

U.S. Persistence Scorecard

Contributor

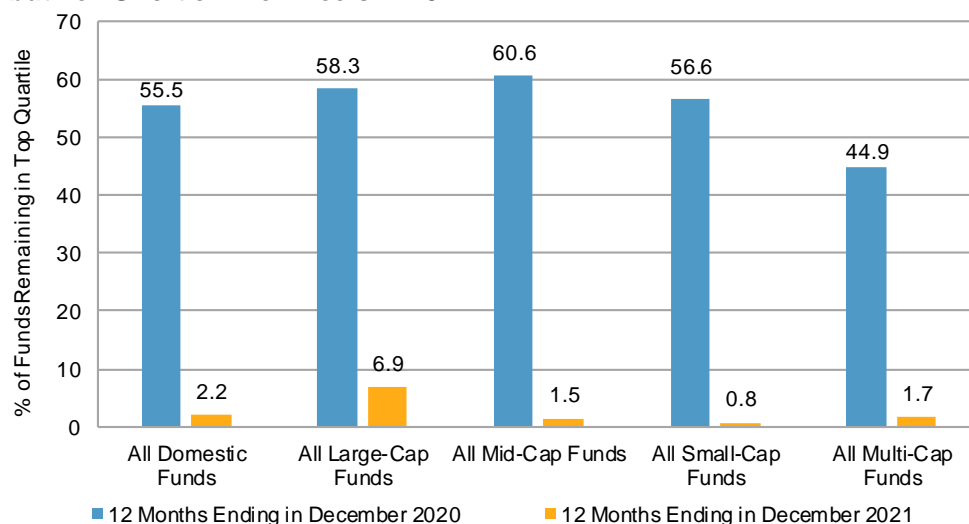
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SUMMARY

Should investment results be attributed to skill or to luck? Genuine skill is likely to persist, while luck is random and fleeting. Thus, one measure of skill is the consistency of a fund's performance relative to its peers or to its benchmark. The Persistence Scorecard shows that **regardless of asset class or style focus, active management outperformance is typically short-lived**, with few funds consistently outranking their peers or benchmarks.

Recent years illustrate this point quite well. Exhibit 1 shows that the top-quartile funds of 2019 often continued to lead the way in 2020. Had these funds developed a consistent winning strategy? Sadly, no. Even with the bull market extending into 2021, these funds quickly reverted to the mean, and **only 2.2% of the 2019 domestic equity winners remained in the top quartile by 2021** (see Report 1 a).

Exhibit 1: The Top-Quartile Funds of 2019 Extended Their Success into 2020, but Fell Short of Their Peers in 2021



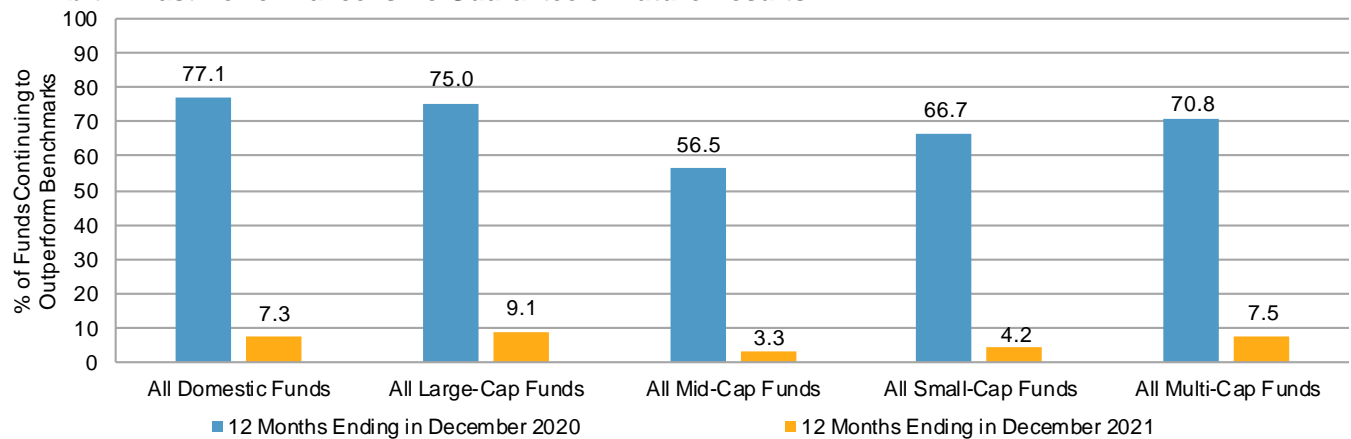
Source: S&P Dow Jones Indices LLC, CRSP. Data as of Dec. 31, 2021. Chart is provided for illustrative purposes. Past performance is no guarantee of future results.

If we extend the time horizon to five years, the picture looks still more bleak. Even selecting for the category with the highest observed persistence, just 3.5% of large-cap funds stayed in the top quartile each year. Mid-cap and small-cap funds displayed poorer persistence across all horizons, with no small-cap fund remaining in the top quartile for five years (see Report 2).

