at End (December 2019-December 2022) | | | | | |
|--|--|---|------------------------|------------------------|------------------------|------------------------------|-------------------------|
| | | 1st Quartile (%) | 2nd Quartile (%) | 3rd Quartile (%) | 4th Quartile (%) | Merged/ Liquidated (%) | Style Changed (%) |
| Investment-Grade Intermediate Funds | | | | | | | |
| 1st Quartile | 34 | 26.47 | 20.59 | 20.59 | 23.53 | 5.88 | 2.94 |
| 2nd Quartile | 33 | 15.15 | 27.27 | 30.30 | 18.18 | 9.09 | 0.00 |
| 3rd Quartile | 33 | 12.12 | 21.21 | 24.24 | 30.30 | 9.09 | 3.03 |
| 4th Quartile | 34 | 32.35 | 14.71 | 14.71 | 14.71 | 20.59 | 2.94 |
| Investment-Grade Short & Intermediate Funds | | | | | | | |
| 1st Quartile | 33 | 27.27 | 18.18 | 18.18 | 33.33 | 3.03 | 0.00 |
| 2nd Quartile | 33 | 21.21 | 24.24 | 21.21 | 27.27 | 6.06 | 0.00 |
| 3rd Quartile | 33 | 24.24 | 24.24 | 18.18 | 12.12 | 18.18 | 3.03 |
| 4th Quartile | 34 | 11.76 | 20.59 | 32.35 | 17.65 | 14.71 | 2.94 |
| High Yield Funds | | | | | | | |
| 1st Quartile | 36 | 38.89 | 25.00 | 13.89 | 22.22 | 0.00 | 0.00 |
| 2nd Quartile | 36 | 11.11 | 16.67 | 38.89 | 33.33 | 0.00 | 0.00 |
| 3rd Quartile | 36 | 13.89 | 30.56 | 25.00 | 25.00 | 5.56 | 0.00 |
| 4th Quartile | 37 | 29.73 | 21.62 | 16.22 | 16.22 | 16.22 | 0.00 |
| Global Income Funds | | | | | | | |
| 1st Quartile | 22 | 18.18 | 18.18 | 31.82 | 27.27 | 4.55 | 0.00 |
| 2nd Quartile | 21 | 14.29 | 33.33 | 28.57 | 14.29 | 9.52 | 0.00 |
| 3rd Quartile | 21 | 38.10 | 28.57 | 4.76 | 14.29 | 14.29 | 0.00 |
| 4th Quartile | 22 | 18.18 | 9.09 | 22.73 | 31.82 | 18.18 | 0.00 |

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Dec. 31, 2022. Table is provided for illustrative purposes. Past performance is no guarantee of future results.

Report 10: Three-Year Transition Matrix – Performance of Domestic Fixed Income Funds over Two Non-Overlapping Three-Year Periods (Based on Halves)

| Half | Fund Count at Start (December 2016- December 2019) | Three-Year Percentages at End (December 2019-December 2022) | | | |
|--|--|---|-----------------|-----------------------|-------------------|
| | | Top Half (%) | Bottom Half (%) | Merged/Liquidated (%) | Style Changed (%) |
| Investment-Grade Intermediate Funds | | | | | |
| Top Half | 67 | 44.78 | 46.27 | 7.46 | 1.49 |
| Bottom Half | 67 | 40.30 | 41.79 | 14.93 | 2.99 |
| Investment-Grade Short & Intermediate Funds | | | | | |
| Top Half | 66 | 45.45 | 50.00 | 4.55 | 0.00 |
| Bottom Half | 67 | 40.30 | 40.30 | 16.42 | 2.99 |
| High Yield Funds | | | | | |
| Top Half | 72 | 45.83 | 54.17 | 0.00 | 0.00 |
| Bottom Half | 73 | 47.95 | 41.10 | 10.96 | 0.00 |
| Global Income Funds | | | | | |
| Top Half | 43 | 41.86 | 51.16 | 6.98 | 0.00 |
| Bottom Half | 43 | 46.51 | 37.21 | 16.28 | 0.00 |

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Dec. 31, 2022. Table is provided for illustrative purposes. Past performance is no guarantee of future results.

