

Does Past Performance Matter? The Persistence Scorecard

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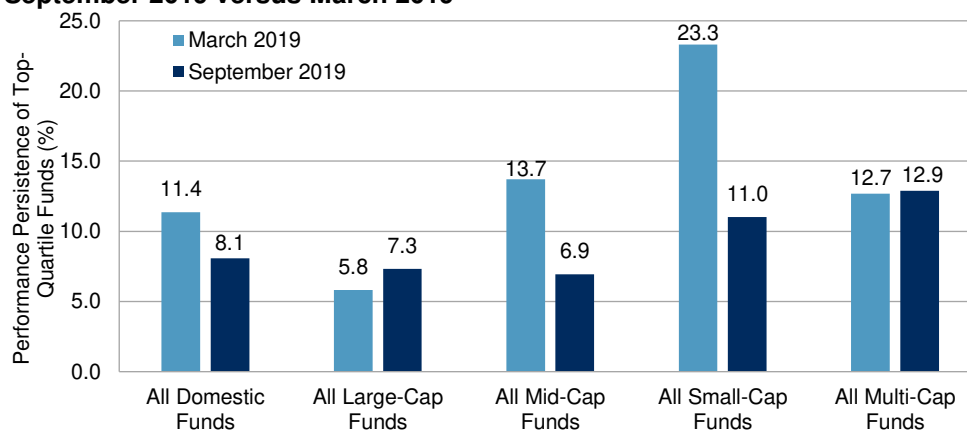
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SUMMARY OF RESULTS

- The S&P Persistence Scorecard attempts to distinguish a manager's luck from skill. One key measure of successful active management lies in the ability of a manager to outperform his peers consistently.
- **This report's results show that, irrespective of asset class or style focus, few fund managers consistently outperformed their peers.**
- For funds categorized as top performers in September 2017, 47% maintained their top-quartile performance the subsequent year. However, there was a dramatic fall in persistence afterward—**just 8% of domestic equity funds remained in the top quartile in the three-year period ending September 2019.** This result (8%) is consistent with the notion that historical performance is only randomly associated with future performance.¹
- Smaller-cap equity funds recorded lower persistence compared with results from six months prior—mid-cap persistence dropped to 7% from 14%, and small-cap funds sank to 11% from 23% (see Exhibit 1).

Exhibit 1: Performance Persistence over the Three-Year Period Ending September 2019 versus March 2019



Source: S&P Dow Jones Indices LLC, CRSP. Data as of Sept. 30, 2019. Chart is provided for illustrative purposes. Past performance is no guarantee of future results.

¹ Given that the universe is broken out into four quartiles, the random odds of a top-performing manager in year one staying in the top quartile in the subsequent two years can be computed as 25% * 25% = 6.25%.

- **An inverse relationship exists between the time horizon length and the ability of top-performing funds to maintain their success.** Less than 3% of equity funds in all categories maintained their top-quartile status at the end of the five-year measurement period. In fact, no large-cap fund was able to consistently deliver top-quartile performance by the end of the fifth year.
- Report 3 shows that over 44% of top-quartile large-cap managers from the first three-year period continued to show top performance in the second three-year period—a figure higher than what would be expected at random. Top-quartile mid- (30%) and small-cap (18%) funds did not fare as well.
- For the five-year transition matrix, 32% of top-performing equity funds in the first period remained in the top quartile in the second period. However, 20% of top-quartile funds also moved to the lowest quartile, and an additional 8% of funds were merged or liquidated, highlighting that it was almost as likely for a top-quartile fund to falter than it was to remain in the top quartile.
- **Fourth-quartile funds were most likely to be merged or liquidated across categories over the five-year horizon.** This supports the view that underperformance typically precedes a fund's closure.
- Top-quartile mortgage-backed securities funds demonstrated the best performance persistence among fixed income funds; 23% of managers maintained their top-performing status during the three-year period ending September 2019. However, this is a decline from the results six months prior (38%).
- **Over longer horizons, most fixed income categories showed no persistence:** Of the 13 fixed income categories, seven showed no managers remaining in the top quartile over the five-year horizon.