Some statistically minded readers might note that these numbers are occasionally better than what would be expected if fund performance were randomly distributed. For example, the odds that a top-quartile fund in one year could remain in the top quartile for the next four consecutive years might be calculated as $(25\%)^4 = 0.39\%$, and the 3.5% referenced previously is substantially better than that.¹ **While the persistence report does not prove that fund performance is completely random, from a practical or decision-making perspective, it reinforces the notion that choosing between active funds on the basis of previous outperformance is likely a misguided strategy.** After all, there remains a 96.5% chance that a top-quartile fund will not stay in the top quartile consistently for the next four years.

Another way of evaluating performance persistence is by comparing performance against fund benchmarks, rather than against peer groups. Any fund alpha quickly proved fleeting viewed under this lens as well. For example, out of 791 large-cap equity funds, 232 (29.33%) beat the [S&P 500®](#) in 2019. As might be expected from the previous statistics, there was significant follow-on for 2020, with 174 of those 232 (75.0%) continuing to put up positive alpha for the next year. Fast-forward to the end of 2021, and only 21 funds (9.1%) repeated their outperformance over the benchmark (see Report 1b).²

Exhibit 2: Past Performance Is No Guarantee of Future Results



Source: S&P Dow Jones Indices LLC, CRSP. Data as of Dec. 31, 2021. Chart is provided for illustrative purposes. Past performance is no guarantee of future results.

Unsurprisingly, **the one pattern that did hold across equity funds was the tendency of the poorest-performing funds to close.** Fourth-quartile funds were almost always the most likely to merge or liquidate over the subsequent three- and five-year windows, as 142 out of the 484 All Domestic Funds (29.3%) classed as bottom quartile from the December 2011–December 2016 period closed their doors within the next five years (see Report 5).

Fixed income funds showed results similar to equities, as strong one-year persistence soon reversed course. **In 11 of the 13 categories considered, not a single top-quartile fund from 2017 maintained that status annually through 2021.** Across all fixed income categories, a nearly identical 28.9% (63 out of 218 funds) of bottom-quartile funds from the December 2011–December 2016 period were consigned to the history books within five years (see Reports 8 and 11).

¹ Similarly, having none of the 131 small-cap funds repeating in the top quartile is quite reasonable: only $0.39\% * 131 = 0.52$ funds “should have” done so if performance was randomly distributed.

² Previous SPIVA® U.S. Scorecards showed that 42.9% and 20.4% of all domestic funds outperformed in [2020](#) and [2021](#), respectively. One might thus expect a $42.9\% * 20.4\% = 8.8\%$ chance of randomly picking a fund that would outperform for two consecutive years, slightly higher than the 7.3% realized—reinforcing the notion that fund alpha is likely fleeting.

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 predicts 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 our underlying data source.

S&P Dow Jones Indices is one of the world’s leading index providers, maintaining a wide variety of investable and benchmark indices to meet an array of investor needs. Our Global Research & Design team is dedicated to conducting unbiased, in-depth analysis on a broad range of topics and issues facing investors in today’s marketplace. This scorecard highlights performance persistence over three and five consecutive 12-month periods and two non-overlapping three- and five-year periods.

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 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 throughout the time period.
- **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 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 between quartiles and halves over non-overlapping three- and five-year periods. They also track the percentage of funds that have merged or liquidated. In addition, we monitor movements across capitalization levels. This helps us capture, for example, the conversion of some large-cap funds to mid- and small-cap funds.
 - Starting with the Persistence Scorecard Year-End 2019, the style change calculation includes funds that changed fund categories at any point between the relevant start and end dates. Previously, this calculation only checked if the fund category remained identical at the endpoints.
- **Tracking reports of top performers:** The tracking reports show the percentages of funds that remain in the top-quartile or top-half rankings over consecutive three- and five-year periods.

REPORTS

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

FUND CATEGORY	FUND COUNT AT START (DECEMBER 2019)	PERCENTAGE REMAINING IN TOP QUARTILE	
		DECEMBER 2020	DECEMBER 2021
TOP QUARTILE			
All Domestic Funds	506	55.53	2.17
All Large-Cap Funds	175	58.29	6.86
All Mid-Cap Funds	66	60.61	1.52
All Small-Cap Funds	122	56.56	0.82
All Multi-Cap Funds	118	44.92	1.69
FUND CATEGORY	FUND COUNT AT START (DECEMBER 2019)	PERCENTAGE REMAINING IN TOP HALF	
		DECEMBER 2020	DECEMBER 2021
TOP HALF			
All Domestic Funds	1,014	70.81	22.98
All Large-Cap Funds	349	77.08	28.94
All Mid-Cap Funds	135	73.33	4.44
All Small-Cap Funds	246	65.85	9.35
All Multi-Cap Funds	232	70.69	28.45

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Dec. 31, 2021. 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 2019)		PERCENTAGE OUTPERFORMING THE BENCHMARK (%)	
			COUNT	PERCENTAGE (%)	DECEMBER 2020	DECEMBER 2021
All Domestic Funds	S&P Composite 1500 [®]	2,152	647	30.07	77.13	7.26
All Large-Cap Funds	S&P 500	791	232	29.33	75.00	9.05
All Mid-Cap Funds	S&P MidCap 400 [®]	306	209	68.30	56.46	3.35
All Small-Cap Funds	S&P SmallCap 600 [®]	539	330	61.22	66.67	4.24
All Multi-Cap Funds	S&P Composite 1500	526	161	30.61	70.81	7.45