Report 11: Five-Year Transition Matrix – Performance of Domestic Fixed Income Funds over Two Non-Overlapping Five-Year Periods (Based on Quartile)

| Quartile | Fund Count at Start (December 2012- December 2017) | Five-Year Percentages at End (December 2017-December 2022) | | | | | |
|--|--|--|------------------------|------------------------|------------------------|------------------------------|-------------------------|
| | | 1st Quartile (%) | 2nd Quartile (%) | 3rd Quartile (%) | 4th Quartile (%) | Merged/ Liquidated (%) | Style Changed (%) |
| Investment-Grade Intermediate Funds | | | | | | | |
| 1st Quartile | 31 | 29.03 | 25.81 | 19.35 | 9.68 | 12.90 | 3.23 |
| 2nd Quartile | 30 | 13.33 | 23.33 | 20.00 | 20.00 | 20.00 | 3.33 |
| 3rd Quartile | 31 | 16.13 | 9.68 | 16.13 | 25.81 | 25.81 | 6.45 |
| 4th Quartile | 31 | 16.13 | 19.35 | 16.13 | 22.58 | 25.81 | 0.00 |
| Investment-Grade Short & Intermediate Funds | | | | | | | |
| 1st Quartile | 32 | 25.00 | 28.13 | 28.13 | 9.38 | 9.38 | 0.00 |
| 2nd Quartile | 31 | 16.13 | 9.68 | 19.35 | 25.81 | 25.81 | 3.23 |
| 3rd Quartile | 32 | 21.88 | 25.00 | 12.50 | 25.00 | 12.50 | 3.13 |
| 4th Quartile | 32 | 9.38 | 6.25 | 15.63 | 18.75 | 34.38 | 15.63 |
| High Yield Funds | | | | | | | |
| 1st Quartile | 41 | 29.27 | 17.07 | 12.20 | 14.63 | 7.32 | 19.51 |
| 2nd Quartile | 40 | 15.00 | 27.50 | 20.00 | 17.50 | 2.50 | 17.50 |
| 3rd Quartile | 41 | 12.20 | 14.63 | 26.83 | 21.95 | 12.20 | 12.20 |
| 4th Quartile | 41 | 12.20 | 14.63 | 19.51 | 7.32 | 19.51 | 26.83 |
| Global Income Funds | | | | | | | |
| 1st Quartile | 21 | 28.57 | 23.81 | 4.76 | 4.76 | 4.76 | 33.33 |
| 2nd Quartile | 20 | 30.00 | 20.00 | 20.00 | 10.00 | 10.00 | 10.00 |
| 3rd Quartile | 21 | 9.52 | 19.05 | 38.10 | 14.29 | 19.05 | 0.00 |
| 4th Quartile | 21 | 9.52 | 9.52 | 4.76 | 52.38 | 19.05 | 4.76 |

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Dec. 31, 2022. Table is provided for illustrative purposes. Past performance is no guarantee of future results.

Report 12: Five-Year Transition Matrix – Performance of Domestic Fixed Income Funds over Two Non-Overlapping Five-Year Periods (Based on Halves)

| Half | Fund Count at Start (December 2012- December 2017) | Five-Year Percentages at End (December 2017-December 2022) | | | |
|--|--|--|-----------------|-----------------------|-------------------|
| | | Top Half (%) | Bottom Half (%) | Merged/Liquidated (%) | Style Changed (%) |
| Investment-Grade Intermediate Funds | | | | | |
| Top Half | 61 | 45.90 | 34.43 | 16.39 | 3.28 |
| Bottom Half | 62 | 30.65 | 40.32 | 25.81 | 3.23 |
| Investment-Grade Short & Intermediate Funds | | | | | |
| Top Half | 63 | 39.68 | 41.27 | 17.46 | 1.59 |
| Bottom Half | 64 | 31.25 | 35.94 | 23.44 | 9.38 |
| High Yield Funds | | | | | |
| Top Half | 81 | 44.44 | 32.10 | 4.94 | 18.52 |
| Bottom Half | 82 | 26.83 | 37.80 | 15.85 | 19.51 |
| Global Income Funds | | | | | |
| Top Half | 41 | 51.22 | 19.51 | 7.32 | 21.95 |
| Bottom Half | 42 | 23.81 | 54.76 | 19.05 | 2.38 |

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Dec. 31, 2022. Table is provided for illustrative purposes. Past performance is no guarantee of future results.

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