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 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 University of Chicago’s CRSP Survivorship Bias Free Mutual Fund 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 two non-overlapping, three- and five-year periods. They also track the percentage of funds that have merged or liquidated. In addition, we monitor movements between capitalization levels. This helps us capture, for example, the conversion of some large-cap funds to mid- and small-cap funds.
- **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 1: Performance Persistence of Domestic Equity Funds over Three Consecutive 12-Month Periods

MUTUAL FUND CATEGORY	FUND COUNT AT START (SEPTEMBER 2017)	PERCENTAGE REMAINING IN TOP QUARTILE	
		SEPTEMBER 2018	SEPTEMBER 2019
TOP QUARTILE			
All Domestic Funds	545	46.79	8.07
All Large-Cap Funds	205	53.17	7.32
All Mid-Cap Funds	72	44.44	6.94
All Small-Cap Funds	136	37.50	11.03
All Multi-Cap Funds	132	46.21	12.88
MUTUAL FUND CATEGORY	FUND COUNT AT START (SEPTEMBER 2017)	PERCENTAGE REMAINING IN TOP HALF	
		SEPTEMBER 2018	SEPTEMBER 2019
TOP HALF			
All Domestic Funds	1090	60.83	30.55
All Large-Cap Funds	409	63.08	24.21
All Mid-Cap Funds	145	60.00	35.17
All Small-Cap Funds	271	54.98	31.37
All Multi-Cap Funds	265	56.23	24.15

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Sept. 30, 2019. 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

MUTUAL FUND CATEGORY	FUND COUNT AT START (SEPTEMBER 2015)	PERCENTAGE REMAINING IN TOP QUARTILE			
		SEPTEMBER 2016	SEPTEMBER 2017	SEPTEMBER 2018	SEPTEMBER 2019
TOP QUARTILE					
All Domestic Funds	567	17.64	6.53	4.06	0.88
All Large-Cap Funds	220	14.09	6.36	5.00	0.00
All Mid-Cap Funds	80	16.25	1.25	1.25	1.25
All Small-Cap Funds	132	20.45	7.58	3.79	1.52
All Multi-Cap Funds	135	17.04	10.37	6.67	2.22
MUTUAL FUND CATEGORY	FUND COUNT AT START (SEPTEMBER 2015)	PERCENTAGE REMAINING IN TOP HALF			
		SEPTEMBER 2016	SEPTEMBER 2017	SEPTEMBER 2018	SEPTEMBER 2019
TOP HALF					
All Domestic Funds	1135	45.64	24.49	16.83	8.37
All Large-Cap Funds	440	41.82	20.00	15.68	6.36
All Mid-Cap Funds	160	40.62	18.75	15.00	12.50
All Small-Cap Funds	265	44.15	23.02	13.96	7.55
All Multi-Cap Funds	270	43.70	21.85	16.67	8.89

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Sept. 30, 2019. 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)							
ALL DOMESTIC FUNDS	FUND COUNT AT START (SEPTEMBER 2016)	THREE-YEAR PERCENTAGES AT END					
		1ST QUARTILE (%)	2ND QUARTILE (%)	3TH QUARTILE (%)	4TH QUARTILE (%)	MERGED/LIQUIDATED (%)	STYLE CHANGED (%)
1st Quartile	514	44.94	25.49	13.62	10.51	5.25	0.19
2nd Quartile	515	14.37	29.51	26.02	19.03	11.07	0.00
3rd Quartile	514	11.09	16.54	30.35	24.32	16.15	1.56
4th Quartile	514	15.37	14.20	15.56	31.91	21.60	1.36
ALL LARGE-CAP FUNDS							
1st Quartile	201	44.28	23.38	10.95	8.96	3.98	8.46
2nd Quartile	201	19.90	32.84	20.40	9.45	8.96	8.46
3rd Quartile	200	8.00	10.00	25.50	27.00	16.50	13.00
4th Quartile	201	3.48	9.45	18.91	30.35	24.88	12.94
ALL MID-CAP FUNDS							
1st Quartile	71	29.58	9.86	22.54	22.54	8.45	7.04
2nd Quartile	71	12.68	22.54	25.35	22.54	9.86	7.04
3rd Quartile	71	14.08	25.35	19.72	9.86	15.49	15.49
4th Quartile	71	16.90	15.49	5.63	18.31	29.58	14.08
ALL SMALL-CAP FUNDS							
1st Quartile	119	18.49	35.29	26.89	14.29	2.52	2.52
2nd Quartile	118	14.41	24.58	21.19	27.12	10.17	2.54
3rd Quartile	119	27.73	16.81	21.01	18.49	12.61	3.36
4th Quartile	118	25.42	9.32	16.10	26.27	20.34	2.54
ALL MULTI-CAP FUNDS							
1st Quartile	124	30.65	21.77	11.29	11.29	5.65	19.35
2nd Quartile	124	13.71	27.42	20.97	12.90	10.48	14.52
3rd Quartile	124	12.10	11.29	16.13	16.94	20.16	23.39
4th Quartile	124	10.48	7.26	18.55	25.81	20.16	17.74