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Dec. 31, 2021. 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 2017)	PERCENTAGE REMAINING IN TOP QUARTILE			
		DECEMBER 2018	DECEMBER 2019	DECEMBER 2020	DECEMBER 2021
TOP QUARTILE					
All Domestic Funds	542	61.62	37.45	28.41	1.66
All Large-Cap Funds	199	66.33	42.21	37.19	3.52
All Mid-Cap Funds	67	50.75	29.85	22.39	1.49
All Small-Cap Funds	131	64.12	38.17	32.82	0.00
All Multi-Cap Funds	125	53.60	33.60	26.40	1.60
FUND CATEGORY	FUND COUNT AT START (DECEMBER 2017)	PERCENTAGE REMAINING IN TOP HALF			
		DECEMBER 2018	DECEMBER 2019	DECEMBER 2020	DECEMBER 2021
TOP HALF					
All Domestic Funds	1,080	72.69	54.72	49.17	14.81
All Large-Cap Funds	388	69.07	53.61	50.77	15.72
All Mid-Cap Funds	133	77.44	61.65	56.39	3.01
All Small-Cap Funds	262	70.99	51.91	45.80	3.44
All Multi-Cap Funds	245	66.94	48.16	44.90	13.88

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Dec. 31, 2021. Table is provided for illustrative purposes. Past performance is no guarantee of future results.

Report 3: Three-Year Transition Matrix – Performance over Two Non-Overlapping Three-Year Periods (Based on Quartile)							
QUARTILE	FUND COUNT AT START (DECEMBER 2018)	THREE-YEAR PERCENTAGES AT END					
		1ST QUARTILE (%)	2ND QUARTILE (%)	3RD QUARTILE (%)	4TH QUARTILE (%)	MERGED/ LIQUIDATED (%)	STYLE CHANGED (%)
ALL DOMESTIC FUNDS							
1st Quartile	500	40.60	20.60	9.80	4.40	5.60	19.00
2nd Quartile	500	14.00	24.00	15.00	14.40	11.20	21.40
3rd Quartile	500	9.00	11.20	19.40	20.80	15.20	24.40
4th Quartile	501	3.99	10.18	15.77	20.96	22.95	26.15
ALL LARGE-CAP FUNDS							
1st Quartile	185	44.86	18.38	8.11	3.78	6.49	18.38
2nd Quartile	185	19.46	28.11	16.22	12.97	5.41	17.84
3rd Quartile	185	6.49	13.51	17.84	21.62	13.51	27.03
4th Quartile	185	5.41	9.19	17.84	23.78	17.30	26.49
ALL MID-CAP FUNDS							
1st Quartile	70	32.86	31.43	7.14	1.43	7.14	20.00
2nd Quartile	69	26.09	13.04	10.14	10.14	11.59	28.99
3rd Quartile	70	4.29	5.71	18.57	21.43	21.43	28.57
4th Quartile	70	4.29	10.00	12.86	18.57	20.00	34.29
ALL SMALL-CAP FUNDS							
1st Quartile	124	38.71	20.97	12.90	8.06	6.45	12.90
2nd Quartile	123	15.45	21.14	20.33	13.82	14.63	14.63
3rd Quartile	123	9.76	16.26	21.14	24.39	15.45	13.01
4th Quartile	124	4.84	12.10	16.94	18.55	26.61	20.97
ALL MULTI-CAP FUNDS							
1st Quartile	124	34.68	17.74	11.29	1.61	9.68	25.00
2nd Quartile	124	6.45	20.16	16.94	14.52	12.10	29.84
3rd Quartile	124	9.68	8.06	17.74	25.00	17.74	21.77
4th Quartile	124	4.03	12.10	9.68	18.55	23.39	32.26

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Dec. 31, 2021. Table is provided for illustrative purposes. Past performance is no guarantee of future results.

Report 4: Three-Year Transition Matrix – Performance over Two Non-Overlapping Three-Year Periods (Based on Halves)						
HALF	FUND COUNT AT START (DECEMBER 2018)	THREE-YEAR PERCENTAGES AT END				
		TOP HALF (%)	BOTTOM HALF (%)	MERGED/LIQUIDATED (%)	STYLE CHANGED (%)	
ALL DOMESTIC FUNDS						
Top Half	1,000	49.60	21.80	8.40	20.20	
Bottom Half	1,001	17.18	38.46	19.08	25.27	
ALL LARGE-CAP FUNDS						
Top Half	370	55.41	20.54	5.95	18.11	
Bottom Half	370	17.30	40.54	15.41	26.76	
ALL MID-CAP FUNDS						
Top Half	139	51.80	14.39	9.35	24.46	
Bottom Half	140	12.14	35.71	20.71	31.43	
ALL SMALL-CAP FUNDS						
Top Half	247	48.18	27.53	10.53	13.77	
Bottom Half	247	21.46	40.49	21.05	17.00	
ALL MULTI-CAP FUNDS						
Top Half	248	39.52	22.18	10.89	27.42	
Bottom Half	248	16.94	35.48	20.56	27.02	

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Dec. 31, 2021. Table is provided for illustrative purposes. Past performance is no guarantee of future results.

