

Persistence Scorecard: Does Past Performance Matter?

SUMMARY

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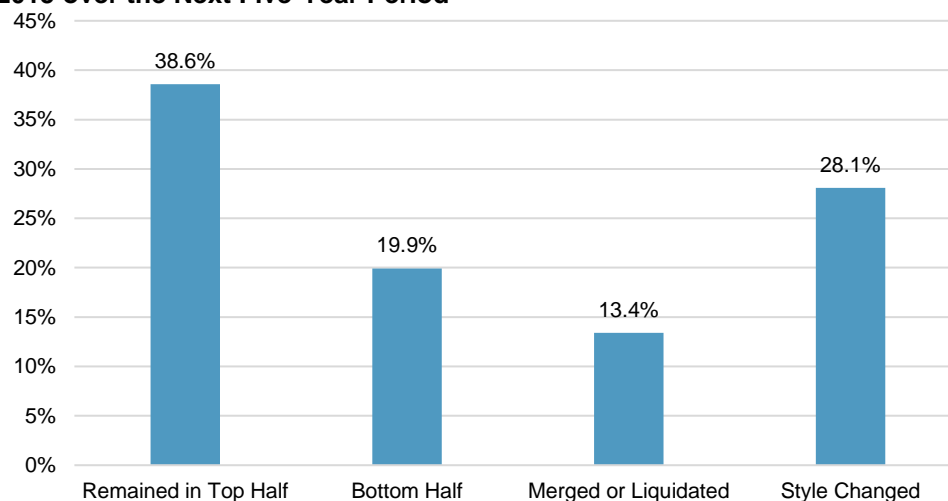
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Do investment results come from skill or luck? Genuine skill is likely to persist, while luck is random and fleeting. Thus, one measure of active management skill is the consistency of a fund's performance relative to its peers.

The Persistence Scorecard attempts to distinguish luck from skill by measuring the consistency of active managers' success. This report shows that, **regardless of asset class or style focus, active management outperformance is typically short-lived**, with few fund managers consistently outperforming their cohorts.

For example, of the domestic equity funds that finished in the top half in terms of cumulative returns for the period from June 2010 to June 2015, 38.6% replicated that accomplishment during the period from June 2015 to June 2020. In fact, **it was more likely for a top-half fund to close its doors or change its style (41.5% combined) than repeat its performance in the top half** (see Report 6).

Exhibit 1: Outcomes of the Top-Half Domestic Funds from June 2010 to June 2015 over the Next Five-Year Period



Source: S&P Dow Jones Indices LLC, CRSP. Data as of June 30, 2020. Chart is provided for illustrative purposes. Past performance is no guarantee of future results.

At first glance, there were some signs of performance persistence when narrowing the measurement intervals to consider annual consistency. Of the top-quartile domestic equity funds in June 2018, 35.5% managed to stay in the top quartile annually through June 2020 (see Report 1).

However, this persistence was inconsistent and decayed over time. Rewinding the clock two years, just 1.6% of domestic equity funds in the top quartile as of June 2016 maintained that status annually through June 2020. Widening the filter to funds in the top half, 15.8% of domestic equity funds maintained that status in each of the next four years (see Report 2).

Some statistically minded readers might note that these numbers are better than what would be expected if fund performance was randomly distributed. For example, the odds that a fund could remain in the top quartile for four consecutive years might be calculated as $(25\%)^4 = 0.39\%$, and the 1.6% referenced above is substantially better than that. While the persistence report may 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 a misguided strategy. After all, there remains a 98.4% chance that a top-quartile fund will not stay in the top quartile for the next four years.

There were few patterns to be found among equity funds, as the non-repeatable distribution of fund performance over various time frames covered large-, mid-, small-, and multi-cap focused funds. One salient illustration of the lack of persistence was that **none of the 71 top-quartile mid-cap funds from June 2016 remained in the top quartile annually through June 2020** (see Report 2).

Unsurprisingly, **one pattern that did hold across equity funds was the tendency of the poorest-performing funds to close**. Of the funds whose performance landed in the fourth quartile, roughly one-quarter closed over the subsequent three-year window and one-third did so over five years. Funds that avoided this fate often only managed to do so by changing styles. For instance, within fourth-quartile multi-cap funds from June 2010 to June 2015, a combined 69.3% (30.7% closed, 38.6% changed style) likely sparked unpleasant conversations within asset allocators' investment committees through June 2020 (see Reports 3 and 5).