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Sept. 30, 2019. 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)					
ALL DOMESTIC FUNDS	FUND COUNT AT START (SEPTEMBER 2016)	THREE-YEAR PERCENTAGES AT END			
		TOP HALF (%)	BOTTOM HALF (%)	MERGED/LIQUIDATED (%)	STYLE CHANGED (%)
Top Half	1029	57.14	34.60	8.16	0.10
Bottom Half	1028	28.60	51.07	18.87	1.46
ALL LARGE-CAP FUNDS					
Top Half	402	60.20	24.88	6.47	8.46
Bottom Half	401	15.46	50.87	20.70	12.97
ALL MID-CAP FUNDS					
Top Half	142	37.32	46.48	9.15	7.04
Bottom Half	142	35.92	26.76	22.54	14.79
ALL SMALL-CAP FUNDS					
Top Half	237	46.41	44.73	6.33	2.53
Bottom Half	237	39.66	40.93	16.46	2.95
ALL MULTI-CAP FUNDS					
Top Half	248	46.77	28.23	8.06	16.94
Bottom Half	248	20.56	38.71	20.16	20.56

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Sept. 30, 2019. 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)							
ALL DOMESTIC FUNDS	FUND COUNT AT START (SEPTEMBER 2014)	FIVE-YEAR PERCENTAGES AT END					
		1ST QUARTILE (%)	2ND QUARTILE (%)	3TH QUARTILE (%)	4TH QUARTILE (%)	MERGED/LIQUIDATED (%)	STYLE CHANGED (%)
1st Quartile	485	31.75	21.44	18.14	20.21	8.04	0.41
2nd Quartile	484	23.76	21.69	21.07	18.18	14.88	0.41
3rd Quartile	485	14.02	22.47	23.30	17.53	21.86	0.82
4th Quartile	484	10.54	14.46	17.56	24.17	30.99	2.27
ALL LARGE-CAP FUNDS							
1st Quartile	188	30.32	21.28	15.96	10.64	10.64	11.17
2nd Quartile	188	19.15	18.62	16.49	15.96	16.49	13.30
3rd Quartile	187	8.56	18.72	18.18	20.32	20.86	13.37
4th Quartile	188	9.57	8.51	17.02	20.21	28.72	15.96
ALL MID-CAP FUNDS							
1st Quartile	73	26.03	10.96	19.18	20.55	9.59	13.70
2nd Quartile	74	18.92	10.81	14.86	22.97	18.92	13.51
3rd Quartile	73	13.70	19.18	19.18	8.22	23.29	16.44
4th Quartile	73	5.48	23.29	9.59	12.33	30.14	19.18
ALL SMALL-CAP FUNDS							
1st Quartile	112	25.89	26.79	17.86	18.75	8.04	2.68
2nd Quartile	112	21.43	16.96	25.00	18.75	15.18	2.68
3rd Quartile	111	16.22	18.92	19.82	20.72	20.72	3.60
4th Quartile	112	16.07	16.96	16.07	21.43	25.89	3.57
ALL MULTI-CAP FUNDS							
1st Quartile	112	25.89	15.18	12.50	16.07	5.36	25.00
2nd Quartile	112	17.86	21.43	16.96	8.93	11.61	23.21
3rd Quartile	111	7.21	12.61	18.02	12.61	25.23	24.32
4th Quartile	112	6.25	7.14	9.82	18.75	33.93	24.11

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Sept. 30, 2019. 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)					
ALL DOMESTIC FUNDS	FUND COUNT AT START (SEPTEMBER 2014)	FIVE-YEAR PERCENTAGES AT END			
		TOP HALF (%)	BOTTOM HALF (%)	MERGED/LIQUIDATED (%)	STYLE CHANGED (%)
Top Half	969	49.33	38.80	11.46	0.41
Bottom Half	969	30.75	41.28	26.42	1.55
ALL LARGE-CAP FUNDS					
Top Half	376	44.68	29.52	13.56	12.23
Bottom Half	375	22.67	37.87	24.80	14.67
ALL MID-CAP FUNDS					
Top Half	147	33.33	38.78	14.29	13.61
Bottom Half	146	30.82	24.66	26.71	17.81
ALL SMALL-CAP FUNDS					
Top Half	224	45.54	40.18	11.61	2.68
Bottom Half	223	34.08	39.01	23.32	3.59
ALL MULTI-CAP FUNDS					
Top Half	224	40.18	27.23	8.48	24.11
Bottom Half	223	16.59	29.60	29.60	24.22