Report 5: Five-Year Transition Matrix – Performance over Two Non-Overlapping Five-Year Periods (Based on Quartile)							
QUARTILE	FUND COUNT AT START (DECEMBER 2016)	FIVE-YEAR PERCENTAGES AT END					
		1ST QUARTILE (%)	2ND QUARTILE (%)	3RD QUARTILE (%)	4TH QUARTILE (%)	MERGED/ LIQUIDATED (%)	STYLE CHANGED (%)
ALL DOMESTIC FUNDS							
1st Quartile	483	13.46	12.84	10.97	16.98	10.77	34.99
2nd Quartile	483	13.46	17.60	11.80	13.04	15.94	28.16
3rd Quartile	483	13.87	12.42	10.77	10.56	23.40	28.99
4th Quartile	484	15.70	9.71	9.09	7.44	29.34	28.72
ALL LARGE-CAP FUNDS							
1st Quartile	181	27.07	19.34	6.08	4.97	8.29	34.25
2nd Quartile	180	18.89	17.78	10.00	11.67	15.56	26.11
3rd Quartile	180	15.56	11.67	13.33	16.67	18.89	23.89
4th Quartile	181	8.84	9.94	12.71	16.02	25.97	26.52
ALL MID-CAP FUNDS							
1st Quartile	67	1.49	13.43	17.91	14.93	10.45	41.79
2nd Quartile	67	10.45	14.93	13.43	16.42	16.42	28.36
3rd Quartile	67	25.37	7.46	4.48	5.97	29.85	26.87
4th Quartile	67	19.40	10.45	2.99	1.49	40.30	25.37
ALL SMALL-CAP FUNDS							
1st Quartile	114	0.88	16.67	24.56	22.81	12.28	22.81
2nd Quartile	114	11.40	16.67	21.93	15.79	14.91	19.30
3rd Quartile	114	21.05	14.91	8.77	11.40	23.68	20.18
4th Quartile	115	29.57	9.57	4.35	3.48	30.43	22.61
ALL MULTI-CAP FUNDS							
1st Quartile	124	7.26	9.68	9.68	12.10	14.52	46.77
2nd Quartile	123	8.94	12.20	14.63	8.13	17.89	38.21
3rd Quartile	123	8.13	8.94	7.32	5.69	26.02	43.90
4th Quartile	124	9.68	6.45	12.10	7.26	25.81	38.71

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Dec. 31, 2021. Table is provided for illustrative purposes. Past performance is no guarantee of future results.

Report 6: Five-Year Transition Matrix – Performance over Two Non-Overlapping Five-Year Periods (Based on Halves)					
HALF	FUND COUNT AT START (DECEMBER 2016)	FIVE-YEAR PERCENTAGES AT END			
		TOP HALF (%)	BOTTOM HALF (%)	MERGED/LIQUIDATED (%)	STYLE CHANGED (%)
ALL DOMESTIC FUNDS					
Top Half	966	28.67	26.40	13.35	31.57
Bottom Half	967	25.85	18.92	26.37	28.85
ALL LARGE-CAP FUNDS					
Top Half	361	41.55	16.34	11.91	30.19
Bottom Half	361	22.99	29.36	22.44	25.21
ALL MID-CAP FUNDS					
Top Half	134	20.15	31.34	13.43	35.07
Bottom Half	134	31.34	7.46	35.07	26.12
ALL SMALL-CAP FUNDS					
Top Half	228	22.81	42.54	13.60	21.05
Bottom Half	229	37.55	13.97	27.07	21.40
ALL MULTI-CAP FUNDS					
Top Half	247	19.03	22.27	16.19	42.51
Bottom Half	247	16.60	16.19	25.91	41.30

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Dec. 31, 2021. 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 2019)	PERCENTAGE REMAINING IN TOP QUARTILE	
		DECEMBER 2020	DECEMBER 2021
TOP QUARTILE			
Government Long Funds	9	66.67	0.00
Government Intermediate Funds	2	100.00	0.00
Government Short Funds	6	50.00	16.67
Investment-Grade Long Funds	20	55.00	10.00
Investment-Grade Intermediate Funds	48	41.67	12.50
Investment-Grade Short Funds	22	40.91	22.73
High Yield Funds	38	28.95	15.79
Mortgage-Backed Securities Funds	11	45.45	36.36
Global Income Funds	23	13.04	4.35
Emerging Markets Debt Funds	13	15.38	0.00
General Municipal Debt Funds	17	47.06	23.53
California Municipal Debt Funds	9	55.56	22.22
New York Municipal Debt Funds	7	28.57	14.29
FUND CATEGORY	FUND COUNT AT START (DECEMBER 2019)	PERCENTAGE REMAINING IN TOP HALF	
		DECEMBER 2020	DECEMBER 2021
TOP HALF			
Government Long Funds	17	70.59	11.76
Government Intermediate Funds	4	100.00	50.00
Government Short Funds	11	63.64	27.27
Investment-Grade Long Funds	40	75.00	30.00
Investment-Grade Intermediate Funds	93	78.49	36.56
Investment-Grade Short Funds	44	59.09	25.00
High Yield Funds	75	56.00	32.00
Mortgage-Backed Securities Funds	22	50.00	45.45
Global Income Funds	46	50.00	19.57
Emerging Markets Debt Funds	26	50.00	30.77
General Municipal Debt Funds	35	65.71	45.71
California Municipal Debt Funds	17	70.59	29.41
New York Municipal Debt Funds	13	53.85	38.46