Fixed income funds similarly showed little evidence for consistent annual outperformance over longer periods. **In 8 of the 13 categories considered, no top-quartile fund from June 2016 maintained that status annually through June 2020**. In six categories, no top quartile fund from June 2018 could repeat that performance for even the next two years (see Report 8).

Transition matrices showed slightly more fixed income fund persistence. Over the three-year horizon from 2017 to 2020, the most likely or joint most likely outcome for top quartile funds in 11 of the 13 categories was to remain in the top quartile. In 5 of the 13 categories, this outcome occurred for 50% or more of top quartile funds. Similar results existed over the five-year window. However, in many fixed income fund categories, fewer than 20 funds qualified within each quartile, perhaps leading to small sample size effects (see Report 9).

One notable lack of fixed income persistence came from Global Income Funds, where just 1.9% of funds maintained top half status annually from June 2016 to June 2020. Similarly, just 20.8% retained their top quartile status in the three-year transition matrix and 17.6% in the five-year analysis, the second lowest of any category for both periods (see Reports 8, 9, and 11).

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. The 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.

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.

REPORTS

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

FUND CATEGORY	FUND COUNT AT START (JUNE 2018)	PERCENTAGE REMAINING IN TOP QUARTILE	
		JUNE 2019	JUNE 2020
TOP QUARTILE			
All Domestic Funds	529	40.45	35.54
All Large-Cap Funds	185	36.22	31.89
All Mid-Cap Funds	66	42.42	33.33
All Small-Cap Funds	130	65.38	54.62
All Multi-Cap Funds	117	43.59	32.48
FUND CATEGORY	FUND COUNT AT START (JUNE 2018)	PERCENTAGE REMAINING IN TOP HALF	
		JUNE 2019	JUNE 2020
TOP HALF			
All Domestic Funds	1,059	57.13	52.22
All Large-Cap Funds	372	58.06	52.69
All Mid-Cap Funds	132	68.94	61.36
All Small-Cap Funds	260	68.08	57.69
All Multi-Cap Funds	225	63.56	53.33

Source: S&P Dow Jones Indices LLC, CRSP. Data as of June 30, 2020. 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 (JUNE 2016)	PERCENTAGE REMAINING IN TOP QUARTILE			
		JUNE 2017	JUNE 2018	JUNE 2019	JUNE 2020
TOP QUARTILE					
All Domestic Funds	556	10.07	4.50	2.16	1.62
All Large-Cap Funds	207	6.28	1.93	0.97	0.97
All Mid-Cap Funds	71	8.45	2.82	1.41	0.00
All Small-Cap Funds	128	15.63	7.03	5.47	4.69
All Multi-Cap Funds	124	15.32	4.03	2.42	0.81
FUND CATEGORY	FUND COUNT AT START (JUNE 2016)	PERCENTAGE REMAINING IN TOP HALF			
		JUNE 2017	JUNE 2018	JUNE 2019	JUNE 2020
TOP HALF					
All Domestic Funds	1,111	34.56	23.13	16.74	15.75
All Large-Cap Funds	409	32.52	22.74	12.71	11.25
All Mid-Cap Funds	142	38.03	19.01	17.61	16.20
All Small-Cap Funds	255	41.18	18.04	12.94	9.02
All Multi-Cap Funds	246	39.02	30.89	21.14	18.70

Source: S&P Dow Jones Indices LLC, CRSP. Data as of June 30, 2020. 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 (JUNE 2017)	THREE-YEAR PERCENTAGES AT END (JUNE 2020)					
		1ST QUARTILE (%)	2ND QUARTILE (%)	3TH QUARTILE (%)	4TH QUARTILE (%)	MERGED/LIQUIDATED (%)	STYLE CHANGED (%)
ALL DOMESTIC FUNDS							
1st Quartile	510	40.59	22.35	8.63	5.10	5.88	17.45
2nd Quartile	509	10.02	24.17	18.27	15.32	11.20	21.02
3rd Quartile	509	11.79	10.81	17.88	22.79	13.56	23.18
4th Quartile	510	6.47	8.24	18.24	18.24	23.73	25.10
ALL LARGE-CAP FUNDS							
1st Quartile	193	58.55	18.13	6.22	1.55	3.11	12.44
2nd Quartile	193	12.44	29.53	17.62	9.84	11.40	19.17
3rd Quartile	193	4.66	11.40	20.21	25.39	12.95	25.39
4th Quartile	193	2.07	8.81	18.65	28.50	23.32	18.65
ALL MID-CAP FUNDS							
1st Quartile	68	26.47	32.35	14.71	8.82	2.94	14.71
2nd Quartile	68	22.06	13.24	19.12	14.71	10.29	20.59
3rd Quartile	68	17.65	2.94	17.65	13.24	17.65	30.88
4th Quartile	69	5.80	14.49	14.49	13.04	26.09	26.09
ALL SMALL-CAP FUNDS							
1st Quartile	124	25.81	29.84	19.35	5.65	6.45	12.90
2nd Quartile	124	19.35	13.71	20.97	26.61	9.68	9.68
3rd Quartile	124	16.94	12.90	20.97	16.94	16.94	15.32
4th Quartile	125	13.60	8.80	11.20	20.00	24.80	21.60
ALL MULTI-CAP FUNDS							
1st Quartile	124	28.23	12.10	11.29	7.26	10.48	30.65
2nd Quartile	124	11.29	25.00	12.10	12.90	11.29	27.42
3rd Quartile	124	8.06	12.10	14.52	15.32	12.10	37.90
4th Quartile	125	5.60	7.20	23.20	11.20	20.80	32.00