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Sept. 30, 2019. 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			
MUTUAL FUND CATEGORY	FUND COUNT AT START (SEPTEMBER 2017)	PERCENTAGE REMAINING IN TOP QUARTILE	
		SEPTEMBER 2018	SEPTEMBER 2019
TOP QUARTILE			
Government Long Funds	14	64.29	0.00
Government Intermediate Funds	5	60.00	0.00
Government Short Funds	6	66.67	0.00
Investment-Grade Long Funds	22	40.91	4.55
Investment-Grade Intermediate Funds	49	55.10	6.12
Investment-Grade Short Funds	24	62.50	4.17
High Yield Funds	51	37.25	7.84
Mortgage-Backed Securities Funds	13	84.62	23.08
Global Income Funds	25	16.00	8.00
Emerging Markets Debt Funds	15	33.33	0.00
General Municipal Debt Funds	19	52.63	15.79
California Municipal Debt Funds	9	44.44	22.22
New York Municipal Debt Funds	7	14.29	14.29
MUTUAL FUND CATEGORY	FUND COUNT AT START (SEPTEMBER 2017)	PERCENTAGE REMAINING IN TOP HALF	
		SEPTEMBER 2018	SEPTEMBER 2019
TOP HALF			
Government Long Funds	27	62.96	11.11
Government Intermediate Funds	10	70.00	10.00
Government Short Funds	12	50.00	16.67
Investment-Grade Long Funds	44	61.36	22.73
Investment-Grade Intermediate Funds	98	66.33	24.49
Investment-Grade Short Funds	47	65.96	23.40
High Yield Funds	103	59.22	22.33
Mortgage-Backed Securities Funds	26	76.92	46.15
Global Income Funds	51	47.06	23.53
Emerging Markets Debt Funds	29	37.93	20.69
General Municipal Debt Funds	38	73.68	34.21
California Municipal Debt Funds	17	52.94	29.41
New York Municipal Debt Funds	13	46.15	15.38

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Sept. 30, 2019. 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

MUTUAL FUND CATEGORY	FUND COUNT AT START (SEPTEMBER 2015)	PERCENTAGE REMAINING IN TOP QUARTILE			
		SEPTEMBER 2016	SEPTEMBER 2017	SEPTEMBER 2018	SEPTEMBER 2019
TOP QUARTILE					
Government Long Funds	14	64.29	7.14	0.00	0.00
Government Intermediate Funds	6	33.33	0.00	0.00	0.00
Government Short Funds	7	42.86	0.00	0.00	0.00
Investment-Grade Long Funds	23	30.43	4.35	4.35	0.00
Investment-Grade Intermediate Funds	47	27.66	4.26	0.00	0.00
Investment-Grade Short Funds	22	45.45	22.73	18.18	4.55
High Yield Funds	50	22.00	4.00	4.00	2.00
Mortgage-Backed Securities Funds	13	23.08	15.38	15.38	15.38
Global Income Funds	26	3.85	3.85	3.85	3.85
Emerging Markets Debt Funds	13	15.38	0.00	0.00	0.00
General Municipal Debt Funds	20	60.00	40.00	25.00	15.00
California Municipal Debt Funds	9	44.44	11.11	11.11	11.11
New York Municipal Debt Funds	7	28.57	14.29	0.00	0.00