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Dec. 31, 2021. 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 2017)	PERCENTAGE REMAINING IN TOP QUARTILE				
		DECEMBER 2018	DECEMBER 2019	DECEMBER 2020	DECEMBER 2021	
TOP QUARTILE						
Government Long Funds	12	16.67	16.67	0.00	0.00	
Government Intermediate Funds	4	0.00	0.00	0.00	0.00	
Government Short Funds	6	66.67	0.00	0.00	0.00	
Investment-Grade Long Funds	21	0.00	0.00	0.00	0.00	
Investment-Grade Intermediate Funds	50	8.00	4.00	0.00	0.00	
Investment-Grade Short Funds	22	22.73	0.00	0.00	0.00	
High Yield Funds	51	13.73	7.84	7.84	3.92	
Mortgage-Backed Securities Funds	13	53.85	23.08	0.00	0.00	
Global Income Funds	25	0.00	0.00	0.00	0.00	
Emerging Markets Debt Funds	14	14.29	0.00	0.00	0.00	
General Municipal Debt Funds	19	31.58	15.79	15.79	15.79	
California Municipal Debt Funds	8	12.50	12.50	0.00	0.00	
New York Municipal Debt Funds	6	16.67	0.00	0.00	0.00	
FUND CATEGORY	FUND COUNT AT START (DECEMBER 2017)	PERCENTAGE REMAINING IN TOP HALF				
		DECEMBER 2018	DECEMBER 2019	DECEMBER 2020	DECEMBER 2021	
TOP HALF						
Government Long Funds	24	37.50	33.33	25.00	4.17	
Government Intermediate Funds	8	37.50	25.00	25.00	25.00	
Government Short Funds	12	75.00	33.33	25.00	8.33	
Investment-Grade Long Funds	41	9.76	2.44	0.00	0.00	
Investment-Grade Intermediate Funds	100	26.00	16.00	11.00	5.00	
Investment-Grade Short Funds	44	50.00	18.18	6.82	4.55	
High Yield Funds	102	41.18	27.45	19.61	14.71	
Mortgage-Backed Securities Funds	26	61.54	38.46	23.08	23.08	
Global Income Funds	50	20.00	12.00	8.00	4.00	
Emerging Markets Debt Funds	28	39.29	21.43	17.86	10.71	
General Municipal Debt Funds	37	56.76	37.84	27.03	21.62	
California Municipal Debt Funds	16	50.00	43.75	25.00	12.50	
New York Municipal Debt Funds	12	33.33	16.67	8.33	0.00	

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Dec. 31, 2021. Table is provided for illustrative purposes. Past performance is no guarantee of future results.

Report 9: Three-Year Transition Matrix – Performance over Two Non-Overlapping Three-Year Periods (Based on Quartile)							
QUARTILE	FUND COUNT AT START (DECEMBER 2018)	THREE-YEAR PERCENTAGES AT END					
		1ST QUARTILE (%)	2ND QUARTILE (%)	3RD QUARTILE (%)	4TH QUARTILE (%)	MERGED/ LIQUIDATED (%)	STYLE CHANGED (%)
GOVERNMENT LONG FUNDS							
1st Quartile	12	41.67	8.33	8.33	8.33	8.33	25.00
2nd Quartile	11	9.09	27.27	0.00	18.18	9.09	36.36
3rd Quartile	12	0.00	16.67	41.67	16.67	8.33	16.67
4th Quartile	12	8.33	8.33	16.67	33.33	8.33	25.00
GOVERNMENT INTERMEDIATE FUNDS							
1st Quartile	4	75.00	0.00	25.00	0.00	0.00	0.00
2nd Quartile	4	25.00	25.00	0.00	25.00	25.00	0.00
3rd Quartile	4	0.00	25.00	25.00	50.00	0.00	0.00
4th Quartile	4	0.00	25.00	50.00	25.00	0.00	0.00
GOVERNMENT SHORT FUNDS							
1st Quartile	6	16.67	16.67	16.67	16.67	16.67	16.67
2nd Quartile	6	16.67	33.33	33.33	16.67	0.00	0.00
3rd Quartile	6	0.00	16.67	33.33	0.00	33.33	16.67
4th Quartile	6	16.67	0.00	0.00	50.00	33.33	0.00
INVESTMENT-GRADE LONG FUNDS							
1st Quartile	19	26.32	36.84	21.05	0.00	15.79	0.00
2nd Quartile	19	42.11	21.05	15.79	10.53	5.26	5.26
3rd Quartile	19	21.05	21.05	26.32	15.79	5.26	10.53
4th Quartile	19	0.00	10.53	15.79	42.11	15.79	15.79
INVESTMENT-GRADE INTERMEDIATE FUNDS							
1st Quartile	46	28.26	26.09	23.91	8.70	10.87	2.17
2nd Quartile	46	41.30	28.26	8.70	10.87	4.35	6.52
3rd Quartile	46	6.52	21.74	34.78	21.74	8.70	6.52
4th Quartile	46	6.52	10.87	19.57	43.48	17.39	2.17
INVESTMENT-GRADE SHORT FUNDS							
1st Quartile	23	39.13	17.39	13.04	17.39	8.70	4.35
2nd Quartile	23	26.09	26.09	34.78	4.35	4.35	4.35
3rd Quartile	23	17.39	26.09	17.39	21.74	17.39	0.00
4th Quartile	23	8.70	17.39	17.39	26.09	13.04	17.39
HIGH YIELD FUNDS							
1st Quartile	48	33.33	20.83	18.75	6.25	4.17	16.67
2nd Quartile	47	12.77	25.53	14.89	12.77	4.26	29.79
3rd Quartile	47	21.28	23.40	27.66	6.38	8.51	12.77
4th Quartile	48	12.50	2.08	8.33	25.00	18.75	33.33