Source: S&P Dow Jones Indices LLC, CRSP. Data as of June 30, 2020. 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 (JUNE 2017)	THREE-YEAR PERCENTAGES AT END (JUNE 2020)			
		TOP HALF (%)	BOTTOM HALF (%)	MERGED/LIQUIDATED (%)	STYLE CHANGED (%)
ALL DOMESTIC FUNDS					
Top Half	1,019	48.58	23.65	8.54	19.23
Bottom Half	1,019	18.65	38.57	18.65	24.14
ALL LARGE-CAP FUNDS					
Top Half	386	59.33	17.62	7.25	15.80
Bottom Half	386	13.47	46.37	18.13	22.02
ALL MID-CAP FUNDS					
Top Half	136	47.06	28.68	6.62	17.65
Bottom Half	137	20.44	29.20	21.90	28.47
ALL SMALL-CAP FUNDS					
Top Half	248	44.35	36.29	8.06	11.29
Bottom Half	249	26.10	34.54	20.88	18.47
ALL MULTI-CAP FUNDS					
Top Half	248	38.31	21.77	10.89	29.03
Bottom Half	249	16.47	32.13	16.47	34.94

Source: S&P Dow Jones Indices LLC, CRSP. Data as of June 30, 2020. 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 (JUNE 2015)	FIVE-YEAR PERCENTAGES AT END (JUNE 2020)					
		1ST QUARTILE (%)	2ND QUARTILE (%)	3TH QUARTILE (%)	4TH QUARTILE (%)	MERGED/LIQUIDATED (%)	STYLE CHANGED (%)
ALL DOMESTIC FUNDS							
1st Quartile	485	30.10	15.26	9.90	10.10	10.31	24.33
2nd Quartile	484	15.70	16.12	9.30	10.54	16.53	31.82
3rd Quartile	484	8.68	15.08	12.81	12.81	23.55	27.07
4th Quartile	485	4.74	8.66	16.70	11.13	29.48	29.28
ALL LARGE-CAP FUNDS							
1st Quartile	184	42.93	13.59	5.98	1.63	13.59	22.28
2nd Quartile	184	17.39	23.37	8.15	10.33	15.22	25.54
3rd Quartile	184	9.24	14.67	14.13	15.76	26.09	20.11
4th Quartile	184	1.63	9.78	19.02	20.11	22.28	27.17
ALL MID-CAP FUNDS							
1st Quartile	72	29.17	15.28	9.72	11.11	8.33	26.39
2nd Quartile	72	19.44	11.11	5.56	4.17	12.50	47.22
3rd Quartile	72	5.56	8.33	15.28	11.11	30.56	29.17
4th Quartile	72	5.56	8.33	9.72	8.33	34.72	33.33
ALL SMALL-CAP FUNDS							
1st Quartile	115	37.39	20.87	8.70	7.83	10.43	14.78
2nd Quartile	114	14.04	16.67	18.42	15.79	19.30	15.79
3rd Quartile	114	10.53	10.53	21.05	13.16	18.42	26.32
4th Quartile	115	3.48	11.30	14.78	16.52	32.17	21.74
ALL MULTI-CAP FUNDS							
1st Quartile	114	18.42	9.65	10.53	5.26	10.53	45.61
2nd Quartile	114	10.53	15.79	9.65	7.89	12.28	43.86
3rd Quartile	114	3.51	15.79	10.53	12.28	26.32	31.58
4th Quartile	114	3.51	5.26	14.91	7.02	30.70	38.60