MUTUAL FUND CATEGORY	FUND COUNT AT START (SEPTEMBER 2015)	PERCENTAGE REMAINING IN TOP HALF			
		SEPTEMBER 2016	SEPTEMBER 2017	SEPTEMBER 2018	SEPTEMBER 2019
TOP HALF					
Government Long Funds	29	75.86	20.69	17.24	10.34
Government Intermediate Funds	11	72.73	27.27	9.09	9.09
Government Short Funds	14	57.14	35.71	14.29	14.29
Investment-Grade Long Funds	46	30.43	10.87	4.35	4.35
Investment-Grade Intermediate Funds	95	60.00	29.47	13.68	10.53
Investment-Grade Short Funds	44	56.82	40.91	27.27	11.36
High Yield Funds	101	45.54	19.80	12.87	6.93
Mortgage-Backed Securities Funds	25	68.00	44.00	40.00	28.00
Global Income Funds	53	30.19	11.32	7.55	5.66
Emerging Markets Debt Funds	27	37.04	22.22	7.41	3.70
General Municipal Debt Funds	39	69.23	38.46	28.21	23.08
California Municipal Debt Funds	18	72.22	33.33	27.78	16.67
New York Municipal Debt Funds	14	57.14	28.57	21.43	7.14

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Sept. 30, 2019. 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)							
GOVERNMENT LONG FUNDS	FUND COUNT AT START (SEPTEMBER 2016)	THREE-YEAR PERCENTAGES AT END					
		1ST QUARTILE (%)	2ND QUARTILE (%)	3TH QUARTILE (%)	4TH QUARTILE (%)	MERGED/LIQUIDATED (%)	STYLE CHANGED (%)
1st Quartile	14	64.29	7.14	7.14	0.00	14.29	7.14
2nd Quartile	14	0.00	35.71	28.57	0.00	0.00	35.71
3rd Quartile	13	0.00	15.38	15.38	30.77	0.00	38.46
4th Quartile	14	0.00	7.14	7.14	35.71	35.71	14.29
GOVERNMENT INTERMEDIATE FUNDS							
1st Quartile	5	80.00	0.00	0.00	20.00	0.00	0.00
2nd Quartile	5	0.00	40.00	20.00	0.00	20.00	20.00
3rd Quartile	4	0.00	25.00	50.00	0.00	25.00	0.00
4th Quartile	5	0.00	20.00	20.00	60.00	0.00	0.00
GOVERNMENT SHORT FUNDS							
1st Quartile	6	66.67	33.33	0.00	0.00	0.00	0.00
2nd Quartile	6	16.67	50.00	16.67	0.00	0.00	16.67
3rd Quartile	6	16.67	0.00	33.33	33.33	16.67	0.00
4th Quartile	6	0.00	0.00	50.00	50.00	0.00	0.00
INVESTMENT-GRADE LONG FUNDS							
1st Quartile	21	66.67	14.29	9.52	4.76	4.76	0.00
2nd Quartile	22	18.18	36.36	22.73	9.09	4.55	9.09
3rd Quartile	21	0.00	19.05	38.10	19.05	14.29	9.52
4th Quartile	21	0.00	9.52	14.29	47.62	19.05	9.52
INVESTMENT-GRADE INTERMEDIATE FUNDS							
1st Quartile	46	52.17	28.26	2.17	10.87	6.52	0.00
2nd Quartile	46	19.57	36.96	23.91	8.70	8.70	2.17
3rd Quartile	46	13.04	17.39	36.96	15.22	15.22	2.17
4th Quartile	46	0.00	4.35	21.74	50.00	19.57	4.35
INVESTMENT-GRADE SHORT FUNDS							
1st Quartile	20	45.00	40.00	5.00	0.00	5.00	5.00
2nd Quartile	20	10.00	25.00	45.00	10.00	10.00	0.00
3rd Quartile	19	26.32	10.53	31.58	21.05	10.53	0.00
4th Quartile	20	5.00	5.00	5.00	50.00	10.00	25.00
HIGH YIELD FUNDS							
1st Quartile	45	28.89	33.33	17.78	11.11	0.00	8.89
2nd Quartile	44	18.18	18.18	18.18	15.91	6.82	22.73
3rd Quartile	45	17.78	11.11	26.67	20.00	15.56	8.89
4th Quartile	44	6.82	11.36	9.09	25.00	20.45	27.27