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Dec. 31, 2021. Table is provided for illustrative purposes. Past performance is no guarantee of future results.

Report 9: Three-Year Transition Matrix – Performance over Two Non-Overlapping Three-Year Periods (Based on Quartile) (cont.)							
QUARTILE	FUND COUNT AT START (DECEMBER 2018)	THREE-YEAR PERCENTAGES AT END					
		1ST QUARTILE (%)	2ND QUARTILE (%)	3RDTH QUARTILE (%)	4TH QUARTILE (%)	MERGED/ LIQUIDATED (%)	STYLE CHANGED (%)
MORTGAGE-BACKED SECURITIES FUNDS							
1st Quartile	12	33.33	33.33	8.33	16.67	8.33	0.00
2nd Quartile	11	36.36	27.27	27.27	0.00	0.00	9.09
3rd Quartile	12	16.67	25.00	33.33	16.67	8.33	0.00
4th Quartile	12	0.00	8.33	25.00	58.33	8.33	0.00
GLOBAL INCOME FUNDS							
1st Quartile	23	13.04	30.43	17.39	4.35	8.70	26.09
2nd Quartile	23	26.09	26.09	17.39	13.04	13.04	4.35
3rd Quartile	23	8.70	17.39	21.74	34.78	13.04	4.35
4th Quartile	23	13.04	13.04	26.09	30.43	13.04	4.35
EMERGING MARKETS DEBT FUNDS							
1st Quartile	12	16.67	33.33	8.33	41.67	0.00	0.00
2nd Quartile	11	36.36	9.09	45.45	9.09	0.00	0.00
3rd Quartile	12	25.00	25.00	16.67	16.67	8.33	8.33
4th Quartile	12	8.33	16.67	16.67	16.67	41.67	0.00
GENERAL MUNICIPAL DEBT FUNDS							
1st Quartile	18	50.00	33.33	5.56	5.56	5.56	0.00
2nd Quartile	17	17.65	35.29	23.53	23.53	0.00	0.00
3rd Quartile	17	23.53	5.88	52.94	11.76	0.00	5.88
4th Quartile	18	0.00	16.67	5.56	44.44	27.78	5.56
CALIFORNIA MUNICIPAL DEBT FUNDS							
1st Quartile	8	62.50	37.50	0.00	0.00	0.00	0.00
2nd Quartile	8	25.00	37.50	37.50	0.00	0.00	0.00
3rd Quartile	8	0.00	12.50	37.50	25.00	25.00	0.00
4th Quartile	8	0.00	0.00	12.50	62.50	12.50	12.50
NEW YORK MUNICIPAL DEBT FUNDS							
1st Quartile	6	50.00	33.33	0.00	16.67	0.00	0.00
2nd Quartile	6	33.33	16.67	50.00	0.00	0.00	0.00
3rd Quartile	6	16.67	33.33	16.67	16.67	16.67	0.00
4th Quartile	6	0.00	0.00	16.67	66.67	16.67	0.00

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Dec. 31, 2021. Table is provided for illustrative purposes. Past performance is no guarantee of future results.

Report 10: Three-Year Transition Matrix – Performance over Two Non-Overlapping Three-Year Periods (Based on Halves)					
HALF	FUND COUNT AT START (DECEMBER 2018)	THREE-YEAR PERCENTAGES AT END			
		TOP HALF (%)	BOTTOM HALF (%)	MERGED/LIQUIDATED (%)	STYLE CHANGED (%)
GOVERNMENT LONG FUNDS					
Top Half	23	43.48	17.39	8.70	30.43
Bottom Half	24	16.67	54.17	8.33	20.83
GOVERNMENT INTERMEDIATE FUNDS					
Top Half	8	62.50	25.00	12.50	0.00
Bottom Half	8	25.00	75.00	0.00	0.00
GOVERNMENT SHORT FUNDS					
Top Half	12	41.67	41.67	8.33	8.33
Bottom Half	12	16.67	41.67	33.33	8.33
INVESTMENT-GRADE LONG FUNDS					
Top Half	38	63.16	23.68	10.53	2.63
Bottom Half	38	26.32	50.00	10.53	13.16
INVESTMENT-GRADE INTERMEDIATE FUNDS					
Top Half	92	61.96	26.09	7.61	4.35
Bottom Half	92	22.83	59.78	13.04	4.35
INVESTMENT-GRADE SHORT FUNDS					
Top Half	46	54.35	34.78	6.52	4.35
Bottom Half	46	34.78	41.30	15.22	8.70
HIGH YIELD FUNDS					
Top Half	95	46.32	26.32	4.21	23.16
Bottom Half	95	29.47	33.68	13.68	23.16
MORTGAGE-BACKED SECURITIES FUNDS					
Top Half	23	65.22	26.09	4.35	4.35
Bottom Half	24	25.00	66.67	8.33	0.00
GLOBAL INCOME FUNDS					
Top Half	46	47.83	26.09	10.87	15.22
Bottom Half	46	26.09	56.52	13.04	4.35
EMERGING MARKETS DEBT FUNDS					
Top Half	23	47.83	52.17	0.00	0.00
Bottom Half	24	37.50	33.33	25.00	4.17
GENERAL MUNICIPAL DEBT FUNDS					
Top Half	35	68.57	28.57	2.86	0.00
Bottom Half	35	22.86	57.14	14.29	5.71
CALIFORNIA MUNICIPAL DEBT FUNDS					
Top Half	16	81.25	18.75	0.00	0.00
Bottom Half	16	6.25	68.75	18.75	6.25
NEW YORK MUNICIPAL DEBT FUNDS					
Top Half	12	66.67	33.33	0.00	0.00
Bottom Half	12	25.00	58.33	16.67	0.00