Source: S&P Dow Jones Indices LLC, CRSP. Data as of June 30, 2020. 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 (JUNE 2015)	FIVE-YEAR PERCENTAGES AT END (JUNE 2020)			
		TOP HALF (%)	BOTTOM HALF (%)	MERGED/LIQUIDATED (%)	STYLE CHANGED (%)
ALL DOMESTIC FUNDS					
Top Half	969	38.60	19.92	13.42	28.07
Bottom Half	969	18.58	26.73	26.52	28.17
ALL LARGE-CAP FUNDS					
Top Half	368	48.64	13.04	14.40	23.91
Bottom Half	368	17.66	34.51	24.18	23.64
ALL MID-CAP FUNDS					
Top Half	144	37.50	15.28	10.42	36.81
Bottom Half	144	13.89	22.22	32.64	31.25
ALL SMALL-CAP FUNDS					
Top Half	229	44.54	25.33	14.85	15.28
Bottom Half	229	17.90	32.75	25.33	24.02
ALL MULTI-CAP FUNDS					
Top Half	228	27.19	16.67	11.40	44.74
Bottom Half	228	14.04	22.37	28.51	35.09

Source: S&P Dow Jones Indices LLC, CRSP. Data as of June 30, 2020. 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 (JUNE 2018)	PERCENTAGE REMAINING IN TOP QUARTILE	
		JUNE 2019	JUNE 2020
TOP QUARTILE			
Government Long Funds	13	7.69	7.69
Government Intermediate Funds	4	0.00	0.00
Government Short Funds	6	0.00	0.00
Investment-Grade Long Funds	21	0.00	0.00
Investment-Grade Intermediate Funds	49	18.37	6.12
Investment-Grade Short Funds	24	20.83	0.00
High Yield Funds	49	14.29	6.12
Mortgage-Backed Securities Funds	12	41.67	0.00
Global Income Funds	25	16.00	8.00
Emerging Markets Debt Funds	13	23.08	0.00
General Municipal Debt Funds	18	27.78	5.56
California Municipal Debt Funds	8	50.00	12.50
New York Municipal Debt Funds	6	33.33	16.67
FUND CATEGORY	FUND COUNT AT START (JUNE 2018)	PERCENTAGE REMAINING IN TOP HALF	
		JUNE 2019	JUNE 2020
TOP HALF			
Government Long Funds	25	56.00	48.00
Government Intermediate Funds	8	25.00	25.00
Government Short Funds	12	41.67	25.00
Investment-Grade Long Funds	41	26.83	14.63
Investment-Grade Intermediate Funds	97	45.36	32.99
Investment-Grade Short Funds	47	36.17	8.51
High Yield Funds	98	41.84	24.49
Mortgage-Backed Securities Funds	24	58.33	29.17
Global Income Funds	49	46.94	36.73
Emerging Markets Debt Funds	25	44.00	32.00
General Municipal Debt Funds	36	58.33	30.56
California Municipal Debt Funds	16	62.50	31.25
New York Municipal Debt Funds	12	33.33	16.67

Source: S&P Dow Jones Indices LLC, CRSP. Data as of June 30, 2020. 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 (JUNE 2016)	PERCENTAGE REMAINING IN TOP QUARTILE				
		JUNE 2017	JUNE 2018	JUNE 2019	JUNE 2020	
TOP QUARTILE						
Government Long Funds	13	7.69	7.69	0.00	0.00	
Government Intermediate Funds	5	0.00	0.00	0.00	0.00	
Government Short Funds	6	16.67	16.67	0.00	0.00	
Investment-Grade Long Funds	20	20.00	5.00	0.00	0.00	
Investment-Grade Intermediate Funds	42	11.90	7.14	7.14	4.76	
Investment-Grade Short Funds	22	36.36	22.73	9.09	0.00	
High Yield Funds	51	9.80	5.88	1.96	1.96	
Mortgage-Backed Securities Funds	13	23.08	15.38	7.69	0.00	
Global Income Funds	27	3.70	0.00	0.00	0.00	
Emerging Markets Debt Funds	14	28.57	7.14	0.00	0.00	
General Municipal Debt Funds	20	35.00	30.00	10.00	5.00	
California Municipal Debt Funds	9	22.22	22.22	22.22	11.11	
New York Municipal Debt Funds	7	42.86	42.86	28.57	14.29	
FUND CATEGORY	FUND COUNT AT START (JUNE 2016)	PERCENTAGE REMAINING IN TOP HALF				
		JUNE 2017	JUNE 2018	JUNE 2019	JUNE 2020	
TOP HALF						
Government Long Funds	25	36.00	24.00	16.00	16.00	
Government Intermediate Funds	9	22.22	11.11	0.00	0.00	
Government Short Funds	12	50.00	41.67	25.00	8.33	
Investment-Grade Long Funds	42	52.38	21.43	16.67	9.52	
Investment-Grade Intermediate Funds	88	37.50	23.86	19.32	12.50	
Investment-Grade Short Funds	43	51.16	37.21	18.60	6.98	
High Yield Funds	101	34.65	20.79	14.85	7.92	
Mortgage-Backed Securities Funds	24	58.33	45.83	33.33	16.67	
Global Income Funds	53	28.30	9.43	1.89	1.89	
Emerging Markets Debt Funds	28	57.14	32.14	21.43	14.29	
General Municipal Debt Funds	39	41.03	33.33	23.08	15.38	
California Municipal Debt Funds	18	27.78	27.78	27.78	16.67	
New York Municipal Debt Funds	13	38.46	38.46	23.08	15.38	