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Sept. 30, 2019. 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.)							
MORTGAGE-BACKED SECURITIES FUNDS	FUND COUNT AT START (SEPTEMBER 2016)	THREE-YEAR PERCENTAGES AT END					
		1ST QUARTILE (%)	2ND QUARTILE (%)	3TH QUARTILE (%)	4TH QUARTILE (%)	MERGED/LIQUIDATED (%)	STYLE CHANGED (%)
1st Quartile	12	58.33	25.00	0.00	8.33	8.33	0.00
2nd Quartile	12	25.00	25.00	25.00	16.67	0.00	8.33
3rd Quartile	12	0.00	16.67	50.00	16.67	16.67	0.00
4th Quartile	12	8.33	16.67	16.67	41.67	16.67	0.00
GLOBAL INCOME FUNDS							
1st Quartile	24	29.17	25.00	0.00	8.33	8.33	29.17
2nd Quartile	24	0.00	33.33	41.67	8.33	8.33	8.33
3rd Quartile	23	21.74	4.35	26.09	30.43	17.39	0.00
4th Quartile	24	25.00	8.33	8.33	25.00	20.83	12.50
EMERGING MARKETS DEBT FUNDS							
1st Quartile	10	30.00	0.00	10.00	40.00	20.00	0.00
2nd Quartile	11	27.27	45.45	9.09	0.00	18.18	0.00
3rd Quartile	10	20.00	20.00	40.00	10.00	10.00	0.00
4th Quartile	10	0.00	10.00	10.00	30.00	40.00	10.00
GENERAL MUNICIPAL DEBT FUNDS							
1st Quartile	18	55.56	27.78	11.11	0.00	5.56	0.00
2nd Quartile	18	27.78	44.44	22.22	5.56	0.00	0.00
3rd Quartile	18	5.56	11.11	50.00	22.22	11.11	0.00
4th Quartile	18	0.00	0.00	5.56	55.56	22.22	16.67
CALIFORNIA MUNICIPAL DEBT FUNDS							
1st Quartile	9	55.56	22.22	11.11	11.11	0.00	0.00
2nd Quartile	9	33.33	22.22	22.22	0.00	22.22	0.00
3rd Quartile	9	0.00	33.33	33.33	33.33	0.00	0.00
4th Quartile	9	0.00	11.11	22.22	44.44	22.22	0.00
NEW YORK MUNICIPAL DEBT FUNDS							
1st Quartile	7	71.43	0.00	28.57	0.00	0.00	0.00
2nd Quartile	7	28.57	42.86	14.29	14.29	0.00	0.00
3rd Quartile	6	0.00	50.00	33.33	16.67	0.00	0.00
4th Quartile	7	0.00	0.00	28.57	57.14	14.29	0.00

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Sept. 30, 2019. 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)					
GOVERNMENT LONG FUNDS	FUND COUNT AT START (SEPTEMBER 2016)	THREE-YEAR PERCENTAGES AT END			
		TOP HALF (%)	BOTTOM HALF (%)	MERGED/LIQUIDATED (%)	STYLE CHANGED (%)
Top Half	28	53.57	17.86	7.14	21.43
Bottom Half	27	11.11	44.44	18.52	25.93
GOVERNMENT INTERMEDIATE FUNDS					
Top Half	10	60.00	20.00	10.00	10.00
Bottom Half	9	22.22	66.67	11.11	0.00
GOVERNMENT SHORT FUNDS					
Top Half	12	83.33	8.33	0.00	8.33
Bottom Half	12	8.33	83.33	8.33	0.00
INVESTMENT-GRADE LONG FUNDS					
Top Half	43	67.44	23.26	4.65	4.65
Bottom Half	42	14.29	59.52	16.67	9.52
INVESTMENT-GRADE INTERMEDIATE FUNDS					
Top Half	92	68.48	22.83	7.61	1.09
Bottom Half	92	17.39	61.96	17.39	3.26
INVESTMENT-GRADE SHORT FUNDS					
Top Half	40	60.00	30.00	7.50	2.50
Bottom Half	39	23.08	53.85	10.26	12.82
HIGH YIELD FUNDS					
Top Half	89	49.44	31.46	3.37	15.73
Bottom Half	89	23.60	40.45	17.98	17.98
MORTGAGE-BACKED SECURITIES FUNDS					
Top Half	24	66.67	25.00	4.17	4.17
Bottom Half	24	20.83	62.50	16.67	0.00
GLOBAL INCOME FUNDS					
Top Half	48	43.75	29.17	8.33	18.75
Bottom Half	47	29.79	44.68	19.15	6.38
EMERGING MARKETS DEBT FUNDS					
Top Half	21	52.38	28.57	19.05	0.00
Bottom Half	20	25.00	45.00	25.00	5.00
GENERAL MUNICIPAL DEBT FUNDS					
Top Half	36	77.78	19.44	2.78	0.00
Bottom Half	36	8.33	66.67	16.67	8.33
CALIFORNIA MUNICIPAL DEBT FUNDS					
Top Half	18	66.67	22.22	11.11	0.00
Bottom Half	18	22.22	66.67	11.11	0.00
NEW YORK MUNICIPAL DEBT FUNDS					
Top Half	14	71.43	28.57	0.00	0.00
Bottom Half	13	23.08	69.23	7.69	0.00