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Dec. 31, 2021. Table is provided for illustrative purposes. Past performance is no guarantee of future results.

Report 11: Five-Year Transition Matrix – Performance over Two Non-Overlapping Five-Year Periods (Based on Quartile)								
QUARTILE	FUND COUNT AT START (DECEMBER 2016)	FIVE-YEAR PERCENTAGES AT END						
		1ST QUARTILE (%)	2ND QUARTILE (%)	3RD QUARTILE (%)	4TH QUARTILE (%)	MERGED/ LIQUIDATED (%)	STYLE CHANGED (%)	
GOVERNMENT LONG FUNDS								
1st Quartile	13	46.15	7.69	7.69	0.00	15.38	23.08	
2nd Quartile	13	0.00	38.46	23.08	7.69	7.69	23.08	
3rd Quartile	13	15.38	7.69	7.69	23.08	15.38	30.77	
4th Quartile	13	0.00	0.00	7.69	46.15	38.46	7.69	
GOVERNMENT INTERMEDIATE FUNDS								
1st Quartile	5	40.00	20.00	0.00	0.00	20.00	20.00	
2nd Quartile	4	50.00	25.00	0.00	25.00	0.00	0.00	
3rd Quartile	5	0.00	40.00	40.00	20.00	0.00	0.00	
4th Quartile	5	0.00	0.00	40.00	20.00	40.00	0.00	
GOVERNMENT SHORT FUNDS								
1st Quartile	6	16.67	0.00	33.33	0.00	50.00	0.00	
2nd Quartile	5	60.00	20.00	20.00	0.00	0.00	0.00	
3rd Quartile	6	0.00	33.33	0.00	33.33	0.00	33.33	
4th Quartile	6	0.00	16.67	0.00	50.00	33.33	0.00	
INVESTMENT-GRADE LONG FUNDS								
1st Quartile	19	57.89	21.05	5.26	0.00	10.53	5.26	
2nd Quartile	19	21.05	42.11	26.32	0.00	10.53	0.00	
3rd Quartile	19	5.26	10.53	15.79	31.58	10.53	26.32	
4th Quartile	20	0.00	10.00	20.00	30.00	35.00	5.00	
INVESTMENT-GRADE INTERMEDIATE FUNDS								
1st Quartile	42	38.10	38.10	9.52	4.76	7.14	2.38	
2nd Quartile	42	28.57	19.05	26.19	4.76	16.67	4.76	
3rd Quartile	42	7.14	19.05	28.57	23.81	16.67	4.76	
4th Quartile	43	4.65	2.33	13.95	41.86	32.56	4.65	
INVESTMENT-GRADE SHORT FUNDS								
1st Quartile	18	38.89	27.78	22.22	0.00	11.11	0.00	
2nd Quartile	18	22.22	22.22	22.22	5.56	27.78	0.00	
3rd Quartile	18	16.67	27.78	33.33	16.67	5.56	0.00	
4th Quartile	19	5.26	5.26	5.26	36.84	21.05	26.32	
HIGH YIELD FUNDS								
1st Quartile	40	27.50	20.00	15.00	7.50	7.50	22.50	
2nd Quartile	39	10.26	30.77	28.21	12.82	7.69	10.26	
3rd Quartile	40	25.00	12.50	17.50	12.50	15.00	17.50	
4th Quartile	40	15.00	7.50	10.00	27.50	17.50	22.50	

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Dec. 31, 2021. Table is provided for illustrative purposes. Past performance is no guarantee of future results.