Source: S&P Dow Jones Indices LLC, CRSP. Data as of June 30, 2020. 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 (JUNE 2017)	THREE-YEAR PERCENTAGES AT END (JUNE 2020)					
		1ST QUARTILE (%)	2ND QUARTILE (%)	3TH QUARTILE (%)	4TH QUARTILE (%)	MERGED/LIQUIDATED (%)	STYLE CHANGED (%)
GOVERNMENT LONG FUNDS							
1st Quartile	14	64.29	14.29	0.00	0.00	14.29	7.14
2nd Quartile	13	7.69	38.46	23.08	0.00	0.00	30.77
3rd Quartile	14	0.00	14.29	14.29	21.43	7.14	42.86
4th Quartile	14	0.00	0.00	21.43	35.71	28.57	14.29
GOVERNMENT INTERMEDIATE FUNDS							
1st Quartile	5	20.00	40.00	20.00	0.00	0.00	20.00
2nd Quartile	4	75.00	25.00	0.00	0.00	0.00	0.00
3rd Quartile	5	0.00	20.00	40.00	40.00	0.00	0.00
4th Quartile	5	0.00	0.00	20.00	40.00	40.00	0.00
GOVERNMENT SHORT FUNDS							
1st Quartile	6	33.33	16.67	16.67	0.00	16.67	16.67
2nd Quartile	6	0.00	50.00	33.33	0.00	0.00	16.67
3rd Quartile	6	16.67	0.00	33.33	16.67	16.67	16.67
4th Quartile	7	14.29	0.00	0.00	42.86	42.86	0.00
INVESTMENT-GRADE LONG FUNDS							
1st Quartile	21	52.38	33.33	4.76	4.76	4.76	0.00
2nd Quartile	20	30.00	10.00	20.00	25.00	10.00	5.00
3rd Quartile	21	4.76	33.33	9.52	23.81	9.52	19.05
4th Quartile	21	0.00	9.52	33.33	23.81	23.81	9.52
INVESTMENT-GRADE INTERMEDIATE FUNDS							
1st Quartile	45	42.22	28.89	13.33	8.89	6.67	0.00
2nd Quartile	45	26.67	35.56	26.67	2.22	6.67	2.22
3rd Quartile	45	13.33	20.00	31.11	20.00	13.33	2.22
4th Quartile	45	4.44	2.22	15.56	51.11	20.00	6.67
INVESTMENT-GRADE SHORT FUNDS							
1st Quartile	21	28.57	28.57	14.29	19.05	9.52	0.00
2nd Quartile	21	33.33	33.33	23.81	4.76	0.00	4.76
3rd Quartile	21	33.33	28.57	19.05	9.52	9.52	0.00
4th Quartile	22	0.00	0.00	31.82	36.36	13.64	18.18
HIGH YIELD FUNDS							
1st Quartile	46	39.13	19.57	10.87	17.39	0.00	13.04
2nd Quartile	46	19.57	17.39	15.22	13.04	6.52	28.26
3rd Quartile	46	8.70	17.39	21.74	23.91	10.87	17.39
4th Quartile	46	10.87	10.87	15.22	17.39	13.04	32.61