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Sept. 30, 2019. 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)							
GOVERNMENT LONG FUNDS	FUND COUNT AT START (SEPTEMBER 2014)	FIVE-YEAR PERCENTAGES AT END					
		1ST QUARTILE (%)	2ND QUARTILE (%)	3TH QUARTILE (%)	4TH QUARTILE (%)	MERGED/LIQUIDATED (%)	STYLE CHANGED (%)
1st Quartile	13	53.85	7.69	7.69	0.00	15.38	15.38
2nd Quartile	14	7.14	42.86	14.29	0.00	14.29	21.43
3rd Quartile	13	0.00	0.00	23.08	7.69	30.77	38.46
4th Quartile	13	0.00	0.00	15.38	46.15	30.77	7.69
GOVERNMENT INTERMEDIATE FUNDS							
1st Quartile	5	60.00	20.00	0.00	0.00	20.00	0.00
2nd Quartile	6	16.67	16.67	0.00	16.67	33.33	16.67
3rd Quartile	5	0.00	40.00	0.00	20.00	40.00	0.00
4th Quartile	5	0.00	0.00	60.00	40.00	0.00	0.00
GOVERNMENT SHORT FUNDS							
1st Quartile	7	42.86	42.86	0.00	14.29	0.00	0.00
2nd Quartile	6	33.33	16.67	0.00	16.67	33.33	0.00
3rd Quartile	7	0.00	14.29	42.86	14.29	14.29	14.29
4th Quartile	6	0.00	0.00	33.33	33.33	16.67	16.67
INVESTMENT-GRADE LONG FUNDS							
1st Quartile	20	55.00	20.00	5.00	5.00	0.00	15.00
2nd Quartile	20	10.00	35.00	15.00	15.00	20.00	5.00
3rd Quartile	20	10.00	10.00	40.00	25.00	5.00	10.00
4th Quartile	20	0.00	10.00	15.00	30.00	25.00	20.00
INVESTMENT-GRADE INTERMEDIATE FUNDS							
1st Quartile	42	40.48	28.57	7.14	7.14	7.14	9.52
2nd Quartile	43	23.26	25.58	23.26	4.65	16.28	6.98
3rd Quartile	42	2.38	19.05	26.19	16.67	28.57	7.14
4th Quartile	42	7.14	2.38	16.67	45.24	19.05	9.52
INVESTMENT-GRADE SHORT FUNDS							
1st Quartile	17	41.18	23.53	17.65	17.65	0.00	0.00
2nd Quartile	17	35.29	17.65	17.65	11.76	17.65	0.00
3rd Quartile	16	6.25	12.50	37.50	25.00	18.75	0.00
4th Quartile	17	0.00	23.53	11.76	23.53	29.41	11.76
HIGH YIELD FUNDS							
1st Quartile	37	16.22	21.62	10.81	21.62	16.22	13.51
2nd Quartile	37	27.03	21.62	24.32	10.81	8.11	8.11
3rd Quartile	37	21.62	21.62	21.62	8.11	13.51	13.51
4th Quartile	37	10.81	8.11	18.92	32.43	18.92	10.81