Report 11: Five-Year Transition Matrix – Performance over Two Non-Overlapping Five-Year Periods (Based on Quartile) (cont.)							
QUARTILE	FUND COUNT AT START (DECEMBER 2016)	FIVE-YEAR PERCENTAGES AT END					
		1ST QUARTILE (%)	2ND QUARTILE (%)	3RD QUARTILE (%)	4TH QUARTILE (%)	MERGED/ LIQUIDATED (%)	STYLE CHANGED (%)
MORTGAGE-BACKED SECURITIES FUNDS							
1st Quartile	12	66.67	16.67	8.33	0.00	8.33	0.00
2nd Quartile	11	9.09	36.36	27.27	0.00	27.27	0.00
3rd Quartile	12	0.00	8.33	25.00	41.67	8.33	16.67
4th Quartile	12	0.00	16.67	16.67	33.33	33.33	0.00
GLOBAL INCOME FUNDS							
1st Quartile	19	10.53	15.79	26.32	10.53	5.26	31.58
2nd Quartile	19	26.32	5.26	10.53	47.37	10.53	0.00
3rd Quartile	19	15.79	36.84	15.79	5.26	21.05	5.26
4th Quartile	20	10.00	15.00	30.00	10.00	25.00	10.00
EMERGING MARKETS DEBT FUNDS							
1st Quartile	7	14.29	0.00	28.57	28.57	28.57	0.00
2nd Quartile	6	33.33	16.67	16.67	16.67	16.67	0.00
3rd Quartile	7	28.57	14.29	28.57	14.29	14.29	0.00
4th Quartile	7	0.00	42.86	0.00	28.57	28.57	0.00
GENERAL MUNICIPAL DEBT FUNDS							
1st Quartile	17	47.06	35.29	17.65	0.00	0.00	0.00
2nd Quartile	16	25.00	25.00	31.25	12.50	6.25	0.00
3rd Quartile	16	0.00	12.50	37.50	18.75	18.75	12.50
4th Quartile	17	5.88	0.00	0.00	47.06	41.18	5.88
CALIFORNIA MUNICIPAL DEBT FUNDS							
1st Quartile	8	62.50	37.50	0.00	0.00	0.00	0.00
2nd Quartile	8	12.50	25.00	0.00	37.50	12.50	12.50
3rd Quartile	8	12.50	25.00	62.50	0.00	0.00	0.00
4th Quartile	9	0.00	0.00	11.11	44.44	33.33	11.11
NEW YORK MUNICIPAL DEBT FUNDS							
1st Quartile	7	71.43	0.00	14.29	0.00	0.00	14.29
2nd Quartile	6	16.67	33.33	33.33	0.00	16.67	0.00
3rd Quartile	6	0.00	33.33	33.33	16.67	16.67	0.00
4th Quartile	7	0.00	0.00	14.29	71.43	14.29	0.00

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Dec. 31, 2021. Table is provided for illustrative purposes. Past performance is no guarantee of future results.

Report 12: Five-Year Transition Matrix – Performance over Two Non-Overlapping Five-Year Periods (Based on Halves)					
HALF	FUND COUNT AT START (DECEMBER 2016)	FIVE-YEAR PERCENTAGES AT END			
		TOP HALF (%)	BOTTOM HALF (%)	MERGED/LIQUIDATED (%)	STYLE CHANGED (%)
GOVERNMENT LONG FUNDS					
Top Half	26	46.15	19.23	11.54	23.08
Bottom Half	26	11.54	42.31	26.92	19.23
GOVERNMENT INTERMEDIATE FUNDS					
Top Half	9	66.67	11.11	11.11	11.11
Bottom Half	10	20.00	60.00	20.00	0.00
GOVERNMENT SHORT FUNDS					
Top Half	11	45.45	27.27	27.27	0.00
Bottom Half	12	25.00	41.67	16.67	16.67
INVESTMENT-GRADE LONG FUNDS					
Top Half	38	71.05	15.79	10.53	2.63
Bottom Half	39	12.82	48.72	23.08	15.38
INVESTMENT-GRADE INTERMEDIATE FUNDS					
Top Half	84	61.90	22.62	11.90	3.57
Bottom Half	85	16.47	54.12	24.71	4.71
INVESTMENT-GRADE SHORT FUNDS					
Top Half	36	55.56	25.00	19.44	0.00
Bottom Half	37	27.03	45.95	13.51	13.51
HIGH YIELD FUNDS					
Top Half	79	44.30	31.65	7.59	16.46
Bottom Half	80	30.00	33.75	16.25	20.00
MORTGAGE-BACKED SECURITIES FUNDS					
Top Half	23	65.22	17.39	17.39	0.00
Bottom Half	24	12.50	58.33	20.83	8.33
GLOBAL INCOME FUNDS					
Top Half	38	28.95	47.37	7.89	15.79
Bottom Half	39	38.46	30.77	23.08	7.69
EMERGING MARKETS DEBT FUNDS					
Top Half	13	30.77	46.15	23.08	0.00
Bottom Half	14	42.86	35.71	21.43	0.00
GENERAL MUNICIPAL DEBT FUNDS					
Top Half	33	66.67	30.30	3.03	0.00
Bottom Half	33	9.09	51.52	30.30	9.09
CALIFORNIA MUNICIPAL DEBT FUNDS					
Top Half	16	68.75	18.75	6.25	6.25
Bottom Half	17	17.65	58.82	17.65	5.88
NEW YORK MUNICIPAL DEBT FUNDS					
Top Half	13	61.54	23.08	7.69	7.69
Bottom Half	13	15.38	69.23	15.38	0.00

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Dec. 31, 2021. Table is provided for illustrative purposes. Past performance is no guarantee of future results.

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