Source: S&P Dow Jones Indices LLC, CRSP. Data as of June 30, 2020. 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 (2014-2016)	THREE-YEAR PERCENTAGES AT END (2017-2019)					
		1ST QUARTILE (%)	2ND QUARTILE (%)	3TH QUARTILE (%)	4TH QUARTILE (%)	MERGED/LIQUIDATED (%)	STYLE CHANGED (%)
MORTGAGE-BACKED SECURITIES FUNDS							
1st Quartile	12	33.33	16.67	16.67	25.00	8.33	0.00
2nd Quartile	11	36.36	27.27	27.27	9.09	0.00	0.00
3rd Quartile	11	18.18	36.36	9.09	9.09	27.27	0.00
4th Quartile	12	0.00	8.33	33.33	33.33	16.67	8.33
GLOBAL INCOME FUNDS							
1st Quartile	24	20.83	20.83	12.50	8.33	4.17	33.33
2nd Quartile	23	43.48	8.70	17.39	13.04	17.39	0.00
3rd Quartile	24	20.83	25.00	12.50	20.83	16.67	4.17
4th Quartile	24	4.17	20.83	20.83	33.33	16.67	4.17
EMERGING MARKETS DEBT FUNDS							
1st Quartile	12	33.33	8.33	8.33	33.33	16.67	0.00
2nd Quartile	12	33.33	33.33	16.67	0.00	16.67	0.00
3rd Quartile	12	0.00	16.67	25.00	25.00	25.00	8.33
4th Quartile	13	7.69	15.38	15.38	15.38	38.46	7.69
GENERAL MUNICIPAL DEBT FUNDS							
1st Quartile	18	61.11	11.11	16.67	5.56	5.56	0.00
2nd Quartile	17	23.53	41.18	29.41	5.88	0.00	0.00
3rd Quartile	18	0.00	33.33	33.33	22.22	11.11	0.00
4th Quartile	18	5.56	5.56	5.56	50.00	22.22	11.11
CALIFORNIA MUNICIPAL DEBT FUNDS							
1st Quartile	8	50.00	25.00	25.00	0.00	0.00	0.00
2nd Quartile	8	37.50	25.00	25.00	0.00	12.50	0.00
3rd Quartile	8	12.50	25.00	12.50	25.00	25.00	0.00
4th Quartile	9	0.00	11.11	22.22	66.67	0.00	0.00
NEW YORK MUNICIPAL DEBT FUNDS							
1st Quartile	6	50.00	33.33	16.67	0.00	0.00	0.00
2nd Quartile	6	16.67	16.67	33.33	16.67	16.67	0.00
3rd Quartile	6	16.67	33.33	16.67	33.33	0.00	0.00
4th Quartile	7	14.29	0.00	28.57	42.86	14.29	0.00

Source: S&P Dow Jones Indices LLC, CRSP. Data as of June 30, 2020. 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 (JUNE 2017)	THREE-YEAR PERCENTAGES AT END (JUNE 2020)			
		TOP HALF (%)	BOTTOM HALF (%)	MERGED/LIQUIDATED (%)	STYLE CHANGED (%)
GOVERNMENT LONG FUNDS					
Top Half	27	62.96	11.11	7.41	18.52
Bottom Half	28	7.14	46.43	17.86	28.57
GOVERNMENT INTERMEDIATE FUNDS					
Top Half	9	77.78	11.11	0.00	11.11
Bottom Half	10	10.00	70.00	20.00	0.00
GOVERNMENT SHORT FUNDS					
Top Half	12	50.00	25.00	8.33	16.67
Bottom Half	13	15.38	46.15	30.77	7.69
INVESTMENT-GRADE LONG FUNDS					
Top Half	41	63.41	26.83	7.32	2.44
Bottom Half	42	23.81	45.24	16.67	14.29
INVESTMENT-GRADE INTERMEDIATE FUNDS					
Top Half	90	66.67	25.56	6.67	1.11
Bottom Half	90	20.00	58.89	16.67	4.44
INVESTMENT-GRADE SHORT FUNDS					
Top Half	42	61.90	30.95	4.76	2.38
Bottom Half	43	30.23	48.84	11.63	9.30
HIGH YIELD FUNDS					
Top Half	92	47.83	28.26	3.26	20.65
Bottom Half	92	23.91	39.13	11.96	25.00
MORTGAGE-BACKED SECURITIES FUNDS					
Top Half	23	56.52	39.13	4.35	0.00
Bottom Half	23	30.43	43.48	21.74	4.35
GLOBAL INCOME FUNDS					
Top Half	47	46.81	25.53	10.64	17.02
Bottom Half	48	35.42	43.75	16.67	4.17
EMERGING MARKETS DEBT FUNDS					
Top Half	24	54.17	29.17	16.67	0.00
Bottom Half	25	20.00	40.00	32.00	8.00
GENERAL MUNICIPAL DEBT FUNDS					
Top Half	35	68.57	28.57	2.86	0.00
Bottom Half	36	22.22	55.56	16.67	5.56
CALIFORNIA MUNICIPAL DEBT FUNDS					
Top Half	16	68.75	25.00	6.25	0.00
Bottom Half	17	23.53	64.71	11.76	0.00
NEW YORK MUNICIPAL DEBT FUNDS					
Top Half	12	58.33	33.33	8.33	0.00
Bottom Half	13	30.77	61.54	7.69	0.00