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Sept. 30, 2019. 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.)							
MORTGAGE- BACKED SECURITIES FUNDS	FUND COUNT AT START (SEPTEMBER 2014)	FIVE-YEAR PERCENTAGES AT END					
		1ST QUARTILE (%)	2ND QUARTILE (%)	3TH QUARTILE (%)	4TH QUARTILE (%)	MERGED/ LIQUIDATED (%)	STYLE CHANGED (%)
1st Quartile	11	63.64	9.09	18.18	9.09	0.00	0.00
2nd Quartile	12	8.33	33.33	33.33	16.67	8.33	0.00
3rd Quartile	11	0.00	27.27	9.09	27.27	27.27	9.09
4th Quartile	11	9.09	9.09	18.18	27.27	18.18	18.18
GLOBAL INCOME FUNDS							
1st Quartile	16	31.25	0.00	6.25	18.75	12.50	31.25
2nd Quartile	17	29.41	23.53	17.65	5.88	17.65	5.88
3rd Quartile	16	6.25	37.50	18.75	18.75	12.50	6.25
4th Quartile	16	6.25	6.25	31.25	25.00	25.00	6.25
EMERGING MARKETS DEBT FUNDS							
1st Quartile	4	50.00	25.00	0.00	25.00	0.00	0.00
2nd Quartile	3	0.00	33.33	0.00	33.33	33.33	0.00
3rd Quartile	4	0.00	25.00	50.00	0.00	25.00	0.00
4th Quartile	3	33.33	0.00	0.00	33.33	33.33	0.00
GENERAL MUNICIPAL DEBT FUNDS							
1st Quartile	17	47.06	41.18	5.88	5.88	0.00	0.00
2nd Quartile	17	35.29	17.65	29.41	5.88	5.88	5.88
3rd Quartile	16	0.00	18.75	37.50	18.75	18.75	6.25
4th Quartile	17	0.00	5.88	11.76	52.94	17.65	11.76
CALIFORNIA MUNICIPAL DEBT FUNDS							
1st Quartile	9	44.44	22.22	22.22	11.11	0.00	0.00
2nd Quartile	8	12.50	37.50	25.00	12.50	12.50	0.00
3rd Quartile	9	33.33	11.11	33.33	0.00	22.22	0.00
4th Quartile	8	0.00	12.50	12.50	62.50	12.50	0.00
NEW YORK MUNICIPAL DEBT FUNDS							
1st Quartile	7	57.14	14.29	14.29	14.29	0.00	0.00
2nd Quartile	6	16.67	66.67	16.67	0.00	0.00	0.00
3rd Quartile	7	0.00	14.29	14.29	42.86	28.57	0.00
4th Quartile	6	16.67	0.00	33.33	33.33	16.67	0.00

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Sept. 30, 2019. 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)					
GOVERNMENT LONG FUNDS	FUND COUNT AT START (SEPTEMBER 2014)	FIVE-YEAR PERCENTAGES AT END			
		TOP HALF (%)	BOTTOM HALF (%)	MERGED/LIQUIDATED (%)	STYLE CHANGED (%)
Top Half	27	55.56	11.11	14.81	18.52
Bottom Half	26	0.00	46.15	30.77	23.08
GOVERNMENT INTERMEDIATE FUNDS					
Top Half	11	54.55	9.09	27.27	9.09
Bottom Half	10	20.00	60.00	20.00	0.00
GOVERNMENT SHORT FUNDS					
Top Half	13	69.23	15.38	15.38	0.00
Bottom Half	13	7.69	61.54	15.38	15.38
INVESTMENT-GRADE LONG FUNDS					
Top Half	40	60.00	20.00	10.00	10.00
Bottom Half	40	15.00	55.00	15.00	15.00
INVESTMENT-GRADE INTERMEDIATE FUNDS					
Top Half	85	58.82	21.18	11.76	8.24
Bottom Half	84	15.48	52.38	23.81	8.33
INVESTMENT-GRADE SHORT FUNDS					
Top Half	34	58.82	32.35	8.82	0.00
Bottom Half	33	21.21	48.48	24.24	6.06
HIGH YIELD FUNDS					
Top Half	74	43.24	33.78	12.16	10.81
Bottom Half	74	31.08	40.54	16.22	12.16
MORTGAGE-BACKED SECURITIES FUNDS					
Top Half	23	56.52	39.13	4.35	0.00
Bottom Half	22	22.73	40.91	22.73	13.64
GLOBAL INCOME FUNDS					
Top Half	33	42.42	24.24	15.15	18.18
Bottom Half	32	28.12	46.88	18.75	6.25
EMERGING MARKETS DEBT FUNDS					
Top Half	7	57.14	28.57	14.29	0.00
Bottom Half	7	28.57	42.86	28.57	0.00
GENERAL MUNICIPAL DEBT FUNDS					
Top Half	34	70.59	23.53	2.94	2.94
Bottom Half	33	12.12	60.61	18.18	9.09
CALIFORNIA MUNICIPAL DEBT FUNDS					
Top Half	17	58.82	35.29	5.88	0.00
Bottom Half	17	29.41	52.94	17.65	0.00
NEW YORK MUNICIPAL DEBT FUNDS					
Top Half	13	76.92	23.08	0.00	0.00
Bottom Half	13	15.38	61.54	23.08	0.00

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Sept. 30, 2019. Table is provided for illustrative purposes. Past performance is no guarantee of future results.

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