Source: S&P Dow Jones Indices LLC, CRSP. Data as of June 30, 2020. 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 (JUNE 2015)	FIVE-YEAR PERCENTAGES AT END (JUNE 2020)					
		1ST QUARTILE (%)	2ND QUARTILE (%)	3TH QUARTILE (%)	4TH QUARTILE (%)	MERGED/LIQUIDATED (%)	STYLE CHANGED (%)
GOVERNMENT LONG FUNDS							
1st Quartile	13	61.54	7.69	0.00	0.00	15.38	15.38
2nd Quartile	13	7.69	30.77	30.77	0.00	7.69	23.08
3rd Quartile	13	0.00	15.38	23.08	15.38	0.00	46.15
4th Quartile	13	0.00	0.00	0.00	53.85	46.15	0.00
GOVERNMENT INTERMEDIATE FUNDS							
1st Quartile	6	50.00	16.67	0.00	0.00	16.67	16.67
2nd Quartile	5	20.00	20.00	0.00	0.00	60.00	0.00
3rd Quartile	5	0.00	40.00	0.00	40.00	20.00	0.00
4th Quartile	6	0.00	0.00	66.67	16.67	16.67	0.00
GOVERNMENT SHORT FUNDS							
1st Quartile	7	28.57	14.29	28.57	0.00	28.57	0.00
2nd Quartile	6	16.67	33.33	0.00	0.00	16.67	33.33
3rd Quartile	6	0.00	0.00	50.00	16.67	33.33	0.00
4th Quartile	7	14.29	0.00	0.00	42.86	28.57	14.29
INVESTMENT-GRADE LONG FUNDS							
1st Quartile	20	65.00	5.00	10.00	0.00	5.00	15.00
2nd Quartile	20	20.00	35.00	15.00	15.00	5.00	10.00
3rd Quartile	20	5.00	25.00	15.00	25.00	20.00	10.00
4th Quartile	20	0.00	15.00	10.00	35.00	20.00	20.00
INVESTMENT-GRADE INTERMEDIATE FUNDS							
1st Quartile	40	40.00	27.50	15.00	10.00	7.50	0.00
2nd Quartile	40	22.50	27.50	27.50	0.00	17.50	5.00
3rd Quartile	40	12.50	20.00	27.50	15.00	20.00	5.00
4th Quartile	40	0.00	7.50	10.00	52.50	25.00	5.00
INVESTMENT-GRADE SHORT FUNDS							
1st Quartile	17	47.06	11.76	11.76	17.65	11.76	0.00
2nd Quartile	17	11.76	17.65	29.41	17.65	23.53	0.00
3rd Quartile	17	11.76	35.29	29.41	17.65	5.88	0.00
4th Quartile	17	11.76	11.76	5.88	17.65	41.18	11.76
HIGH YIELD FUNDS							
1st Quartile	38	21.05	18.42	18.42	18.42	13.16	10.53
2nd Quartile	38	21.05	18.42	18.42	7.89	13.16	21.05
3rd Quartile	38	28.95	15.79	23.68	15.79	10.53	5.26
4th Quartile	38	7.89	10.53	13.16	23.68	26.32	18.42

Source: S&P Dow Jones Indices LLC, CRSP. Data as of June 30, 2020. 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 (JUNE 2015)	FIVE-YEAR PERCENTAGES AT END (JUNE 2020)					
		1ST QUARTILE (%)	2ND QUARTILE (%)	3TH QUARTILE (%)	4TH QUARTILE (%)	MERGED/LIQUIDATED (%)	STYLE CHANGED (%)
MORTGAGE-BACKED SECURITIES FUNDS							
1st Quartile	11	54.55	27.27	18.18	0.00	0.00	0.00
2nd Quartile	11	9.09	18.18	27.27	18.18	18.18	9.09
3rd Quartile	11	0.00	27.27	27.27	27.27	18.18	0.00
4th Quartile	12	16.67	0.00	8.33	25.00	25.00	25.00
GLOBAL INCOME FUNDS							
1st Quartile	17	17.65	11.76	11.76	17.65	11.76	29.41
2nd Quartile	16	31.25	18.75	25.00	18.75	6.25	0.00
3rd Quartile	16	12.50	31.25	6.25	31.25	12.50	6.25
4th Quartile	17	11.76	17.65	23.53	5.88	17.65	23.53
EMERGING MARKETS DEBT FUNDS							
1st Quartile	4	0.00	0.00	50.00	25.00	25.00	0.00
2nd Quartile	4	25.00	25.00	0.00	50.00	0.00	0.00
3rd Quartile	4	25.00	0.00	25.00	0.00	50.00	0.00
4th Quartile	5	40.00	40.00	0.00	20.00	0.00	0.00
GENERAL MUNICIPAL DEBT FUNDS							
1st Quartile	17	58.82	11.76	5.88	11.76	5.88	5.88
2nd Quartile	16	25.00	37.50	25.00	0.00	12.50	0.00
3rd Quartile	17	0.00	29.41	35.29	17.65	11.76	5.88
4th Quartile	17	0.00	5.88	17.65	47.06	23.53	5.88
CALIFORNIA MUNICIPAL DEBT FUNDS							
1st Quartile	9	55.56	11.11	22.22	11.11	0.00	0.00
2nd Quartile	8	25.00	25.00	12.50	0.00	25.00	12.50
3rd Quartile	8	12.50	50.00	25.00	12.50	0.00	0.00
4th Quartile	9	0.00	0.00	22.22	55.56	22.22	0.00
NEW YORK MUNICIPAL DEBT FUNDS							
1st Quartile	6	50.00	16.67	0.00	0.00	16.67	16.67
2nd Quartile	6	50.00	16.67	33.33	0.00	0.00	0.00
3rd Quartile	6	0.00	33.33	16.67	50.00	0.00	0.00
4th Quartile	7	0.00	14.29	42.86	28.57	14.29	0.00

Source: S&P Dow Jones Indices LLC, CRSP. Data as of June 30, 2020. 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 (JUNE 2015)	FIVE-YEAR PERCENTAGES AT END (JUNE 2020)			
		TOP HALF (%)	BOTTOM HALF (%)	MERGED/LIQUIDATED (%)	STYLE CHANGED (%)
GOVERNMENT LONG FUNDS					
Top Half	26	53.85	15.38	11.54	19.23
Bottom Half	26	7.69	46.15	23.08	23.08
GOVERNMENT INTERMEDIATE FUNDS					
Top Half	11	54.55	0.00	36.36	9.09
Bottom Half	11	18.18	63.64	18.18	0.00
GOVERNMENT SHORT FUNDS					
Top Half	13	46.15	15.38	23.08	15.38
Bottom Half	13	7.69	53.85	30.77	7.69
INVESTMENT-GRADE LONG FUNDS					
Top Half	40	62.50	20.00	5.00	12.50
Bottom Half	40	22.50	42.50	20.00	15.00
INVESTMENT-GRADE INTERMEDIATE FUNDS					
Top Half	80	58.75	26.25	12.50	2.50
Bottom Half	80	20.00	52.50	22.50	5.00
INVESTMENT-GRADE SHORT FUNDS					
Top Half	34	44.12	38.24	17.65	0.00
Bottom Half	34	35.29	35.29	23.53	5.88
HIGH YIELD FUNDS					
Top Half	76	39.47	31.58	13.16	15.79
Bottom Half	76	31.58	38.16	18.42	11.84
MORTGAGE-BACKED SECURITIES FUNDS					
Top Half	22	54.55	31.82	9.09	4.55
Bottom Half	23	21.74	43.48	21.74	13.04
GLOBAL INCOME FUNDS					
Top Half	33	39.39	36.36	9.09	15.15
Bottom Half	33	36.36	33.33	15.15	15.15
EMERGING MARKETS DEBT FUNDS					
Top Half	8	25.00	62.50	12.50	0.00
Bottom Half	9	55.56	22.22	22.22	0.00
GENERAL MUNICIPAL DEBT FUNDS					
Top Half	33	66.67	21.21	9.09	3.03
Bottom Half	34	17.65	58.82	17.65	5.88
CALIFORNIA MUNICIPAL DEBT FUNDS					
Top Half	17	58.82	23.53	11.76	5.88
Bottom Half	17	29.41	58.82	11.76	0.00
NEW YORK MUNICIPAL DEBT FUNDS					
Top Half	12	66.67	16.67	8.33	8.33
Bottom Half	13	23.08	69.23	7.69	0.00

Source: S&P Dow Jones Indices LLC, CRSP. Data as of June 30, 2020. Table is provided for illustrative purposes. Past performance is no guarantee of future results.

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